

# ABSTRACT BOOK



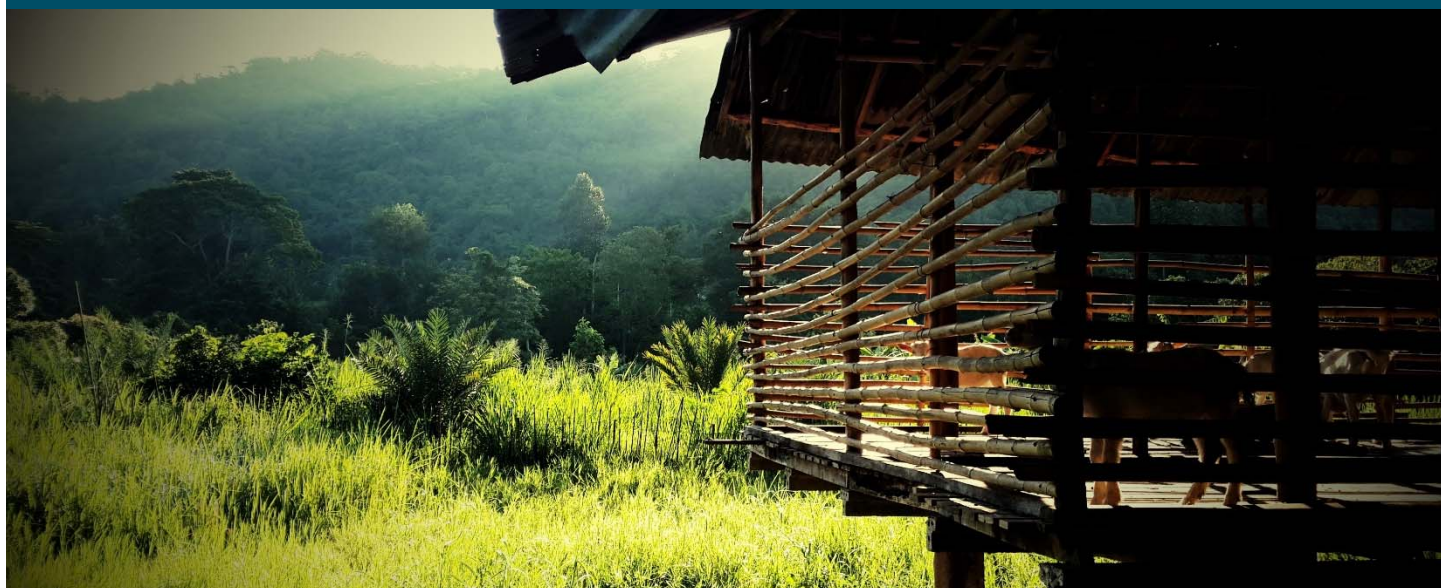
5<sup>th</sup>

# SAADC 2015

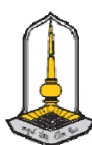
The 5<sup>th</sup> International Conference on  
**Sustainable Animal Agriculture for Developing Countries**

**“CLIMATE SMART SUSTAINABLE ANIMAL AGRICULTURE FOR FOOD SECURITY  
AND LIVELIHOOD IMPROVEMENT IN THE DEVELOPING COUNTRIES”**

October 27-30, 2015, Dusit Thani Pattaya Hotel, THAILAND



Jointly organized by



**ABSTRACT BOOK**  
*of*  
***The 5<sup>th</sup> International Conference on***  
**Sustainable Animal Agriculture for Developing Countries**  
**(SAADC 2015)**  
**October 27-30, 2015**  
**Dusit Thani Pattaya Hotel, Thailand**

**Jointly Organized by:**



Faculty of Sciences and Liberal Arts, Rajamangala University of Technology Isan



Institute of Agricultural Technology, Suranaree University of Technology



Faculty of Technology, Mahasarakham University



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Tropical Feed Resources Research and Development Center (TROFREC)



Department of Livestock Development  
Thailand



The Animal Husbandry Association of Thailand under the Royal Patronage of  
H.R.H. Princess Maha Chakri Sirindhorn

## ***Message from the President of RMUTI***

**Dear Participants,**

It is my great honor to welcome all of participants to attend the 5<sup>th</sup> Sustainable Animal Agriculture for Developing Countries (SAADC) conference which held at the Dusit Pattaya Hotel, Chonburi, Thailand during 27-30 October 2015. It is also 10 years Anniversary of Rajamangala University of Technology Isan (RMUTI), which established depending on Rajamangala University of Technology Act B.E. 2548 (2005). On behalf of RMUTI, I would like to welcome about 350 participants from 40 countries to participate at the conference. The principal objective of SAADC is to provide a venue for animal scientist, agriculturist, farmers and private sectors to build up the relationship and to exchange their experiences.



The 5<sup>th</sup> SAADC 2015 is organized by seven institutes such as Rajamangala University of Technology Isan (RMUTI); Suranaree University of Technology (SUT); Mahasarakham University (MSU); Silpakorn University (SPU); Mahanakorn University of Technology (MUT); Nakhon Ratchasima Rajabhat University (NRRU) and Udon Thani Rajabhat University (UDRU).

All sponsors are highly appreciated to make the conference more successful. Last but not least, all partners who contributed to this conference are deeply thanks without your fully supports this conference would never be accomplished.

With best wishes,

A handwritten signature in black ink, appearing to be 'V. Limkaisang', written in a cursive style.

**Assistant Professor Dr. Viroj Limkaisang**

President of RMUTI

27 October 2015

## ***Message from President SAADC International Advisory Committee***

**Ladies and Gentlemen,**

First and foremost, I would like to thank the Organising Committee of the 5<sup>th</sup> International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC2015) for inviting me to pen a few words in this Souvenir Programme.



I would like to take this opportunity to share with you, especially those who are attending the SAADC series of conferences for the first time that SAADC has grown steadily since the inaugural SAADC2007 organised by Yunnan Agricultural University in Kunming, China. The numbers of participants and countries involved have increased from less than 200 from seven countries in the inaugural conference to more than 300 from 40 countries in this conference. This reflects the relevance of SAADC in providing a platform for animal scientists and producers especially from the developing countries to share experience and network to promote sustainable animal agriculture in our respective countries.

This week we are here again to present our research findings and ideas for promotion of sustainable animal agriculture. I congratulate the Organising Committee for their hard work throughout the last two years to make it possible for us to meet in one of the world renowned beach resorts in Thailand. I would like to thank members of the SAADC2015 International Advisory Committee and the SAADC2015 in-house editors for their input and hard work to support the local organising committee of this conference. Special thank goes to Dr Chris Anderson of the CSIRO Publishing for his help to create the SAADC2015 special issue in the journal of *Animal Production Science* for publication of selected papers presented by the participants of this conference.

Most of all, I thank each and every one of you for your participation in making this conference a great success. I would like to encourage all participants, particularly the younger ones to take this opportunity to make new friends and to create new opportunities to foster cooperation towards promotion and enhancement of sustainable animal agriculture in our respective countries.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Juan Boo Liang'.

**Professor Dr. Juan Boo Liang**

President  
SAADC2015 International Advisory Committee  
27 October 2015

## *Message from the Chairman of the 5<sup>th</sup> SAADC Conference*

On behalf of Rajamangala University of Technology Isan (RMUTI), I would like to express my deeply thanks to the SAADC International Advisory Board (IAB) for their agreement to permit RMUTI to organize the 5<sup>th</sup> SAADC conference together with our co-hosts institutes, these are Suranaree University of Technology (SUT), Mahasarakham University (MSU), Silpakorn University (SPU), Mahanakorn University of Technology (MUT), Nakhon Ratchasima Rajabhat University (NRRU) and Udontani Rajabhat University (UDRU).



The 5<sup>th</sup> SAADC 2015 consists of scientific session, private sector demonstration, social and cultural activities. The scientific session offers plenary session, invited session, symposium and graduate course. The symposium is an entitled on “Understanding of Biological Product: The role for sustainable Animal Production” by Associate Professor Dr. Kriengsak Poonsuk (K.M.P. BIOTECH CO., LTD). The workshop is an established on “Publishing Your Research Findings in International Journals” by Dr. Thomas J. Schonewille (Utrecht University, The Netherlands). The cultural activities are Thai regional dancing (Fon Ram) with the contributing of Rajamanagala University of Technology Tawan-ook. Field trips are based on two routes: Route I is a “Dairy Buffalo Farm: Runjaun Farm” and Route II is a tropical garden so called “Saun Nongnooch”.

I would like to express my sincerely thanks for the keynote, plenary, invited speakers and participants who had been fully supported to make the conference more success and fruitful.

I deeply appreciate to the International Advisory Board (IAB) and the local organizing committee for their great effort and dedication to make the proceeding in time.

Last but not least, I would like to sincerely thanks to President of RMUTI for his fully supports to make this conference successful.

Wish best wishes.

A handwritten signature in blue ink, consisting of stylized, overlapping loops and lines.

**Assistant Professor Dr. Chalermpon Yuangklang**

Chairman of the 5<sup>th</sup> SAADC 2015

Dusit Thani Hotel, Pattaya, Chonburi, THAILAND



## *Message from Academic Committee Chairman*

As the host of the 5<sup>th</sup> International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC2015), Rajamangala University of Technology Isan do realize the significance of research, innovation and application in terms of international development of economics and society. The SAADC 2015 conference has its objectives to provide a chance for researchers in field of animal science, agriculture and related fields including academicians, researchers, administrators and private sectors both in developing and developed countries to share their own experiences, to develop collaborative networks among institutions and to strengthen research quality of staff and students for sustainable animal agriculture production.



From the number of oral and poster presentations submitted in this conference in Pattaya, I do impress your participation and have confidence that you all are the scientists with very great enthusiasm to solve problems as well as to share valuable information and knowledge for people prosperity.

I would like to particularly thank all guest speakers and participants who make this conference such a valuable collaborative and successful forum. My sincere thanks go to our co-organizing committee form Suranaree University of Technology, Nakhon Ratchasima Rajabhat University, Mahasarakham University, Mahanakorn University of Technology, Silpakorn University, and Udon Thani Rajabhat University. Special thanks to the scientific committee, reviewers and editorial boards for their great contribution to make the conference successfully organized.

I believe all delegates will benefit substantially from the conference through the presentations of expert speakers and exchanges of ideas with one another. I wish you all have most pleasant and most wonderful time in the conference in Pattaya, Thailand and a safe journey home.

A handwritten signature in blue ink, which appears to read 'Kraisit Vasupen'.

**Assistant Professor Dr. Kraisit Vasupen**

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**SAADC2015. 2015. The 5<sup>th</sup> International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC2015): Abstract Book. 340 pages.**

First Edition: 500 books

ISBN 978-974-625-711-4

Year 2015

LERTSIL PRINTING

336 Suranaree Rd, Nai Mueang, Mueang Nakhon Ratchasima, Nakhon Ratchasima 30000

Published by Rajamangala University of Technology Isan

The individual contributions in this publication and any liabilities arising from them remain the responsibility of the authors.

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## **Sustainable agriculture in developing countries during the past four decades and future approach**

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### **Abstract**

Due to the adverse effects of some farming practices, especially the use of chemical inputs, sustainable agriculture with the aim of maintaining the quality of the environment and conserving natural resources has been internationally accepted as the alternative to the conventional agricultural production. It is now worthwhile to look at the sustainable agriculture in retrospect among the developing countries in Asia.

It has been noted that globalization and free trade clearly created serious negative impacts on the small farmers who produced most agricultural products in developing countries, such as rice and other crops and livestock, through mixed small farm systems. These negative impacts imposed adverse effects including economic aspects such as increased farm debt and loss of land tenure, social aspects such as increased materialistic wants and greed, impacts on natural resources and environment, as well as long-term national stability and security. Consequently these adverse conditions appeared to be unfavorable for the promotion of sustainable agricultural production.

As for future hope, this paper highlights some approaches which are conducive or favorable to the development of sustainable agriculture; these are the philosophy of sufficiency economy based on the aim for the Middle Path in national development goal, value-added innovation based on processing of agricultural raw materials, and strengthening and empowering of rural community. Detailed discussion has been presented.

*Keywords: sustainable agriculture, sustainable development, sufficiency economy, value-added innovation*

## **Taurus: A ration balancing software to improve sustainability of beef production**

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### **Abstract**

One of the main constraints to higher productivity under small-holder mixed crop-livestock farming systems is related to nutrition and appropriate diet formulation. In several tropical and semi-tropical countries, use of higher genetic potential animals is promoted to improve animal productivity. However, without supplying the requirement of these animals the potential for higher production cannot be realized and imported genetics are underutilized. Therefore, in the short term models that quantify nutrient requirement of tropical livestock and supply from available resources are urgently needed. A software, *Taurus*, has been developed using C++ computer language and linear programming as a decision support system to help extension agents and producers in formulating diets that optimizes productivity and minimizes cost of production. Several equations used within the software that calculate the requirements of energy, protein, macro and micro minerals and vitamins based on animal breed, sex and frame are described. In addition, due to growing environmental concern, equations to calculate enteric methane emissions are also provided. The software allows users to access the output in three sections that describe the animal performance, cost-benefit analysis and environmental indicators. *Taurus* has a flexible design that allows translation into languages other than English. Development of a Vietnamese version, *Taurus VN* is described. Software that provides information on locally available feed sources and written in a local language enhances its adoption and wide-spread use among the target population, promoting increases in productivity and alleviation of poverty in small-holder mixed crop-livestock farming systems.

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## Greenhouse gas mitigation: on-farm feed development and utilization in the developing countries

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### Abstract

Livestock productions are important to the livelihood of the farmers engaged in the integrated livestock-crop production systems. Quantity and quality of feed resources as well as feeding systems can greatly impact on the production efficiency and environment. Feed resources locally available are numerous and can be used to improve rumen fermentation, subsequent production as well as to maintain a friendly environment. Global warming has been attributed by various sources including animal agriculture. Rumen fermentation can be manipulated by many ways in order to increase fermentation efficiency and to mitigate methane production. Although the world buffalo population has been slightly increasing, their vital role are accountable for the demand of meat and milk. Manipulation of the rumen in reducing methane using chemicals, feed additives, roughage and concentrate utilization, use of plants containing secondary compound, oils have been reported. However, among many approaches, nutritional manipulation by using feeding management and especially the use of plant extracts or plant containing secondary compounds (condensed tannins and saponins, and plant oil) have been receiving more attention and most promising. To mitigate enteric methane production is to trap rumen hydrogen for producing energetic fermentation end-productions such as propionic acid used for ruminant production in terms of meat, milk, and wool. Possible strategies implemented by farmers should be through feeding supplements capable of Establishing (E), Development (D), Utilizing (U), and Sustaining (S) the whole ruminant production system. Hence, implementation of the food-feed-system (FFS) using leguminous crops, fodder tree/shrub planted on farms as integrated livestock-crop production system is highly encouraged and recommended in sub-tropical and tropical livestock farming system. At the current stage, more research concerning this hot issue with the role of livestock on global warming warrants further research undertakings

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## **Transforming research into commercialization**

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### **Abstract**

One of the grand goals of any high impact of research and development is for an overall improvement of well-being and sustainable quality of life through innovations. As universities continuously churn out innovations from immense R&D activities, many prototypes and lab-scale products, whether tangible and intangible, can be made available for public use. The success of bringing these innovations to the marketplace is depending on the quality and capability of technology transfer office to lead different types of activities, engagements, negotiation and inclusiveness towards fulfilling the needs of commercialisation partners and the market. This paper presented a general overview on transforming research output into commercialisation in the context of Malaysian universities. Different commercialization channels, key players, drivers and the roles of multiple agencies are further discussed with special focus given to agricultural innovations and technologies.

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**The impact of extension programs to increase the productivity of the small-holder dairy farming industry of Pakistan**

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**Abstract**

Dairy farming operations with small animal numbers producing low volumes of around three litres per animal per day predominate in Pakistan's dairy industry. Although much of this is consumed domestically, many farmers sell small volumes into traditional milk marketing chains which feed the product into urban retail outlets. Analysis of these marketing chains show that these farmers make a loss on every litre sold, while at the other end milk available to the consumer is of poor quality and often diluted as much as 1:2 with water. Small incremental profit margins are achieved by dilution and the use of distorted volume measures as the product is passed from small dealers to larger distributors and then to retail outlets. It is important that farmers are able to improve the efficiency of production by boosting the productivity of animals. This can be achieved through the adoption of better nutrition and animal husbandry practices. At the same time small scale local marketing chains require refinement to ensure profits generated from milk production stay with local communities. This paper reports on the development of effective extension strategies involving the whole family including the farmer, his wife and children. They have led to significant improvements in the profitability of small-holder dairy farming and a growing awareness of farmers of the commercial potential for their household cows and buffalo. The sustainability of these small-holder production systems in the face of changing consumer demands for higher quality products and world dairy product trade remains to be seen.

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**A simple concentrate feeding to lactating cows for small-holder farmers  
so-called 123.**

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**Abstract**

Dairy production in Thailand has been formally established since 1962, but the development of dairy performance is increase in a slow rate. Two keys factors that make a success in dairy production are milk yield (>15 kg/h/d) and numbers of lactating cows (>40 percentage of herds). Many aspects have to be focused to increase both milk yield and conception rate of dairy herds. Feeding is one of strategies has to be considered to improve milk yield of dairy lactating cows. Dry matter intake, energy and protein intakes are to be taken into accounts. In Thailand, roughage source used for dairy cows is based on agricultural by-products particularly rice straw. Rice straw is widely used as main roughage source due to easily to access and cheapest prices as compared to other roughage sources. Due to low protein and high fiber contents, rice straw could not provide enough nutrients to meet not only maintenance requirement but also production requirement. Thus concentrate has to be fed to animals to meet their requirement. Currently, most of dairy farmers fed concentrate to lactating cows according to the ratio of concentrate to milk yield as 1 to 2. Based on calculation, I propose a simple concentrate feeding to lactating cows so-called 123. The first two numbers mean an amount of concentrate according to concentrate to milk yield ratio at 1 to 2. The last number means an amount of extra concentrate added to animal. Thus, the amount of concentrate for lactating cows producing 15 kg/d is 10.5 kg/d. Details of concentrate feeding for lactating cows so-called 123 are discussed.

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## **Is small animal farming system of low technology?**

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### **Abstract**

We cannot ask the farmers stay as its origin. This kind of thinking is very cruel and not realistic. Why a professor, a politician, or a businessman can have good life and income, why farmers cannot improve their living standards? Why farmers should only use traditional ways to live but professor, politician and businessman can live on the modern life? The purpose of the paper tries to discuss how to improve farmer's life but still can have eco-balance farms. Here will discuss the topic from 6 areas: animal breeding, animal management, nutrition, business management, waste management and training. All these areas need to use modern technology and knowledge to help improve production and income for farmers.

*Keywords: small animal farming system, technology.*

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## Developing zero-discharge pig farming system – a feasibility study in Malaysia

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### Abstract

Pig production in many rapidly developing Asian countries evolved from traditional small family farms without parallel increase in land resource for waste treatment thus further worsened the already fragile environment. This paper reports result of a feasibility study on developing a zero-waste discharge pig farming system in the hot-humid environment such as Malaysia. The approach includes (i) reduction in the usage of water, (ii) use of chlorella culture technology to reduce pollutants in the wastewater and (iii) use of artificial wetland to further cleaning up the wastewater and to reduce the volume via evapo-transpiration. Results of the study showed that water usage could be reduced from the current 40-50 to 7.5 L/pig/day. The biological oxygen demand (BOD) of the effluent was reduced to below 10 mg/L while other pollutants, such as suspended solid (SS), total nitrogen (T-N) total ammonium nitrogen (NH<sub>4</sub><sup>+</sup>-N) were also reduced to the levels which meet the standards required for affluent discharge in most countries in this region. Water balance study based on a 200-pig house showed that 1.15 m<sup>3</sup> of water were used daily and this was reduced to 0.38 m<sup>3</sup> at the end of the system. Financial projection study based on a farm size of 2,000 pigs showed that the primary challenge to the adoption of this system is its high initial investment costs, estimated to be 1.8 times of that for a similar size traditional farm with open-sided house and lagoons for wastewater treatment. However, higher productivity is expected from the use of ventilated close-house and together with the premium price of the pigs which could be fetched from this eco-friendly production system would make it an economically viable system in the long run.

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## **Effects of climate change on Thai indigenous chicken**

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### **Abstract**

The good climate-adapted breeds are increasingly needed in livestock production. The breeding objectives required an improvement adaptive trait essential to climate change. The heat tolerance, disease resistance, ability to succeed in poor-quality feed resources, needed to be considered. Thai indigenous chickens were distributed in various environments, which make them have high adaptation to climate changes causing from global warming, feed resources, tropical diseases, etc. and ability to cope with heat tolerance is the most prevailing.

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## **Value added technology for cattle hide quality improvement in sustainable animal production**

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### **Abstract**

Because of the low quality of local hides in Thailand as in other developing country, the end users in the industrial sector have long experienced major difficulties. They operate without having the ways and means to deal with the existing problems of defects that originate from different sources in other segments of the industry. This paper mainly reviews research findings in Thailand involving in cattle hide quality improvement through traceability by use of an integrated approach. The approach used a hide cluster model to facilitate operational research and development, that aimed to introduce new and promising technologies for improved hide salting, to study some key physical indicators of desirable cattle hides, to identify the types and severity of damages that occur on hides and to trace these to the original sources of the problems and to develop a quality standard for Kamphaeng Saen (KPS) hides. With a common aim in improving hide quality of Kasetsart University (KU), the KU Beef Cooperative Ltd. and the Thai Leather Cluster, a hide cluster model was initiated to form a transaction chain of all operators from upstream to downstream. An Industrial-pattern hide was subjected to use in this research. A prototype stainless drum with a capacity of 3 tons was introduced for operational research use. The drum was tested at a full and a low work load for its accurate processing system and control settings as well as economic use prior to other drum salting experiments. Outputs at a full work load were advantageous over those at a low work load in terms of less weight loss from green hides to salted hide, and less contraction in size of the hides and lower cost of hide salting per kilogram of green hide.

The key indicators of industrial-pattern hides from KPS cattle chosen to study were weight and size of the hide, salinity and moisture content of hides because of their importance in the hide industry and in a hide transaction chain. Research in this area indicated that the weight reduction from the whole hide to the industrial-pattern hide was about 15% and the trimmed industrial-pattern hide on average was about 7% of the live animal slaughter weight. The weight and size of KPS hides in relation to the premium price for slaughter weight range of feedlot steers (550 to 600 kg), the specification for “KPS Hide Grade I”, has been proposed as having a green hide weight of 40 kg upwards with the industrial-pattern size being 200 cm upwards for both width and length; and the drum salted hide (after 2-hour ambient drying) a weight of 35 kg upwards with the size for both width and length being 180 cm upwards after salting. The assessment of the hide salinity in terms of relative values and the estimation of hide moisture content were created by use of methodological and instrumentation developed and applied during the process of the operational research. The specification for a good quality of salted hide without any risk due to rot was proposed as a relative value of 55% upwards for salinity from the 1-hour hide solution obtained by placing a hide specimen in distilled water in the proportion of 1:2 (w/w). To ensure bacterial control while retaining sufficient elasticity of the salted hides, the moisture content for high quality hide was determined to best be in the range of 21 to 29%; it

was proposed that the median value of 25% be specified as a criterion for the quality standard to guide the setting of a purchase price for a salted hide.

With the emphasis on the methodology and scientific information for improving the quality of cattle hides through tracing back to the origin of problems in the transaction chain, visual assessment of hide defects as well as identification of their primary causes was carried out on both green hides and wet-blue leathers. The defects most readily seen on green hides were knife defects from manual flaying, brand marks and dirty stains from farm management. Additional defects found on wet-blue leathers were those due to insect and parasite marks, open scratches, scars, brand marks, deeper corrosion from manure and urine arising under farm management and transportation, some less noticeable knife defects introduced during manual flaying and rots from inadequate hide salting. The defects found on specific positional areas of green hides were analyzed in terms of the percentage area affected. A scoring system for visual assessment of types of damage observed on wet-blue leathers was established with three classes of damage and six levels of scores from 0 to 5, with the description of each defect score for hide grading. According to the descriptive analysis, the quality standard for the green hide was classified into 4 grades, each with descriptions based on visual assessment of defects and their origins. In terms of the quality standard for raw hide based on the visual assessment of defects on wet-blue leathers, hides can be assigned to one of 3 grades, each grade having a full description based on all defects of hides and of defects from individual primary causes.

Further recommendations that enable progress from setting the quality standard to achieving quality assurance are proposed. It is clear that quality assurance in the hide industry depends upon all operators in the transaction chain.

*Keywords: Kamphaeng Saen hide cluster, hide salting technology, hide physical indicators, hide defects, hide quality*

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**Human behaviours as determinants of animal disease: meeting the challenge of a complex mix of changing production systems**

*Peter Daniels*

**Abstract**

There are encouraging signs that the next wave of specialists and professionals who will become deeply and essentially involved in the matrix of human endeavor we call animal agriculture are the sociologists, the social anthropologists, the behavioural scientists. We should welcome these people with their important skills. We increasingly see our production and marketing systems in the context of “value chains”. As animal science specialists we are used to helping the farmers, but the consumer of the end product, the public, is an equally important part of the matrix.

Animal production is more than genetics and breeding, nutrition and reproduction, more than animal health, and even more than economics. Producing our food is a part of human endeavor that the whole of society should understand and support. How often do we see narrowly defined single issues capturing the attention of the public from time to time, things like welfare, environmental impact, antibiotic resistance, fear of pandemic disease? We need the role of animal production broadly and comprehensively embedded in the understanding that the public has in its view of the world, its place on the planet. From such a base of broad understanding and acceptance single issues can be worked through and not become flash points of antagonism and conflict between the public and the animal industries that serve their basic needs.

Such considerations are mission critical for food security, and are captured in the growing understanding of the inter-relatedness of people, wildlife, farming and the environment that is now referred to by some as “One Health”. The inter-relatedness of all things is not a new concept, but we still need help so that the public thinks of animal agriculture as part of their world, and not just a source of occasional threats and concerns.

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## **Oxidant/antioxidants balance in female reproduction**

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### **Abstract**

Since reproductive and developmental processes accompany dynamic changes in metabolism and energy consumption, by-products are generated on an extraordinary scale. Among such by products, free radicals (oxidants) are inevitably generated during the physiological process of oxygen consumption. As the ovary is a metabolically active organ, it generates oxidants. Growing follicles, granulosa cells of Graafian follicles and ovulated follicles all produce both enzymatic and non-enzymatic antioxidants to preserve themselves from the oxidative damage of oxidants. Oxidants and antioxidants are involved in several reproductive functions such as the regulation of follicular fluid environment, folliculogenesis, steroidogenesis, corpus luteum function, and luteolysis. However, overproduction of oxidants or over-depletion of antioxidants may cause oxidative stress which can lead to a number of reproductive diseases such as endometriosis, polycystic ovary syndrome, and unexplained infertility. Pregnancy complications such as spontaneous abortion, recurrent pregnancy loss, and preeclampsia, can also develop in response to OS. In this article the currently available literature is reviewed in relation to the roles of reactive species and OS in both normal and abnormal reproductive physiological processes.

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## Challenges for sustainability of beef cattle production in Thailand

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### Abstract

Thailand is a tropical country in Southeast Asia that generally has high temperature and high humidity. Climate changes directly and indirectly affect efficiency of beef cattle production. Changes in economic also affect opportunity and potential of beef cattle production. To identify the situation and challenges to sustain supplying ability and security of beef production in Thailand, the information gathered from 501 beef producers, 7 cooperatives, 6 companies, 7 universities, 1 association, and 4 government organizations through interview and discussion during the period from January 2015 to May 2015 were analyzed. The results indicated that 1,252,000 cattle were slaughtered in Thailand (2014), only 1% of them were sold for the premium market that consider high marbling beef, 40% of them were sold for the modern market that consider red beef, and the rest (59% of them) were sold for the traditional market. Forecasting indicated the decrease of slaughtering cattle from 1,252,000 cattle in 2014 to be 626,408 cattle in 2018, and it would be similar if the number of cows in the cow-calf production is kept at least 80% every year. Cattle in the premium and modern markets were crossbreds and intensively raised by members of beef cooperatives or business producers, while those cattle in the traditional market were native or crossbreds and traditionally raised by small holders. To sustain beef cattle production from the current situations, number of cow-calf production and fattening cattle need to be increased, knowledge and motivations of the farmers need to be improved, networks among groups of farmers or cooperatives should be developed, the appropriate laws and regulations need to be updated, and appropriate technology should be used to create chances in the business competition. These tasks need participation from all people related beef cattle production.

*Keywords: cattle, sustainability, production, tropics*

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## Co-cultivation of Caprine arthritis encephalitis virus infected macrophage with primary goat synovial cells<sup>1</sup>

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### Abstract

Caprine arthritis encephalitis virus (CAEV) has been indicated as an important contagious disease of small ruminants because of its long-term impact on the economic losses. The CAEV is a small ruminant lentivirus that could induce persistent infection associated with chronic debilitating syndrome in sheep and goats. Infection in young animals results in encephalitis and interstitial pneumonia, while in adult animals, mastitis and arthritis are predominant. The study of CAEV infection in Thailand has mainly focused on seroprevalence survey and risk factors investigation. The evidence of viral isolation and cultivation had not yet been reported because of the limitation of appropriate cultivating cell types. Primary goat synovial cells, one of the most suitable cultivating cell types, have been developed and employed in this present research. Two CAEV-seropositive and one CAEV-seronegative goats from a dairy goat farm were identified for the presence of viral particles using PCR technique. Heparinized blood samples from the three goats were collected and were isolated for monocytes. Thereafter, the isolated monocytes were cultivated to differentiate into macrophages. Seven to ten days-old cultivated macrophages were co-cultivated with the primary goat synovial cells for 7 days. Microscopic examination was performed every 2 days for multinucleated syncytial formation, and immunofluorescence assay was applied using monoclonal antibody against CAEV on day 7 to detect viral particles in primary goat synovial cells. Results showed that the primary goat synovial cells cultivated with macrophages from the two seropositive goats had multinucleated syncytial formation and positive immunofluorescence, while the co-cultured cells from the seronegative goats showed normal appearance with negative immunofluorescence. Then heparinized blood samples were collected from 10 clinical seropositive goats from four dairy goat farms in Ratchaburi province and one dairy goat farm in Bangkok for further testing of our primary goat synovial cells and the cultivating system. All primary synovial cells which were co-cultivated with CAEV-infected macrophages from clinical goats showed multinucleated syncytial formation and were positive to immunofluorescence as well. In conclusion, our developed primary goat synovial cells and the cultivating system were proven to be an appropriate cultivation and isolation assay for CAEV. This attempt was the first report of cultivation and isolation of CAEV virus in goats in Thailand.

*Keywords: caprine arthritis encephalitis virus, co-cultivation, goat, macrophage*

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<sup>1</sup>This work was partially supported by the Center for Advanced Studies for Agriculture and Food, Institute for Advanced Studies, Kasetsart University Under the Higher Education Research Promotion and National Research University Project of Thailand, Office of the Higher Education Commission, Ministry of Education, Thailand

## Two types of grazing system under tropical pasture in South western islands of Japan

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### Abstract

In south-western sub-tropical area in Japan, grazing is often carried out for cattle for breeding, however, cattle for fattening is usually raised mainly by imported concentrates in house pen. In this study, two trial experiments were conducted for grazed breeding cattle with increased carrying capacity and grazed fattening cattle without imported concentrates on south-western sub-tropical pasture.

Firstly, grazing experiment was conducted by Japanese Black cattle for breeding on giant stargrass pasture. Cattle were raised by year-round grazing. Calves are grazed from delivery to several months on the pasture. High pasture availability and good quality forage to bring about an effective animal production were produced by using relatively heavy stocking rates of 6 - 8 heads/ha, and achieved the optimum pasture utilization of giant stargrass. It is not enough known, however, an effective year-round grazing system under giant stargrass pasture, and also methods of pasture management corresponding to low pasture production in winter (Average temperature about 22°C, 5 months). Pasture utilization and daily dry matter intake on pasture oversown with ryegrass were higher than pure giant stargrass during winter. Average pasture availability and utilization at heavy stocking rate was higher than at light stocking rate even in winter.

Secondly, grazing experiment was conducted by Japanese Brown cattle for fattening on giant stargrass (Gs) pasture with some complementary feed. Cattle were raised from 10 months age at about 300 to 27 months age at 650 kg or more under rotational grazing system and then planted to ship. Fattening cattle on the tropical pasture was confirmed under the increased self-sufficient feed ratio and the relative low production cost as comparing with a general fattening method of our country.

*Keywords: cattle for breeding, cattle for fattening, carrying capacity, grazing pasture, pasture management*

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## **Family poultry farming system and their characteristics in developing countries**

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### **Abstract**

Family farming includes all family-based agricultural activities, and it is linked to several areas of rural development. It is the predominant form of agriculture in the food production sector in both developing and developed countries. The term “Family poultry” used to describe the full variety of small-scale poultry production systems that are found in rural, urban and peri-urban areas of developing countries. Whereas, the term “Poultry farming” refers to the raising of domesticated birds such as chickens, turkeys, ducks, and geese for the purpose of farming meat or eggs for food. Poultry are farmed in great numbers with chickens being the most numerous around the world. Chickens raised for eggs are usually called layers while chickens raised for meat are often called broilers. Chickens are also the most frequently commercialized of all these birds. Family poultry farming makes a significant contribution to poverty alleviation, food security, HIV/AIDS mitigation, empowerment of women and wildlife conservation in many countries. In most developing countries, indigenous poultry genotypes constitute up to 80 percent of the poultry populations that are kept in villages. The birds largely subsist on scavenging in gardens, village alleys and surroundings of the farms by feeding on crop residues, insects, worms and green forage. While for the poor members of society this system provides a subsidiary income, the present dimensions of traditional backyard poultry production have changed drastically and crossed the boundaries of the economically weaker sectors.

*Keywords: Family poultry farming system, Developing countries*

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**A strategy for improvement of protein and energy utilization in broiler chicken: using concept of low-protein diets and compensatory growth**

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**Abstract**

Feeding low-protein diets clearly reduces feed costs and improves protein efficiency, whilst increasing fat accumulation and decreasing the growth performance of broiler chickens. Although the negative effects of using a low-protein diet can be prevented by adding supplementary synthetic amino acids, inconsistencies of improvement of growth performance have been observed. In light of the fact that many studies have reported improvements in feed efficiency during compensatory growth in restricted-refed broilers, the concept of feeding a low-protein diet with amino acids supplementation during the starter-grower period merits investigation along with associated compensatory responses in order to address the inconsistent effects of such a diet. Recently, we suggested that reducing the protein concentration with amino acids balance during starter-growing period, then re-feeding with a conventional or low-energy diet is an appropriated tool for improving overall protein utilization, reducing fat accumulation and slightly reducing the production cost.

*Keywords: Protein, Energy, Utilization, Compensatory, Chickens*

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## **Inhibition of FASN suppress triglyceride synthesis via the control of malonyl-CoA in goat mammary epithelial cells**

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### **Abstract**

Fatty acid synthase (FASN) is the key enzyme for de novo fatty acid synthesis from acetyl-CoA and malonyl-CoA. Its role on triglyceride accumulation has been established in monogastrics. However, there are no data on the mechanism of how FASN affects lipid metabolism in ruminants. Inhibition of FASN in goat mammary epithelial cells by C75-, a synthetic inhibitor of FASN activity, and shRNA markedly suppressed the accumulation of triglyceride in goat mammary epithelial cells (GMECs). Meanwhile, C75 treatment significantly reduced the relative content of monounsaturated fatty acids (C16:1 and C18:1). Corresponding to the suppression of lipid accumulation, both of C75 and shRNA also decreased the mRNA expression of GPAM, AGPAT6 and DGAT2, all of which are related to triglyceride synthesis. The fact that treatment of malonyl-CoA decreased the expression of these genes is consistent with the results of shRNA treatment. Furthermore, the supplementary of malonyl-CoA enhanced the suppression on GPAM, AGPAT6, LPIN1, DGAT1 and DGAT2. The results underscore the role of malonyl-CoA in inhibition of FASN in regulating triglyceride synthesis in GMECs.

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## The role of saponin as feed additive for sustainable poultry production

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### Abstract

Poultry especially broiler is an important protein source for many people in developing countries in Asia. Under intensive condition, economic and efficient broiler production is affected by disease challenges as many broilers are raised under un-hygienic condition therefore feed additives (coccidiostat and antibiotic growth promoter-AGP) have been added to feed to prevent the associated disease. Starting from Europe that banned AGP in 2006, many other countries perform review on the use of AGP and seek possible alternatives to replace AGP in the diet. One of possible replacements of AGP is natural substance found in plant that may have function to replace AGP and or improve poultry production. One of the substances is saponin found in certain plants. Saponin is a glycosidic compound which can produce foam in water. It gives several advantages for poultry production. *Sapindus rarak*'s fruit pericarp (SRF) is one of the plants that contain high saponin level. *Sapindus rarak*'s fruit pericarp destroyed the sporocytes inside the wall of oocytes of *Eimeria tenella* in the *in vitro* trial. Chicken infected by *E. tenella* through drinking water showed less oocytes shed per gram faeces when fed with SRF. The mechanism of saponin in inhibiting *E. tenella* oocytes may be different from that depress protozoa population in the rumen. Saponin or saponin containing plants decreased total cholesterol and LDL in the blood in a dose dependent manner. Other research report showed that saponin increased fecal cholesterol. Saponin is reported to act as immunostimulant when used as adjuvant in several vaccines. These results confirmed that saponin is potential to be used as natural anticoccidia, immunostimulant, antifungi, antibacteria for chicken production and a cholesterol reducer in chicken meat products. Further research is warranted if saponin can be used as feed additive in commercial scale and provides economic benefit to poultry production.

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## **Incorporation of environmental impacts for evaluating animal production systems**

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### **Abstract**

The impacts of animal production on the environment have received a great deal of attention recently in both developed and developing countries. In this study, we demonstrate two procedures for incorporating environmental impacts into animal production through respective examples. The first procedure was a simplified least-cost diet-optimization method that was extended to reduce both feed cost and nitrogen excretion by introducing the weighted excesses (penalty coefficient) of nitrogen in each diet ingredient in the objective function of a conventional linear program. The second was a way to quantify nitrogen flow and use efficiency and cycling in integration systems (crop-animal mixed farming systems) at the farm level. The two procedures may be robust tools that could be used to assess the trade-off between production efficiency and potential environmental impacts in various animal production systems.

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**Measurement the quality of inorganic feed grade phosphorus for livestock and poultry**

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**Abstract**

Phosphorus is the second most abundant vital element in the animal nutrition. In recent years, new forms of many feed phosphates have been entered which contain little information about their exact chemical structure or nutritional value. High quality feed phosphates are predictable in their phosphorus content and availability to the animal. Practically all phosphates are derived from rock phosphate which cannot be used directly for animal feed because it is not absorbed by the animal and contain a high degree of fluorine, cadmium, arsenic, lead and mercury which can be harmful to the animal and to the consumers. This paper provides a straight forward test procedure to evaluate the quality of feed phosphates.

*Keywords: phosphorus, inorganic feed phosphate, quality evaluation*

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## **An update on direct-fed microbial in broiler chickens in post-antibiotic era**

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### **Abstract**

In a post-antibiotic era, adding alternatives to antibiotics into diets of chickens has been common practice to improve the productivity and health status of chickens. It is generally accepted that direct-fed microbials (DFMs), defined as a source of viable, naturally occurring microorganism, among the alternatives to antibiotics, have a long history of safe use with health benefit and are generally regarded for therapeutic, prophylactic and growth promotion use in poultry industry. It has been suggested that two primary modes of action by DFMs are balancing gut microbiota and modulating host immunity. Recent findings suggest that gut microbiota plays an important role in developing immune system and maintaining the homeostasis of mature immune system in mammal and chickens. With the help of molecular and bioinformatics tools, it is now known that gut microbiota is diverse, dynamic and varies according to age, breed, diet composition, raising environment, and feed additives. Broiler chickens are commonly raised on the floor with bedding materials, of which condition facilitates the acquisition of microorganisms present in the bedding materials. Thus, it is expected that environmental factors including the type of litter influence host immunity in a positive or negative way. In this regard, adding DFMs into diets of chickens will affect host-microbe interaction shaping host immunity toward increasing resistance of chickens to enteric diseases.

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## Capacity building and services to assist local farmers to improve aquaculture management in Vietnam

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### Abstract

Since 2000, we can observe important changes in traditional production systems of coastal communes in North Vietnam. Faced with relatively low incomes, rice farms converted the surfaces available to them in aquaculture ponds. These are difficult to reverse conversions were carried out by farmers seeking to improve family income in areas of relatively low rice productivity. These changes have had a significant impact on the revenues generated in coastal villages with changes in work organization and the upstream business opportunities for feed plants. This type of family aquaculture has grown rapidly to meet domestic demand but also to export markets.

Faced with these voluntary initiatives, the Vietnamese authorities have had difficulties to coach and support these new producers in sustainable development schemes for fresh water or brackish water aquaculture. In addition, climate change could significantly affect these areas particularly exposed to rising sea waters.

Moreover, aquaculture producers respond to logic relatively isolated individual entrepreneurs. They deliver their products to many collectors who engage strong competition. This is particularly true at the sub-sectors supplying the domestic market.

The Vietnamese marketing system for aquaculture products is generally considered competitive and efficient. It involves different stakeholders (collectors, dealers, wholesalers and processors) that develop often difficult short-term strategies to understand and which do not permit a good traceability of production.

At producer level, understanding of market mechanisms is very limited which makes it difficult to decision support for investments and marketing. Meanwhile, producers are exposed to high price volatility. Small producers oriented towards the local market are particularly exposed and vulnerable to this issue and it is important to understand the strategies that can be implemented to ensure against this form of risk.

In this context, this paper describes two initiatives conducted in the Northern area of Vietnam to strengthen the sustainability of clam's farms and supported by researchers from Vietnam National University of Agriculture.

*Keywords: cost monitoring, risk analysis, aquaculture economics*

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## **Vitrification of bovine and buffalo oocytes and embryos**

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### **Abstract**

The cryopreservation of the female livestock genetics has become an international priority, which is a crucial step for animal genetic resources conservation. The buffalo and bovine are the major milk and meat producing farm animal in many countries. However, oocytes and early embryos are very sensitive to chilling and cryopreservation. This review presents the cryopreservation of bovine and buffalo oocytes as well as embryos including associated problems, source of oocytes cryopreservation, embryos cryopreservation, and the future of buffalo oocytes vitrification.

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**Native Asian chickens: an alternative for matching the specific meat quality demands of certain groups of consumers. A review**

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**Abstract**

Native chickens are slowly growing indigenous chicken (*Gallus domesticus*) genotypes. Many of them were developed from Jungle Fowl which is found in every part of Asia. These genotypes are disease resistant, easy adapting to tropical climates, and have a low mortality. In Thailand, consumers prefer to eat meat from native chicken to that from broilers because of the more tasty and chewy meat. In addition, studies showed that it has low contents of fat and cholesterol which may be helpful for people susceptible to coronary heart disease. This review also compiles evidence for further indicators of a special meat quality such as more oxidative (type I) muscle fibers, a higher collagen content (promoting the preferred chewiness), an elevated content of certain flavor-relevant compounds, as well as high ratio of polyunsaturated to saturated fatty acids.

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## Relationship between rumen acidosis and laminitis in the bovine; what do we know about the underlying mechanism?

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### Abstract

It is generally accepted that many predisposing factors are associated with the occurrence of laminitis (*Pododermatitis diffusa aseptica*) including farm management, housing, genetics, breeding, and nutrition. Nutrition has been identified as a major contributing factor in relation to laminitis, but the precise cause of the underlying mechanism of laminitis is not yet known. Currently, it is believed that two potential processes may play an important role in the pathogenesis of bovine laminitis. First, a compromised microcirculation of the dermis, which contributes to the separation of the dermal and epidermal tissues. Secondly, degradation of collagen which is essential for supporting and suspending the pedal bones. It has been suggested that a compromised microcirculation is the initial trigger in the etiology of bovine laminitis. Several bovine studies have clearly demonstrated that oral doses of high amounts of oligo-fructose are highly effective in inducing laminitis. In those studies, the administration of oligo-fructose was associated with the occurrence of rumen acidosis. These results are in line with the idea that the presence of rumen acidosis is a prerequisite to develop laminitis. During rumen acidosis, histamine can be produced and it is known that histamine is a potent vasodilator. As such histamine can potentially influence the hemodynamics in the claw thereby contributing to the development of laminitis. The production of histamine involves the decarboxylation of the amino acid histidine. Consequently, high levels of histamine can only be produced after the ingestion of appropriate amounts of protein. However, the feeding of high protein rations (26%, dry matter basis) did not result in a relevant rise in ruminal histamine concentrations (< 1.3 mg/L) but nevertheless two out of the six cows developed clinical signs of laminitis. Furthermore, injection of histamine did not induce any clinical signs of laminitis in horses. Next to histamine, lipopolysaccharides (LPS) are also released during rumen acidosis. Circulating LPS can trigger the release of different pro-inflammatory cytokines thereby affecting the activity of metalloproteinase and tissue inhibitors of metalloproteinase which may ultimately cause vascular dysfunction. However, induction of rumen acidosis by means of a reduction of the fiber content of the ration or by a combination of a low fiber content together with a high starch content resulted in high rumen LPS values but responses in plasma LPS were not detected. Furthermore, several authors reported about significant LPS induced increases in serum levels of LPS binding protein, serum amyloid-A and haptoglobin, but these inflammatory responses were not proven to be associated with cases of (sub) clinical laminitis in dairy cows. Finally, several equine studies have shown that infusions of LPS did not result in clinical signs of laminitis. In conclusion, the mechanism(s) by which histamine and/or LPS contributes to the development of laminitis, if any, remains unclear.

**Keywords:** laminitis, rumen acidosis, histamine, lipopolysaccharides

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## **Livestock Farming to Meet Climate-Smart Agriculture and Sustainable Livelihood**

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### **Abstract**

Global warming will change the face of livestock farming. Increases in temperature, changing patterns of rainfall, more extreme droughts and floods, the shifting distribution of pests and diseases: all can be attributed, in part, to the increase in emissions of greenhouse gases resulting from human activities. All will have an impact on food production in the future. Enteric fermentation in livestock produces large quantities of methane, comprising 32% of agricultural emissions. Thus, livestock farming is responsible for a much greater share of global emissions if the clearance of forests to make way for livestock farming is included. Therefore, the basics of climate change and mitigation, climate-smart livestock farming and climate-smart practices will be reviewed. How can climate-smart livestock farming practices, mitigate climate change, improve farmers' lives and make local communities better able to adapt to climate change also be given.

*Keywords: Climate-smart livestock farming, Sustainable livelihood*

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## **Thailand efforts to create a sustainable buffalo agro-economy utilizing basic veterinary science knowledge**

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### **Abstract**

Buffaloes (*Bubalus bubalis*), are common domestic animals used for meat (swamp type) and milk (river type) production. In South East Asian countries including Thailand the dominant species is the swamp type. Research has been done for nearly 40 years in Thailand regarding buffalo genetics, physiology, nutrition, production, disease, breeding and reproduction. Despite these years of research however, the species many unique reproductive limitations have not been overcome. Delays in puberty (and the subsequent delay in the age of first conception) as well as a long inter-calving period can cause infertility and represent a major source of economic loss in buffalo, leading to low reproductive performance and a lengthening of their non-productive life. As a result of these and other factors – such as increased buffalo meat consumption and exports - Thailand has been challenged by a buffalo population which has decreased more than 60% within the last 20 years (1997-2014). Attempts have been made by researchers to solve this problem using assisted reproductive technology. Frozen semen and artificial insemination (AI) have been developed and utilized in both government and private farming during this decade for genetic improvement and preservation. However, estrous detection is a limitation for effective AI. Estrous and ovulation synchronization, such as ovsynch protocol, have been recently applied in small holder farms producing a 34% pregnancy rate similar to natural heat detection groups. A study on ovsynch combined with intravaginal progesterone supplement seems to induce fertility in acyclic postpartum cows. Embryo transfer with both *in vivo* and *in vitro* embryos have attempted since 1984 but still have not been practically applied in the field.

One of the reasons this research has not affected the buffalo population decline, however, is that Thais and as whole have failed to embrace the very idea of a sustainable, commercial buffalo agro-economy. Buffalo farming remains, with few exceptions, a small and informal affair undertaken mostly by small farmers as a side business. To utilize the scientific techniques and herd management strategies developed by researchers requires a change not just in attitude, but in the scale and economic approach taken by Thai's to this industry.

For sustainable buffalo agro-economy farming in Thailand to succeed, in short, the application of appropriate scientific knowledge, herd health management and a change in the Thai traditional attitude toward buffalo and buffalo farming (which may be the most important) all need to be promoted and actively supported by government and private sectors.

*Keywords: buffalo, Thailand, sustainable, agro-economy, veterinary science*

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## **Highly pathogenic avian influenza: continuous circulation**

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### **Abstract**

Since 1997, poultry production has been damaged by highly avian influenza (HPAI) H5N1. Human being and mammalian species were also infected with HPAI H5N1 with high mortality, leading to public health concern. In Asia, H5N6 is now a new threat for poultry production and zoonotic issue because of wide-spreading infection of poultry and other animals. Reassortment of local AI viruses, with HPAIv is invariably present as emergence of H5N8 and H7N9 subtypes. Because we cannot predict which HPAI subtype will emerge in the future, active surveillance, monitoring and genomic characterization of AI viruses need to be conducted. It is known that movement of infected poultry and carcasses is the highly risk factor of disease distribution. In addition, contaminated vehicles, equipments and mechanical vectors are also inevitably concerned. The role of migratory birds in HPAI distribution appears less when compared to movement of infected poultry. However, migratory aquatic birds can be a mixing vessel for reassorted viruses because of habitat sharing. Although vaccination is a tool to control/eradicate HPAI, it needs additional activities simultaneously implemented during the vaccination campaign. These implemented activities include farm biosecurity, active surveillance, serologic monitoring, strictly control movement of poultry and education campaign. Vaccination campaign however, directly effect on genetic evolution of AIVs unless the vaccine is properly applied. Non-uniformity of vaccination and poor quality of the vaccines lead to unsuccessful control of the problem. Since there are zoonotic HPAI viruses circulating in endemic areas, public health must be also inevitably emphasized. Strategic control measures should be suitable for the way of life of villagers. Sustainable community and food security/safety are also concerned. Besides, international collaboration of implementation of all strategic control measures must be performed in order to ending the problem as fast as possible.

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# **Oral Presentation**

**Meat and bone meal as an alternative for fish meal in diets for black carp  
(*Mylopharyngodon piceus*)**

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**Abstract**

A growth experiment was conducted to determine growth performance, feed utilization of black carp, *Mylopharyngodon piceus* fed three isonitrogenous (35%) and isolipidic (10%) diets, adding meat and bone meal (MBM) levels of 5, 10, and 15%, (abbreviated MBM5, MBM10, and MBM15, respectively) as replacement for fish meal (FM). Each diet was randomly fed to three replicate groups of homogenous black carp (initial average weight of  $8.43 \pm 0.21$  g), held in 500L composite tanks with 10 fish/tank. Fish were fed by hand to apparent satiation twice daily at 08:00 h and 15:00 h for 45 days. Fish fed diets, MBM5, MBM10 and MBM15 showed no significant difference in growth and feed utilization parameters ( $P>0.05$ ). The findings propose that FM in black carp diets can be replaced by MBM without negative effects on growth performance, feed utilization.

*Keywords: black carp, meat bone meal, fish meal, growth performance, feed utilization*

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## Growth performance of carrageenan-producing seaweeds of *Kappaphycus* and *Eucheuma* in Sumbawa

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### Abstract

This research purpose is to address growth performance of carrageenan-producing seaweeds of *Kappaphycus* and *Eucheuma*. The research was conducted in coastal area of Kaung Island, Buer sub-district, Sumbawa Regency from August to September 2012. Importance of *Eucheuma*/*Kappaphycus* spp. for Indonesian economy and farmer livelihood are main source of hydrocolloids and main source of income. West Nusa Tenggara is one of the production center for *Eucheuma*/*Kappaphycus* in Indonesia. The method used for this study was planting seaweed using long-line system involving 25 farmers. The species planted were *Kappaphycus alvarezii* Tembalang, *Kappaphycus alvarezii* Maumere, *Kappaphycus striatum* and *Eucheuma spinosum*. The growth of *Eucheuma* spp was measured every 7 days until harvesting time which is 45 days. Initial seed weight was 100 g and the number of seeds perline were 200. Purphoses sampling done by 5 samples per line for analysis of fresh weight, dry weight, carragenan content and incident disease. The result of this research shows that the increase in weight *Kappaphycus alvarezii* Tembalang is 0,82 grams/day, *Kappaphycus alvarezii* Maumere is 0,06 grams/day, whereas that of *Kappaphycus striatum* is 0,97 grams/day and *Eucheuma spinosum* is 5,59 grams/day. It can be concluded that *K. alvarezii*, *K. striatum* and *E. spinosum* can grow in Kaung, *E. spinosum* is more adaptable to Kaung ecology, and can be grown throughout the year.

**Keywords:** cultivation, long line, fresh weigth, dry weight, adaptable.

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## Advantages of environmentally sound poly-eco-aquaculture in fish farms

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### Abstract

Environmentally sound poly-eco-aquaculture enables the preservation of aquatic environments to be compatible with that of sustainable aquaculture. With this method, not only healthy fish can be cultured in purified water, but also the productivity will increase by recycling seaweed to feed fish. The maximum nitrogen uptake rate of each seaweed per square meter of seaweed area was 2.9 mg N/m<sup>2</sup>/day for *Laminaria japonica*, 3.1 mg N/m<sup>2</sup>/day for *Undaria pinnatifida* and 3.6 mg N/m<sup>2</sup>/day for *Ulva pertusa*. The maximum phosphate uptake rate was 0.43 mg P/m<sup>2</sup>/day, 0.54 mg P/m<sup>2</sup>/day, and 0.19 mg P/m<sup>2</sup>/day. The calculated values of nitrogen and phosphate uptake rates, obtained by integrating the nutrient concentrations, light intensity, and water temperatures, corresponded well with each observed value. The minimum seaweed cultural density necessary per unit area of *Seriola quinqueradiata* farm was calculated using the values of the maximum nitrogen uptake rate. The maximal production rates were 0.75 mg O<sub>2</sub>/g wet/h for *L. japonica*, 0.83 mg O<sub>2</sub>/g wet/h for *Un. pinnatifida*, and 6.39 mg O<sub>2</sub>/g wet/h for *Ul. pertusa*. The minimal weight of cultured seaweeds necessary to accommodate the oxygen consumption of an individual *S. quinqueradiata* was calculated as 1.17 kg wet/a fish, 0.83 kg wet/a fish, and 0.21 kg wet/a fish.

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## Enhancing the nutritional value of soybean through supplementation with new-generation feed enzymes for poultry -Review

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### Abstract

In terms of greenhouse gas emission, climate change and efficiency of feed utilization, poultry (chicken) are the preferred farm animals to meet the high demand for animal protein. Soybean meal (SBM) remains the most important and the preferred protein feed source. However, supply of conventional SBM fluctuates while the price is on the increase due to demand, processing and transportation costs. Although there is a growing interest in the use of raw SBM for birds, the nutritive value is negatively affected by anti-nutrients. Heat treatment is employed to reduce the concentrations of some of the anti-nutrients such as trypsin inhibitors and lectins, but both under- and over-processing of soybean tend to reduce the quality of the meals. Supplementation of poultry diets with microbial enzymes, including phytase and protease, is a routine biotechnological intervention for improving the nutritional value of feed ingredients and reducing pollution. Protease can break down both stored proteins and proteinaceous anti-nutrients in soybeans, to improve bird performance and reduce environmental pollution. Phytase is effective in breaking down the phytate associated with a number of nutrients, including minerals and protein. Recent *in vitro* and *in vivo* studies are showing that the use of microbial enzyme cocktails can reduce the negative effects of anti-nutrients in soybean meal for birds. This review provides information on how protease and phytase are contributing to improved nutritional value and can obviate the need for pre-processing of SBM for poultry.

**Keywords:** *New-generation enzymes; anti-nutritional factors; soybean meal.*

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## **Fertility status of local PO cattle and its crosses with Limousin and Simental bull in Situbondo Regency, East Java, Indonesia**

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### **Abstract**

Fertility status or fertility index is a simple indicator to measure the fertility conditions of cow or bull in herd. This study was to evaluate the reproductive performances of local Peranakan Ongole (PO) cattle and its crosses with Limousin and Simental at Parity 3 and 4. There were no significant differences between parities and breeds for the reproductive performances and fertility status (FS) in this location. The reproductive performances and fertility status of PO cows and its crosses with Limousin and Simental bull conducted artificially insemination were in normal range, and there were no significant different between breeds and parities.

*Keywords: local cattle, service per conception, days open, conception rate, calving rate.*

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## **Poor manifestation of estrus signs in riverine buffalo tempting genetic appraisal**

*Maryam Javed, Asif Nadeem and Masroor Ellahi Babar*

### **Abstract**

Among different species of livestock, buffalo stands out as an efficient converter of poor quality roughages into highly valuable products as milk and meat. Due to high production capabilities, these animals are narrated as Black Gold of Asia. But production abilities are hampered by poor fertility traits. Among these, most significant is silent estrus, which is a leading cause of delayed cyclicity of these animals. Genetic framework of animals controls their structural and functional attributes and their production and reproduction potentials either via single genes or by combined effect of multiple genes located at different loci. Therefore, variation in genetic make-up of dairy animals leads to variation in phenotypic manifestation of traits under control. Continuance in estrus cyclicity is due to combined effect of many hormones. Most important is CYP19A1, which encodes for aromatase protein which ultimately converts androgens to estrogen. So this gene was selected as candidate gene for present study. Selected buffalo breed was Nili-Ravi buffalo. Animals of this breed were categorized in two groups: one with good manifestation of heat signs and second with poor estrus signs. Genetic analysis of coding parts of the gene was performed by amplification of targeted parts by specific sets of primers and DNA sequencing by Sanger's chain termination method. Comparison of DNA sequences of both animal groups provided six variants. After HWE and association analysis only one was found significantly associated with silent estrus behavior in river buffalo. This marker can be used as selection signature for future breeding programs to enhance the genetic potential of our animals for estrus cyclicity and better fertility.

## **Impact of complete feed silage from sugar cane waste product on Bali beef cattle performance**

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### **Abstract**

The research objective was to study the impact of using complete feed silage from sugar cane waste product which supplemented by other feed stuffs on Bali beef cattle performance. The experiment tested two kinds of diet ie: the existing diet that has been applied by the farmers (A) and complete feed silage from sugar cane waste product (B). It was used 14 heads of Bali bull with 1.5 to 2.0 years old, body weight 135 to 155 kg. The experiment was conducted on CV Gemini farm in Sijunjung Regency, West Sumatra Province Indonesia on 5 July to 27 September 2014. The result show that the average daily gain (ADG) of B (0.62 kg) was higher than A (0.24 kg). Daily feed intake (DFI) as fed basis for A and B was 17 kg and 13 kg respectively, so the feed efficiency (FE) was 5.8% and 16%. ADG, DFI and FE were significantly difference ( $P \leq 0.01$ ) between the treatments. The technical performance improved the income over feed cost (IOFC). IOFC of A only Rp 1500/head/day, while the B can provide much higher i.e. Rp 8729/head/day. It is concluded that the using of the silage provide good impact on Bali beef cattle fattening.

*Keyword: complete feed silage, Bali cattle, sugar cane waste product*

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## **Development of a rapid immunochromatography test for detecting antibodies after anthrax vaccination in cattle: A preliminary study**

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### **Abstract**

Anthrax is a zoonotic disease of strategic importance with high mortality rate in ruminants. Vaccination and monitoring of antibody titer after anthrax vaccination have been carried out in an effort to prevent anthrax disease in cattle. Enzyme linked immunosorbent assay (ELISA) is a method commonly used in the monitoring of antibody titer after vaccination. However, the use of the ELISA method requires skilled laboratory personnel, specialized laboratory equipment, and relatively more expensive. This study aimed to develop a method to detect antibodies after anthrax vaccination in cattle using rapid immunochromatography detection. Colloidal gold as a marker were conjugated with protective antigen (PA), with a concentration of 0.2, 0.4 and 0.8mg/ml, then put on the conjugate pads as part of the immunochromatography test strip. A total of 13 serum samples of cattle after vaccination was used in this study. The sample consisted of seven positive and six negative sera samples based on the results of the ELISA test to detect the presence or absence of anti-PA antibodies in serum. The results using the rapid immunochromatography test indicate that the anti-PA antibodies in the serum can be detected within 10min. Antigen concentration of 0.2mg/ml in the conjugate pads showed the same sensitivity test as other antigen concentrations used in this study.

*Keywords: anthrax, rapid test, immunochromatography, cattle, protective-antigen*

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## The effect of *Cinnamomum burmannii* extract as an immunomodulator on the increase of GR-1 expressing IFN $\gamma$ and macrophage

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### Abstract

*Cinnamomum burmannii* was known as one of herbal medicine that has been used traditionally as an ingredient of traditional medicine extract, contains *cinnamaldehyde*, which is a naturally trigger of the body's immune response. This study aimed to evaluate the immunostimulant effect of *C. Burmannii* and the increase of Granulocyte Receptor - 1 (GR-1) that can be recognized from neutrophil expressing IFN $\gamma$  and the increase of macrophage phagocytosis activities. Thirty wistar mouse were appropriately infected with *Salmonella enteridis* and then orally treated with *C.burmannii* alcohol extract at different dosages. The mouse were observed for the increase of *GR-1* expressing IFN $\gamma$  using flow-cytometry and the increase of macrophage phagocytosis activities using Giemza staining. The result showed that increasing dosage of *C. burmannii* extract treatment increased the GR-1 level and the IFN $\gamma$  by 97.7% and macrophage phagocytosis activity by 98.1% (P<0.05). Thus, the observations reflected clearly that *C.burmannii* ethanol extract can be utilized as immunomodulator that increased immune response.

**Keywords:** *Cinnamomum burmannii*, *GR-1*, IFN $\gamma$ , macrophage, phagocytosis

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## Genetic variation of MHC Class II DRB3 gene in local goat from South Sulawesi Indonesia

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### Abstract

Major histocompatibility complex (MHC) class II proteins are primarily restricted to the surface of immune cells and are responsible for immune regulation. The objective of this study is to identify the genetic variation of MHC class II DRB3 genes in Indonesian local goats from South Sulawesi province. A total of 113 blood samples were collected from three local goats (Boerawa, Kacang and Peranakan Ettawa) in South Sulawesi province. The genomic DNA was extracted by using Genomic DNA extraction Kit and then MHC Class II DRB3 gene were amplified by PCR with predicted amplicon length 285 bp. To identify alleles variation of MHC gene, the PCR product were cut with *Hae*III restriction enzymes. Genetic variation between populations calculated based on genotypic and allelic frequencies, observed heterozygosity ( $H_o$ ), expected heterozygosity ( $H_e$ ) and the Hardy-Weinberg equilibrium. There were 6 alleles found in local goat population (A, B, C, D, E and F alleles). C and F were the common alleles found in this population (0.278 and 0.269 respectively), while the rare allele was E allele (0.022). Genotype frequencies of this gene were respectively AA (0.018), AB (0.053), BB (0.009), AC (0.142), BC (0.088), CC (0.106), AD (0.080), BD (0.018), CD (0.009), DD (0.009), AE (0.018), BE (0.0), CE (0.009), DE (0.0), EE (0.0), AF (0.177), BF (0.053), CF (0.097), DF (0.0), EF (0.018) and FF genotype (0.097). The observed heterozygosity value ( $H_o$ ) was 0.761 while the expected heterozygosity ( $H_e$ ) was 0.771. Allelic variation found in local goat population could be used as genetic information in selection program for disease resistant.

**Keywords:** genetic variation, MHC Class II DRB3, local goat, disease resistant, South Sulawesi

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## The Effect of methane mitigation by condensed tannins on ruminal homoacetogens

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### Abstract

Ruminants emit methane gas via the process of methanogenesis that occurs during the natural ruminal fermentation. The Wood-Ljungdahl pathway of reductive acetogenesis has been identified as a potential alternative hydrogen sink within the rumen. Condensed tannin extract from *Leucaena leucocephala* hybrid-Rendang has been found to reduce methane production and rumen methanogen population *in vitro*. However, the effect of condensed tannins on ruminal acetogens has yet to be elucidated. Therefore, this functional gene-based study was initiated to investigate the effect of methane mitigation by condensed tannins on the ruminal homoacetogens. In this study, condensed tannin extract were supplemented to diet containing *Panicum maximum* in the *in vitro* gas production system. Primer set targeting the *fhs* and *acsB* were used for amplification. The amplicons recovered from the *fhs* gene were cloned and clones were selected to determine their nucleotide and amino acid sequences. The resultant sequences were then used to construct phylogenetic trees based on the neighboring joining and maximum likelihood methods using the reference sequences from the NCBI gene bank. Homoacetogen similarity (HS<sub>i</sub>) score was also calculated from the most promising translated amino acid sequence to evaluate its FTHFS activity. The positive results of amplified *fhs* and *acsB* genes supported the presence of homoacetogenic bacteria in the condensed tannin-supplemented treatment. Novel sequences closely linked to the uncultured rumen bacterium were retrieved from this study and they were found to be strongly affiliated to the known homoacetogen cluster in the phylogenetic tree. Conserved regions were further identified from the deduced amino acid sequence and an intermediate HS<sub>i</sub> score of 69.6% was obtained. The results showed a potential shift of hydrogen sink from methanogenesis to the less thermodynamically favorable reductive acetogenesis due to supplementation of condensed tannins.

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## **Most probable producing ability of production and reproduction traits of Bali cows**

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### **Abstract**

Growth of calves from birth to weaning is an important economic aspect in the production of beef cattle. Pre weaning growth rate is influenced by genotype and environment of the calves. The purpose of the research was to study the genetic ability of production and reproduction traits of Bali cows. A total of 296 weaning weight data from 99 dams with 2 to 7 records per dam; 245 yearling weight data from 86 dams with 2 to 6 record per dam and 194 calving interval data from 63 dams with 2 to 7 records per dams were used to estimate repeatability and most probable producing ability (MPPA) of Bali cows. Repeatability of weaning weight, yearling weight and calving interval was estimated by analysis of intra-class correlation. The estimated repeatability of those traits was as the basis for calculating the estimated of MPPA. The estimated of MPPA was calculated based on the average of weaning weight, yearling weight and calving interval. The results showed that the average of weaning weight, yearling weight and calving interval was  $88.59 \pm 15.78$  kg,  $120.09 \pm 22.01$  kg and  $560.65 \pm 255.02$  days, respectively. The estimated repeatability of weaning weight, yearling weight and calving interval was 0.006; 0.022 and 0.115, respectively. The best ten of the dams based on the estimated of MPPA for weaning weight, yearling weight and calving interval on the same population would produce different order for different traits.

*Keywords: weaning weight, yearling weight, calving interval, mppa*

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## **The relationship between longevity and reproductive efficiency in Lori-Bakhtiari ewes**

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### **Abstract**

The phenotypic, genetic and environmental correlations between longevity and reproductive efficiency traits over a lifetime in Lori-Bakhtiari ewe's were estimated using the data set consisted of 8202 records of reproductive traits in a lifetime of 2478 ewes collected from 1989 to 2012 inclusive from a Lori-Bakhtiari research flock at Shooli station in the southwestern part of Iran (Shahrekord). Reproductive efficiency over all consecutive lambing opportunities were calculated by adding the total reproductive efficiency traits per ewe joined for all of the parturition opportunities. The reproductive efficiency included, average conception rate (ACR), number of parity (NP), total number of lambs born (TNLB), total number of lambs weaned (TNLW), total of lambs birth weight (TLBW) and total of lambs weaning weight (TLWW). The data set analyzed with multi-trait animal model included the fixed effects birth year of ewe, number of parturition in ewe's lifetime, ewe body weight as covariate and random effects direct additive genetic and residual effects. The estimates of genetic correlations between longevity and ACR, NP, TNLB, TNLW, TLBW and TLWW were  $0.17 \pm 0.13$ ,  $0.96 \pm 0.01$ ,  $0.86 \pm 0.03$ ,  $0.88 \pm 0.03$ ,  $0.89 \pm 0.03$  and  $0.90 \pm 0.02$ , respectively. The estimates of phenotypic correlations between longevity and ACR, NP, TNLB, TNLW, TLBW and TLWW were  $-0.01 \pm 0.03$ ,  $0.92 \pm 0.01$ ,  $0.77 \pm 0.01$ ,  $0.78 \pm 0.01$ ,  $0.84 \pm 0.01$  and  $0.82 \pm 0.01$ , respectively. The environmental correlations between longevity and total reproductive efficiency traits over ewe's lifetime were lower than phenotypic correlations. Thus, improving longevity by genetic selection could make significant improvements in reproductive efficiency traits over ewe's lifetime.

*Keywords: Reproductive efficiency, Ewe's lifetime, Genetic parameters.*

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## **The Interleukin-8 gene polymorphism and its association with milk production traits in Holstein Cows**

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### **Abstract**

Genomic selection on individual genes is a promising method to genetically improve economically important traits in dairy cows. The objective of this study was to identify polymorphism of Interleukin-8 (IL8) gene and its association with milk production traits in Holstein dairy cows. Sixty-eight Holstein cows with 171 milking records were genotyped and were evaluated for the impact of polymorphism of IL8 gene on milk production traits. There were 56, 50, 31, 20, 11, and 3 cows with 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> lactation records, respectively, which were further classified as primiparous and multiparous records. Fixed effects model was employed for the analysis with genotype of IL8 gene. Traits evaluated included 305-2X-ME, daily milk yield, fat%, protein%, lactose%, total solid%, somatic cell count (SCC), and somatic cell score (SCS). Genotypic frequencies of CC, CT and TT were 0.22, 0.47, and 0.31, respectively. No significant difference was found among genotypes for 305-2X-ME, fat%, protein%, total solid%, and SCS. However, polymorphism of IL8 gene did show significant effects on daily milk yield and SCC ( $P < 0.05$ ) and lactose% ( $P < 0.01$ ). These results confirm that IL8 gene plays main role in phenotypic traits, and it might be used in marker assisted selection to improve milk production traits.

*Keywords: interleukin-8 gene, milk production traits, polymorphism, Holstein cows*

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## Production and reproduction characteristics of tegal and magelang ducks

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### Abstract

The objective of the present research was to describe and compare the production characteristics of Tegal and Magelang duck, comprising vital body measure (body weight, abdominal circumference, breast circumference, shank length, and neck length), egg production (egg weight, hatching weight and egg production), and reproduction characteristic (fertility, hatchability, and embryo mortality). Research materials were 196 Tegal ducks and Magelang ducks, each consisted of 16 males and 80 females. Experimental method was applied by calculating the mean and standard deviation, and comparing the characteristics of production and reproduction of Tegal and Magelang duck with one sample t-test. The results of mean and standard deviation of Tegal duck comprised vital body measure were (1392,74±117,99 g; 26,97±2,71 cm; 26,25±1,33 cm; 20,26±1,03 cm; 6,31±0,35 cm and 20,27±1,63 cm, respectively), egg production (67,25±5,71 g; 44,19±3,33 g and 66,41±12,84 %, respectively) and reegg production (86,87±9,12 %; 43,02±14,15 % and 56,95±16,16%, respectively). While in Magelang duck the result demonstrated vital body measurement (1612,18±122,74 g; 27,65±0,88 cm; 27,75±1,44 cm; 22,28±1,75 cm; 6,53±0,47 cm and 21,80±2,08 cm, respectively), egg production (67,91±2,56 g; 46,43±4,37 g and 65,08±11,80 %, respectively) and reproduction characteristics (87,14±1,54 %, 50,53±11,45 % 49,43±2,09%, respectively). T-test result showed that vital body measurement, egg production and production characteristics between Tegal duck and Magelang duck was significantly different, in which the latter showed relatively higher performance than the former, but egg production percentage of the former outperformed the latter. Tegal duck and Magelang duck crossbreed was viable to obtain offspring with more superior vital body measure and egg production percentage.

*Keywords: characteristics, production, reproduction, Tegal duck, Magelang duck*

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## **Breeding potency of Bali cattle as indigenous beef cattle breed in Sumbawa Island Indonesia**

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### **Abstract**

Study on breeding potency of Bali cattle was conducted in station of Bali cattle breeding and forage in Serading, Sumbawa, West Nusa Tenggara, Indonesia. Data on birth weight, population structure and mortality during 2009 to 2013 were collected. Data were analyzed using analysis of variance applying software of Genstat version 16 (Anonymous 2014). Result showed that mean of birth weight of Bali cattle during 2009 – 2013 was  $14.93 \pm 1.90$  kg. During 3 years of study, birth weight of Bali cattle increased, which was 14.45 kg in 2009 to be 16.19 kg in 2011. However, it then reduced to be 13.47 kg in 2013. It was found that birth weight of male was significantly different to those of female, which were  $15.38 \pm 2.26$  kg and  $14.20 \pm 1.83$  kg for male and female, respectively. The male to female ratio was 3 to 78. Proportion of adult, young and calves were 34.62%, 17.95% and 47.43%, respectively. The result indicated that there are improvement of performance and genetic quality of Bali cattle; although it increased only 16.85% during 12 years. This ratio of male to female cattle was categorized ideal. Considering the availability of feed resources in West Nusa Tenggara and high adaptability of Bali cattle in Sumbawa Island, there is high potency of improving genetics and performance of Bali cattle in Sumbawa, West Nusa Tenggara, Indonesia.

*Keywords: birth weight, mortality, population structure*

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**Institutional development on conservation of Madura cattle**

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**Abstract**

Study on institutional development on conservation of Madura cattle was aimed to empowerment of farmers, to improve production performance and to conserve Madura cattle as genetic resource of Indonesia. Survey methode was applied to collect data using conversation teqnique and observation participation. Instrument as data collection were questionnaires and conservation guidance. Result showed that most of the farmers managed 2-3 cattle as their own, but there were 32.5% farmers managed cattle using profit sharing system. Reproductive performance of Madura cattle was categorized good. service per conseption (S/C) was 1-2 and calving interval was 18 months. Artificial insemination using frozen semen of exotic breed has been applied institutionally in small holder farmer and farmer tended to prefer exotic breed than Madura cattle as local breed. Economic aspect was the main reason for choosing crossbreeding. Without good breeding program, cross breeding could threaten the existence of Madura cattle as genetic resource of Indonesia. Goverment policy to determine Sapudi island as breeding centre for Madura cattle was an institutional change in conservation of Madura cattle. In order to conserve Madura cattle, education and supervision to the farmers should be done continously. Economic insentive as a reward for Madura cattle farmer should be given for developing of Madura cattle conservation model.

*Keywords: institutional, conservation, genetic resource*

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## Phenotypic and chromosome band intensity characters of swamp buffalo in very isolated area of East Java, Indonesia

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### Abstract

The aims of this research are to identify the phenotypic and analyze the chromosome characters of the swamp buffalo. The chromosome and molecular analysis of breeding animal began in different countries, because chromosomal and molecular abnormality can be identified and culled from breeding program. This early study was conducted to swamp buffalo for any karyotypic and phenotypic abnormality in isolated area of east java Indonesia. Chromosome analysis was performed by collecting blood samples from normal phenotypic swamp buffalo in Java Island and swamp buffalo with high level of inbreeding Kangean Island, Indonesia. The 0.5 ml of blood sample per animal was added to 5 ml chromosomal medium (Karyo MAX, Gibco). After 70 hours add to 1 ml colchicines, centrifuge at 1000 RPM for 10 minute and added then by fixative solution. Slides were prepared, stained with Giemsa. Analysis have been done by cytovision image software (Genetix, USA). The 2N diploid chromosome numbers were observed normal, male buffalo was 48 (46 autosomes and 2 sex chromosomes: XY). All the autosomes and sex chromosomes were found normal in both area. Karyotypes of male buffalo showed there were 5 submetacentric and 20 acrocentric pairs (including sex chromosomes). The phenotypic character in isolated area was varied in their color of skin from grey (normal) to red and white (abnormal). Analysis of banding quality of each chromosome showed different intensity.

*Keywords: Chromosome, Swamp Buffalo, Breeding, Genetic*

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**The study of reproductive efficiency over the lifetime of Lori-Bakhtiari ewes**

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**Abstract**

The data set used in this study consisted of 8202 records of reproductive traits in a lifetime of 2478 ewes collected from 1989 to 2012 inclusive from a Lori-Bakhtiari research flock at Shooli station in the southwestern part of Iran (Shahrekord). Reproductive efficiency over all consecutive lambing opportunities were calculated by adding the total reproductive efficiency traits per ewe joined for all of the parturition opportunities. The reproductive efficiency included, number of parity (NP), total number of lambs born (TNLB), total number of lambs weaned (TNLW), total of lambs birth weight (TLBW), total of lambs weaning weight (TLWW), total of lambs weaning weight per kg ewe body weight (TLWW/EBW) and total of lambs weaning weight per kg metabolic ewe body weight (TLWW/MEBW). The overall mean reproductive efficiency traits were 3.31, 3.31, 3.21, 16.51 kg, 87.31 kg, 1.51 and 4.16 for NP, TNLB, TNLW, TLBW, TLWW, TLWW/EBW and TLWW/MEBW, respectively.

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## Genomic prediction using single nucleotide polymorphism markers of different density for carcass traits in Japanese Black cattle

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### Abstract

Genomic prediction (GP) of breeding values using single nucleotide polymorphism (SNP) markers can be conducted even when pedigree information is unavailable, if phenotypes are known and marker data provided. While the use of fully high-density SNP markers is desirable to capture the total additive genetic variance of a quantitative trait and to accurately predict breeding values, GP using SNPs of lower density can nevertheless be useful. In this study, GP was carried out for carcass weight and marbling score in Japanese Black cattle, using SNP markers of varying densities. A total of 1,980 fattened steers with available genotype data on around 560,000 autosomal SNPs were included. Of these, 1,791 with phenotypic data were treated as the training population, and the remaining 189 animals which provided predicted breeding values (PBVs) following official genetic evaluation using pedigree data were the validation population. SNPs were selected to provide different equally-spaced SNP subsets of lower density. Genomic estimated breeding values (GEBVs) were obtained with genomic best linear unbiased prediction, incorporating any one of two sorts of genomic relationship matrices (G matrices). For both traits, the two types of G matrices used resulted in no substantial difference in the results at given SNP densities. When the SNP density was decreased to one-thousandth, the estimated additive genetic variance and the correlation between GEBVs and PBVs were around 40% and 80%, respectively, of those using all available SNPs. The GP accuracy exceeded 90% of that using all available SNPs when the SNP density was one-hundredth or greater. These results indicate that even when an SNP panel of lower density is used, if the density is appropriate, GP can be beneficial for the pre-selection of the carcass traits in breeding animals of Japanese Black breed.

*Keywords: genomic estimated breeding value, lower-density SNP markers, carcass weight, marbling score, Japanese Black cattle*

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## Effects of different mating methods on hatchability and embryonic mortality of indigenous chicken eggs

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### Abstract

The study was conducted to determine the effects of mating methods on hatchability and embryonic mortality of indigenous chicken eggs. Ninety, 17 week-old normal feathered indigenous chicken breeders comprising 72 hens and 18 cocks were allotted to three mating methods: pen mating (PM), alternate males (AM) and stud mating (SM). Each group, comprising 24 hens and 6 cocks, was replicated thrice with 8 hens and 2 cocks per replicate. A total of 387 hatchable eggs were obtained from the hens for determination of hatchability and embryonic mortality. Data obtained were subjected to analysis of variance in a completely randomized design. Mating methods significantly ( $p < 0.05$ ) influenced hatchability and embryonic mortality of eggs as hens in SM produced more chicks (76.48%) and less embryonic deaths (23.52%) than PM (66.75% and 33.25%). There was a strong positive ( $p < 0.01$ ) correlation between egg weight and chick hatching weight. It was concluded that SM and AM resulted in better hatchability and lower embryonic mortality of normal feathered indigenous eggs and therefore could be considered as better alternatives to PM in poultry breeding programmes.

*Keywords: mating methods, hatchability, embryonic mortality, indigenous chickens*

## Proximity of genetic cross Boer goat with Local goat to parent based on gene DNA *Capra hircus* growth hormone (*ChGH*)

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### Abstract

The aims of this study were to identify and analyze the closeness of the relationship between parent (Boer and Local) with their kid by the DNA of the gene *Capra hircus* Growth Hormone (*ChGH*). The results of this study can be used as the initial information in an effort to develop a goat farm with a certain growth rate for the purpose of meat production. The materials used in this study were respectively 5 head blood samples from Boer, local and cross-bred kid result. Blood samples of DNA isolated by salting out method. Total DNA was amplified with primers that in the design of the growth hormone gene into exon2 that F-primer →5'-AGG TAT CTG CAC CCA GAC ATT TGG-3' and R-primer →5'-CCT GAC CAC ATC CTT ACT TGG ATA-3'. PCR results in pieces with RFLP method using restriction enzyme *HaeIII*. Amplification and restriction results in electrophoresis using 1.5% agarose gel and documented with a Polaroid camera. Data were analyzed descriptively and Multi-Variate statistical Packed (MVSP) 3.1. The results showed that the primers used to amplify the gene can *ChGH* specifically, to produce a 426 bp DNA fragment size. GH gene amplification products can be cut with restriction enzymes and DNA that produces 5 fragments in sizes 400, 300, 200, 100 and 50 bp. Based on gene DNA *Capra hircus* Growth hormone, the percentage Boer buck genetic closeness with kid was 51.42%, while the local doe parent with kid was 48.57%. These results indicate that the Boer goat stud genetic contribution was slightly higher (2.85%) of the doe Local goat.

*Keywords: GH gene, PCR-RFLP, polymorphism*

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## Effect of numbers of day of progesterone intra–vaginal device insertion on oestrus rate pregnancy rate and little size in Thai-native cross breed goats

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### Abstract

The aim of this study was to determine the effect of estrus synchronization protocols on estrus rate pregnancy rate and little rate in Thai-cross breed goats. Eighty nanny goats were randomly divided into two groups and assigned according to completely random design (CRD). The first group goats were treated with a short protocol of estrus synchronization (5d and 7d): medroxyprogesterone acetate (sponge) was inserted on day 0, PGF<sub>2α</sub> 125μg; PMSG 150IU; (I/M) and sponge removal on day 5 and 7. TAI was performed 48, 72hr. after sponge removal. The second group, a long protocol, was treated the same as the first group except sponge was inserted for 16 days. Estrus signs and standing heat were observed in all does of both groups by deviated bucks for four days after sponge removal. Pregnancy was checked by ultrasonographic scanning 60 days after TAI. The results of this study showed the first group had higher conception rate than the second group 60%, 40% and 25%, ( $P < 0.05$ ). All does in both groups expressed estrus (80/80). There was no significant difference of litter size in both groups (1.6, 1.5 and 1.4) respectively. This study reveals that five days sponge insertion estrus synchronization improves conception rate in goats and is beneficial for reproductive herd management in Thai native crossbreed goats.

*Keywords: synchronization of estrus, pregnancy rate, goats.*



## Genetic parameter estimation for prolificacy trait of local Ettawah crossbreed goat

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### Abstract

The prolificacy variation in Local Ettawah Crossbreed (PE) goats makes it an excellent aspect to increase PE goat production although this depends on the management of the production system and prevailing environmental and economic conditions. The objective of this reaseach was to estimate parameter genetic for prolificacy trait in center breeding of PE goat in East Java. The data included the performance of 520 Does in 14 breeding centers of PE goat in East Java with 1347 prolific records. Genetic parameter estimation was performed included calculating variance component, repeatability and heritability estimates using paternal half sib correlation. The data were analyzed using ANOVA with SPSS 15 version. The least square means of prolificacy trait was  $1.72 \pm 0.53$ . The heritability and variance component for prolificacy trait was 0.2 and 0.18. The repeatability and variance component for prolificacy trait was 0.89 and 2.18. It was concluded that the prolificacy trait of PE goat in East Java was medium categorized. Heritability and repeatability of prolificacy trait was considered medium and high.

*Keywords: prolificacyy trait, goat, parameter genetic*

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## **Truly absorbed protein in the small intestine content of alfalfa hay harvested at various blooming**

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### **Abstract**

The present study was conducted to determine chemical composition and truly absorbed protein in the small intestine (DVE) content of alfalfa hay sampled during different stage of the plant maturation. Samples of alfalfa hay were taken at initial, half and full bloom stages, then dried at 65 °C 48 h, using air forced oven, then analyzed to determine crude protein, neutral detergent fiber and acid detergent fiber. Ruminal incubations for test feeds and laboratory techniques were performed according to protocol for in situ rumen incubations published by central veevoeder bureau standards. Dry matter content of the samples were increased with the plant maturation and varied from 260 (g/kg) at the initial bloom to 280 (g/kg) in the full bloom. The NDF and ADF content of alfalfa at the initial bloom, half bloom and in full bloom were 381 and 292; 432 and 308; 511 and 327 g/kg DM, respectively. However, crude protein was decrease with the stage of growth and the value for the initial, half and full bloom was 198, 192, and 190g/kg, respectively. The value of the DVE of the samples was decline with the stage of the blooming and were 162.9, 161.3 and 156.1 g/kg for initial, half and full bloom, respectively. The present results indicated that the stage of maturity might impact on the nutritional value of alfalfa hay by altering the chemical composition and especially the protein content evaluated as truly absorbed protein in the small intestine.

*Keywords: DVE/OEB, alfalfa hay, growth stage*

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## Phytobiotic properties of garlic, red ginger, turmeric and kencur in growing ducks

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### Abstract

Phytobiotic properties of garlic (*Allium sativum*), turmeric (*Curcuma domestica*), red ginger (*Zingiber officinale*) and kencur (*Kaempferia galangal*) were studied using standard *in vitro* antibacterial test and *in vivo* feeding trial with ducklings. In the *in vitro* experiment, potency of aqueous extract of these phytobiotic agents were tested against *Salmonella pullorum* and *Escherichia coli*. The feeding trial was carried out for 6 week starting at day 28 using ducklings fed diets supplemented with 1% of each of four phytobiotic agents. The highest antibacterial activity against *S. pullorum* and *E. coli* was observed with garlic and no additive effect when mixture of phytobiotics was used. Weight gain, feed intake and feed conversion ratio of ducklings were not affected by inclusion of garlic, red ginger and kencur. However, turmeric supplementation at 1% significantly reduced growth performance to ducklings.

**Keywords:** phytobiotic, antibacteria, mortality, hematologic

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## Vitamin E and C effect on meat of Muscovy duck

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### Abstract

This research was aimed to study the effect of vitamin E and C supplementation in feed on body weight, feed conversion, color value and Fe level of Muscovy duck meat. This research applied experimental method with completely randomized design (CDR) with seven treatments, namely basal feed (21% protein and 3100 kcal/kg feed metabolic energy) without vitamin E and C, basal feed + 400 IU vitamin E, basal feed + 600 IU vitamin E, vitamin C 400 mg/kg feed, basal feed + vitamin C 600 mg/kg feed, basal feed + combination 200 IU vitamin E + 200 mg/kg feed vitamin C, and basal feed + 300 IU vitamin E + 300 mg/kg diet vitamin C, given initially for 4 weeks since 10 weeks old. Each treatment had four time repetition, if there is a difference between the treatment continued with test Honestly Significant Difference (HSD) (Steel and Torrie, 2001). Variables measured were body weight, feed conversion, the value of L \*, a \*, and b \* of the Muscovy duck meat. The results showed that supplementation of vitamin E and C has not significantly affected body weight and feed conversion of muscovy duck, a\* (reddish color of meat) and b\* (yellowish of meat) of Muscovy duck meat, but significantly affected on Fe level and L\* (lightness of meat) of Muscovy duck meat. It can be concluded that vitamin E and C supplementation affected on colour of Muscovy duck meat by increasing the brightness of meat and lower iron content of Muscovy duck meat.

*Keyword: Antioxidant, Meat colour, Performance*

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### ***In vitro* nutrients digestibility and fermentation characteristics of king grass combined with concentrate containing mixed microbes**

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#### **Abstract**

The main feed for ruminants is forage which is composed by polysaccharides. Feed digestion in the rumen is done by microbes, thus type and population of microbes are important factor which affect the digestibility of nutrients. The objective of this study was to evaluate *in vitro* nutrient digestibility and fermentation characteristics of king grass combined with concentrate containing mixed microbes. *Lactobacillus plantarum*, one strain yeast of *Saccharomyces cerevisiae* and two strains of cellulolytic bacteria *i.e.* *Acinetobacter baumannii* and *Pseudomonas aeruginosa* was added in concentrate. The cellulolytic bacteria was isolated from rice straw waste and palm oil seeds waste, respectively. The concentrate was mainly formulated from agricultural and food industry wastes *i.e.* cassava waste, tofu waste and rice bran. The bacteria and yeast was added in concentrate at  $10^6$ - $10^7$  cfu/g. The *in vitro* nutrient digestibility was conducted according to Tilley and Terry procedure using 250 mg of substrate comprised king grass and concentrate (70:30, DM). The results showed the concentrate containing  $7.2 \times 10^6$  cfu/g of *L. plantarum*,  $3 \times 10^8$  cfu/g of *S. cerevisiae*,  $8.6 \times 10^7$  cfu/g of *A. baumannii* and *P. aeruginosa*. The OM digestibility was higher ( $P < 0.01$ ) in grass substrate with concentrate containing *L. plantarum* and *S. cerevisiae* than concentrate without addition of microbe. However, NDF digestibility was higher ( $P < 0.01$ ) in grass substrate combined with concentrate containing mixed microbes. Addition of mixed microbes increased ( $P < 0.05$ )  $\text{NH}_3\text{-N}$ , acetic acid and total VFA concentration. It was concluded that addition of mixed microbes in concentrate improved fermentation activity and *in vitro* nutrient digestibility.

**Keywords:** by-products, concentrate, digestibility, rumen, cellulolytic

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## Periodic changes in chemical composition and *in vitro* digestibility of Gramineae feed resources in the Philippines

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### Abstract

Many tropical grasses have already been studied for its agronomic characteristics and quality. However, reports on chemical composition and *in vitro* digestibility of Gramineae feed resources in the Philippines are meager. In addition, periodic changes in nutritive value of Gramineae feeds in the country are still obscure. Hence, the present study is conducted to identify the chemical composition and *in vitro* digestibility of Gramineae feed resources in four different periods divided by the temperature and rainfall in the Philippines. Nueva Ecija and Bukidnon Provinces in the Philippines were selected for the collection of Gramineae feed resources in the hot-wet-period (HWP), the cool-wet-period (CWP), the cool-dry-period (CDP) and the hot-dry-period (HDP). The chemical composition and *in vitro* digestibility of the resources were analyzed. The digestibility of dry matter (DMD), organic matter (OMD) and neutral detergent fiber (NDFD) was calculated. Fourteen feed resources were collected in each period. The most resources tended to have lower dry matter (DM) contents in HWP and CWP than in CDP and HDP. The crude protein (CP) contents of most resources tended to show the lowest value in CDP or HDP. The CP concentrations of *Brachiaria brizantha*, *Setaria incrassata* and *Coix lacryma-jobi* tended to be higher than those of the other resources. The DMD of *Brachiaria brizantha*, *Paspalum atratum* and *Pennisetum purpureum* in the four periods assumed to be stable and higher than that of the other resources. The most resources tended to show the highest DMD, OMD and NDFD in HWP or CWP. Although the digestibility of the most resources was over 30%, the digestibility of *Imperata cylindrica* was below 25%. The periods divided by the temperature and rainfall caused the variance of chemical composition and digestibility.

**Keywords:** chemical composition, feed, Gramineae, *in vitro* digestibility, Philippines

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## Chemical composition of forages and browses offered to stall fed goats on smallholder farms in Mauritius

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### Abstract

A survey was conducted on the utilization of forage species in smallholder goat farms in 4 regions (Canot, Lallmatie, Riche Terre and St Hubert) representative of different agroclimatic zones of Mauritius. The survey involved a total of 17 goat farmers and consisted of formal and informal interviews with the aim of characterising the types of forages collected by farmers during the wet and dry periods to depict any seasonal availability. A wide range of forages totaling to 41 species was collected by farmers for feeding to goats during both wet and dry season. Forages were grouped as climbers, grasses, trees and other herbaceous plants including sugarcane tops. Use of some species on farms was specific to some regions while on other farms some species were used only during the dry season when commonly used species were not available. Tree species were used on all farms, with species like *Leucaena leucocephala* (Acacia) and *Litsea glutinosa* (Bois d'oiseau à petites feuilles) having an island wide distribution. Other tree species like *Albizia lebbbeck* (Bois Noir), *Melia azedarach* (Lilas), *Santalum album* (Chandan) and *Litsea monopelata* (Bois d'oiseau à grandes feuilles) were used only on farms in specific regions, indicative of localized distribution. Some farms used tree species as sole diet while most farms use it in combination with grasses. There was wide variation in the chemical composition of the forages, namely, crude protein (CP) 3.2 to 34.5%, crude fibre (CF) 13.4 to 55.8%, ash 4.2 to 12.8%, acid detergent fibre (ADF) 23.7 to 66.2%, neutral detergent fiber (NDF) 45.0 to 88.6% and lignin (ADL) 1.6 to 44.1% . The average CP content of climbers, grasses, trees and other herbaceous plants was 15.7, 9.2, 16.7 and 13.2% respectively. The total phenolics (TP), total tannins (TT) and condensed tannins (CT) contents ranged from 0.57 to 12.8, 0.27 to 10 and 0.02 to 2.5 %, respectively. The highest TP content was found in *Syzygium cuminis* (Jamblon) (12.8%) while highest TT and CT was found in *Schinus terebenthifolius* (poivrier marron) (10.8% and 2.5%, respectively) and jamblon (10.0% and 0.93%, respectively). Tree species were categorized according to phenolic content: low to negligible levels (<1%) (lilas), intermediate level (1-5%) (Acacia, Bois Noir, Ti feuilles and Gros Feuilles), high levels (>5%) (poivre marron and jamblon). This study showed that forages collected by farmers can meet the nutrient requirements of the animals for maintenance when fed in adequate amounts. Study also showed that tree species such as Acacia, Lilas, Bois Noir, Ti Feuilles and Gros Feuilles are available throughout the year and represent good sources of protein that can be exploited as alternatives to partly replace concentrates for enhancing productivity on goat farms.

**Keywords:** smallholder farms, goats, forages, tannins, crude protein

## Feed intake and serum metabolite of goats fed crude glycerin from waste vegetable oil

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### Abstract

This study aimed to evaluate the effects of crude glycerin from waste vegetable oil (CGWVO) supplementation on feed intake, blood metabolites, and hormone concentrations of goats. Four-Thai Native x Anglo Nubian crossbred growing male goats with an average body weight of  $31.5 \pm 1.9$  kg were randomly assigned according to a 4x4 Latin square design with four consecutive 21-d periods. Treatment diets contained 0, 2, 4, and 6% of dietary DM of CGWVO. Goats were fed unlimited amounts (*ad libitum*) as a total mixed ration (TMR). Based on this experiment, there was no significant difference ( $p > 0.05$ ) among treatment groups regarding daily DMI (total DMI, % BW, and g/kg BW<sup>0.75</sup>), except DMI of goat fed 6% of CGWVO in the diets which was the lowest ( $p < 0.05$ ) as compared with other treatments. The blood glucose, BHBA and packed cell volume (PCV) were similar among treatments ( $p > 0.05$ ), whereas plasma insulin was significantly ( $p < 0.05$ ) higher as higher levels of CGWVO were incorporated into diets. The data suggest that CGWVO (63.42% of glycerol, 4.38% methanol, and 47.78% of crude fat) may be used in diets of goats with concentrations up to 4% without negative effects on feed intake and blood.

*Keywords: By-product, crude glycerin, waste vegetable oil, serum metabolite, goat.*

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## Nutritive value of oil palm fronds treated with white rot fungi

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### Abstract

The effects of white rot fungi (WRF) treated biologically on chemical composition of oil palm fronds (OPF) were investigated using a completely randomized design with a 6x3 factorial arrangement consisting of eighteen treatments and four replicates. Fungal treatments decreased ( $p<0.05$ ) the amount of neutral detergent fiber (NDF) and acid detergent fiber (ADF) but increased ( $p<0.05$ ) crude protein (CP) content of OPF. As a result of this experiment, treatment of OPF with six WRF particularly *Lentinus sajor-caju* (LSc) and *Schizophyllum commune* (SC) resulted in reducing of its cell wall components and increasing of CP and adding a high amount of urea (0.5-1%) intended to increase CP in OPF.

*Keywords: Fungal treatment, oil palm fronds, nutritive value, white rot fungi*

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**Effect of chemical treated shrimp meal on growth performances of broilers**

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**Abstract**

The present study was performed to evaluate whether formic acid treated shrimp meal (SM) is more suitable protein source for broilers than untreated one. Seven dietary groups (5 chicks each) were allocated to one of the 7 experimental diets (control diet and diets containing 5%, 10% and 15% of untreated SM (SMu) and treated SM (SMt). Their growth performance was measured from 8 to 35 days of age with free access to diets and water.

The growth performance data exhibited that body weight gain (BWG) decreased with increasing level of SMu and SMt, and this tendency was prominent in untreated groups, although 5% SMu and SMt groups showed similar and greater BWG, respectively, comparing with control group. Feed intake decreased slightly with increasing level of SMu, but increased in 5% SMt group and unchanged in 10% and 15% SMt groups. Feed conversion ratio (FCR) deteriorated with increasing level of SMu and SMt, except 5% SMu and SMt groups showing similar FCR to control group. The deteriorating tendency was prominent in untreated groups. Similarly, nitrogen retention in SMu and SMt groups showed reduction with increasing level of SM and the reduction effect was somewhat greater in SMu groups. Chitin digestibilities in SMt groups were greater than corresponding values in SMu groups. In conclusion, it is suggested that formic acid treated SM may be more suitable protein source for broiler diets than untreated one.

*Keywords: broiler, growth performance, shrimp meal, treatment*

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## **Nutritive value of grower pig ration using local feeds in West Manokwari District, Manokwari**

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### **Abstract**

A study was carried out to observe the nutritive value of grower pig ration using local feeds applied by farmers in West Manokwari district, Manokwari, Indonesia. Thirty-five pig farmers from 3 different places at West Manokwari district were used as respondents. Descriptive method with technical survey was used to know the followings: 1. Information on flock size of grower pigs owned by farmer, 2. Identification of local feeds used to formulate a ration, 3. Information on the quantity of each local feed used in the ration, and 4. Information on the frequency of grower pig feeding in a day. In addition, the chemical analysis of each local feed was applied. Data obtained was used to calculate the nutritive value (protein and energy contents) of the rations. Supporting data obtained were education background, age, and job preference of the farmer. Results showed that 80% of the grower pig rations using local feeds applied by the farmers in West Manokwari district had achieved the standard of protein requirement, but had not achieved the standard of energy requirement suggested by NRC. The majority of the farmers (49%) only had a high school education background. Approximately 86% of the farmer was in productive age, and about 63% said that pig farming was their primary job. In conclusion, local feeds were potential to be used as basic ingredient for the grower pig ration in West Manokwari district, however due to less knowledge of the farmer about feed formulation therefore the nutritive value (energy content) of the rations still below the nutritive standard suggested by the NRC.

*Keywords: grower pig ration, local farmer, nutritive value*

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## **The effect of chemical processing of soybean meal on *in vitro* ruminant intestinal available protein**

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### **Abstract**

The aim of this study was to investigate the effects of chemical processing of soybean meal on the amount of available crude protein at the duodenum (uCP) using a new modified gas technique. Evaluated samples were two samples of unprocessed soybean meal and one sample of processed soybean meal (heat processing with xylose) containing 495, 480 and 446 g/kg crude protein (CP), respectively. To perform the gas test, rumen fluid was collected before the morning feeding from two rumen fistulated Holstein dairy cows ( $640 \pm 38$  kg, body weight). Feed samples (200 mg) and blanks (only 30 ml of buffered rumen fluid) incubated simultaneously in three repeats and three runs for 8 and 24 hours. At the end of the each incubation time, the uCP was calculated as non-ammonia N which was calculated by subtracting the amount of ammonia N released in the incubation medium of the total incubated N (sum of N content of feed sample and ammonia N in blanks). Effective uCP (EuCP) was calculated via an exponential equation using the estimated uCPs at 8 and 24 h post incubation. Ratio of effective uCP (at the passage rate of 0.1/h) to the CP content of feed samples for processed soybean meal and two untreated soybean meals were 0.873, 0.747 and 0.785 (SEM=0.0355), respectively. These results showed that the processing had no significant effect on the amount of EuCP of soybean meal ( $P > 0.05$ ). However, the amount of relative EuCP for processed soybean meal was 10-15 percent greater than untreated soybean meals.

*Keywords: soybean meal, protein*

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## **The effect of Mao pomace supplementation in diets on blood parameters of meat ducks**

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### **Abstract**

The objective of this study was to determine the effects of dietary supplementation with Mao pomace on blood parameters in meat duck. One hundred and twenty 1-d-old Cherry Valley duck were allocated to three treatments with four replicates based on a Completely Randomized Design. Dietary treatments were included 0% (Control), 0.5% and 1.0% Mao pomace powder. Blood parameters of ducks aged 54 days were determined for hematocrit, red blood cell count, white blood cell count, heterophil, lymphocytes, cholesterol and triglyceride. The results showed that ducks fed with Mao pomace at level of 0.5% significant decrease ( $P < 0.05$ ) in cholesterol and triglyceride concentrations.

*Keywords: Mao pomace, meat duck, blood parameters*

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## **Study of potential local feeds for pig farming development in Manokwari, West Papua, Indonesia**

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### **Abstract**

A study was carried out to observe the potential of local feeds for pig farming development in Manokwari, capital city of West Papua, Indonesia. Descriptive method with technical survey was used to know the followings: 1. Information on pig management systems, housing, flock size, and use of local feeds, 2. Identification of local feeds used by farmers, 3. Formulation of pig rations using local feeds based on the nutritive value of local feeds. Results showed that: 1. Most of the farmers (88%) in Manokwari used simple permanent housing in raising pigs. Half wood open-sided pig houses formed the greater proportion (70.9%) of pig housing maintained by the farmers in the study area. The rearing system practiced by the farmers was intensive system. The majority of the farmers kept less than 50 pigs in a flock. All of the farmers used local feeds as pig rations but without formulating properly. 2. Local feeds which were potential to be used for pig rations were fish waste, tofu waste, soybean hull, mung-bean hull, rice bran, banana peel, taro peel, market waste (vegetable stalks), and restaurant waste. The production of those feeds per day was 1000 kg, 2400 kg, 55.5 kg, 83.4 kg, 11,386.6 kg, 127.5 kg, 11.4 kg, 546 kg, and 2056.6 kg, respectively. 3. Local feeds available can be used as ingredients for pig rations when formulated properly. In conclusion, available local feeds in Manokwari were potential in supporting pig farming development when formulated properly.

*Keywords: local feeds, pig farming, pig ration*

## Effects of recombinant *Saccharomyces cerevisiae* on ruminal degradability in Thai native cattle

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### Abstract

This study evaluated ruminal degradability of two feeds – (1) maize cob and husk (MCH) and (2) rice straw (RS) – supplemented with recombinant *Saccharomyces cerevisiae* by *in vitro* gas production technique. Total DNA extracted from *Shewanella putrefaciens* was used for PCR amplification using the *pfaE* gene primer. The PCR products were cloned using plasmid vector pTA2 and transformed with *S. cerevisiae*. The experiment was designed as a 3 × 2 factorial in a completely randomized design (CRD) arrangement of six treatments. The factors were type of roughage (MCH or RS) and yeast supplementation (control: C, *S. cerevisiae*: SC and recombinant *S. cerevisiae* harboring *pfaE* gene from *S. putrefaciens*: SCSP). Rumen fluid was collected from four fistulated Thai native cattle. Gas production was determined after incubating for 4, 6, 8, 12, 24 and 48 h. Microbial biomass yield (MBY) was determined after incubating for 24 h. According to the results, gas production after incubating roughage supplemented with SC and SCSP for 8 and 12 h was significantly higher than C; gas production after incubating roughage supplemented with SC for 24 h was highest ( $P < 0.05$ ). Roughage supplemented with SC had the highest organic matter digestibility (OMD), metabolizable energy (ME) and short-chain fatty acid (SCFA). The interaction effect between the type of roughage and yeast supplements was found on the MBY. The RS supplemented with SCSP responded to MBY, then MCH. Roughage supplemented with recombinant *S. cerevisiae* increased gas production, OMD, ME and SCFA.

*Keywords: S. cerevisiae, S. putrefaciens, ruminal degradability, maize cob and husk, rice straw*

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## Effects of cassava treated lactic acid supplementation on dry matter degradability and rumen fermentation in beef cattle

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### Abstract

Objectives of this study were to investigate the effect of lactic acid (LA) treated cassava in rations with low or high rice straw on dry matter degradability and rumen fermentation in beef cattle. Four experimental rations contained either high-forage (HF, 30% DM of rice straw) inclusion either 35% of cassava treated water (UTC) or LA treated cassava (LA-TC) ration or low-forage (LF, 15% DM of rice straw) inclusion either 50% of UTC or LA-TC ration. The effect of the experimental rations on dry matter degradability in rumen fluid was performed using gas technique. The *in vivo* trial, four fistulated beef cattle were each fed the four experimental rations with a 4×4 Latin square with 2×2 factorial arrangement treatment. Results of the *in vitro* trial indicated that the level forage, but not the LA-TC affects the cumulative gas production. Irrespective of LA-TC, gas production was significantly higher ( $P<0.05$ ) for the LF rations compared with the HF rations. The *in vivo* trial showed that DM intake was not affected ( $P=0.32$ ) by dietary treatments. Mean rumen pH was lower ( $P=0.04$ ) for the LF rations compared to the HF rations. The supplementation of LA-TC significantly ( $P=0.01$ ) increased rumen pH compared to UTC rations. Total VFA concentrations in the rumen fluid were significantly greater ( $P=0.05$ ) for the LF rations compared to the HF rations, but was not affected by the supplemental LA-TC. All dietary treatments had no effect on the concentration of lactate in rumen fluid. In conclusion, both supplemental low and high LA-TC did not affect cumulative gas production and rumen fermentation. However, feeding a low forage ration containing high LA-TC was shown to improve rumen pH. The results reveal that the amount of forage in the ration is an important element in improving rumen pH.

*Keywords: cassava treated lactic acid, gas production, rumen fermentation, beef cattle*



## **Feeding trait, reproductive and productive system, trading and slaughter as meat resources of goat for farmers in mid hills of Nepal**

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### **Abstract**

This study was commissioned to assess the feeding traits, reproductive and production systems, and trading and slaughter as meat resources of goat in mid hills of Nepal. A total of 120 goat farms from Kaski, Tanahun and Palpa districts of Nepal were visited and each farm was interviewed using a structured questionnaire. The livestock raising integrated with crop production is preferred by farmers in this region. Most of the farms kept the indigenous Khari goats, either in pure flocks or in crossbreeding with Jamunapari. The farmer's kept 4.4 goats, 2.2 buffaloes, 2.3 cattle, 13.0 poultries and 1.7 pigs per household, averagely. The survey report also summarizes that purpose of farmers raising goat for meat (77.5%), manure (10.0%) and meat & manure (12.5%). The types of goat farming were commercial (5.0%), semi-commercial (52.5%) and subsistence (42.5%). The nature of feeding for goat farmers was stall feeding (22.5%), stall feeding & grazing (72.5%) and grazing only (5.0%). The place of grazing by farmers was in own land (27.3%), community forest (66.7%) and the other places (6.0%). The time of grazing was three to four hours (84.8%), five to six hours (6.1%), six to seven hours (3.0%) and seven to eight hours (6.1%). The buck for natural breeding was borrowed (13.1%) or owned (63.2%) or hired (23.7%). All the farmers preferred to the natural breeding method. The percentage of the farmers who maintained the breeding record was 42.5%. The number of goat for sale, purchase and slaughtered by the farmers was the most in October, 2014 (79, 27 and 42 head, respectively). It was due to many goats utilization as sacrifices and meat resources during one of the largest festivals in Nepal. The number of sale was higher than that of purchase and slaughtered. Goat production was an important component of subsistence farming system in Nepal, contributing to meat, farm manure and cash productions. Therefore, the study identified trainings in improved goat husbandry and research on improved goat genotypes in Mid hill of Nepal were required.

*Keywords: feed, indigenous goat, Nepal, trade*

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## Feeding value of dried cashew nut testa in finishing pigs: effects on growth performance, economic return and carcass characteristics

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### Abstract

A total of 48 LYD finishing pigs (initial BW of 82.1 kg) were used to determine the effect of dried cashew nut testa (DCNT) on growth performance, economic return, and carcass characteristics in finishing pigs. Pigs were randomly allotted to 8 treatments using a 4 × 2 factorial arrangement in a randomized complete block design. Diet and gender were the factors. Dietary treatments were: corn-SBM diet with no DCNT and corn-SBM diet with 5% unsoaked DCNT (unsoaked DCNT), 5% unsoaked DCNT with added fat (unsoaked DCNT + fat), and 5% soaked DCNT (soaked DCNT). No interactions ( $P > 0.23$ ) were observed on growth performance. There were no differences in ADG, ADFI, F/G, final BW, and caloric efficiency among pigs fed the different diets. Barrows were heavier (106 kg;  $P < 0.05$ ) and had greater (1.04 kg/d;  $P < 0.01$ ) ADG than gilts (98 kg and 0.87 kg/d, respectively). Margin over feed cost ranged from 649.8 to 711.6 baht/pig, with pigs fed the unsoaked DCNT having the least net margin while pigs fed the soaked DCNT having the greatest net margin. There were no ( $P > 0.20$ ) interaction and diet effects on carcass characteristics. However, barrows had heavier (80 kg;  $P < 0.05$ ) hot carcass weight than gilts (73.82 kg). Back fat thickness at P2 and LSQ of gilts were better ( $P < 0.05$ ) than barrows. Therefore, in areas where DCNT is abundant, readily available, and cheap, inclusion of 5% soaked DCNT may be used in finishing pig diets.

*Keywords: alternative feed stuff, dried cashew nut testa, growth performance, carcass characteristics, pigs*

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## Effect of oral administration of red ginger extract on performances of hybrid ducks

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### Abstract

Red ginger is one of traditional herbs popular among people in Asia for healing and disease prevention. It has been reported to have antimicrobial effect, but some reports indicated improving performances of broiler. The purpose of the research was to evaluate and find the best level of oral administration of turmeric water extract use on performances of hybrid duck. The result was expected to contribute knowledge on the use of red ginger for hybrid duck performance improvement. In this experiment, there were 5 treatments P0: basal feed, P1: basal feed+antibiotic, P2: basal feed+red ginger extract 0.7 ml/duck/day, P3: basal feed+ red ginger extract 1.4 ml/duck/day and P4: red ginger extract 2.1 ml/duck/day with oral treatment on performances of hybrid duck. Variables in this research were feed consumption, body weight gain, feed conversion ratio and IOFC. The method of this research was experiment arranged in Completely Randomized Design and if there was a different effect among the treatments would be further tested by Duncan's Multiple Range Test. The result of this research showed that the use of red ginger extract with oral treatment highly significantly affected on feed consumption, body weight gain, feed conversion ratio and IOFC ( $P < 0,01$ ). The conclusion of this research was oral administration of red ginger extract would improve performances of hybrid duck and it is suggested to use 2.1ml oral administration of red ginger water extract per duck per day.

*Keywords: Red Ginger, Oral Administration, Performances, and Hybrid Duck*

## **The inclusion effect of mangosteen (*Garcinia Mangostana L.*) peel as feed additive on blood profile and testosterone level of Mojosari male duck**

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### **Abstract**

The research was aimed to investigate the effect of Inclusion of Mangosteen peel meal (MPM) as feed additive on blood lipid profile and testosterone hormone level of Mojosari male duck. The material used in this study was 40 males Mojosari duck at the age of 10 months. The method used an experiment with a completely randomized Design with 4 level mangosteen inclusion on basal diet : were P0 = basal feed (without MPM ), P1 = 1 , P2 = 2, and P3 = 3 g MPM/day/bird; with 5 replications(@2 male ducks each).

The variables measured were total cholesterol, triglycerides, HDL and LDL, and testosterone hormone level. The results of this research showed that inclusion of MPM significantly affected to testosterone level, but not significant effect on blood serum lipid profile. The average value of cholesterol, triglyceride, HDL and LDL and testosterone level of blood were: cholesterol (P0 = 188.0 , P1 = 162.4, P2 = 170.8 and P3 = 167.2 mg/dl), triglycerides (P0 = 182.8, P1 = 140.8, P2 = 179 and P3 = 161.8 mg/dl), HDL (P0 = 103.3, P1 = 144.28, P2 = 99.94 and P3 = 106.56 mg/dl), LDL (P0 = 45.52, P1 = 26.66, P2 = 31.04 and P3 = 28.28 mg/dl), and testosterone level (P0 = 232.8, P1 = 262.0, P2 = 372.8, and P3 = 349.4 ng/dl), respectively. The inclusion of MPM as feed additive tended to improve the lipid blood profile and testosterone level of Mojosari male duck.

*Keywords: Mangosteen peel meal, Mojosari duck*

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## **The effects of quantitative restricted feeding on performances and internal organ weight broiler**

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### **Abstract**

This research was aimed to evaluate the effects of quantitative restricted feeding in different time period on production performance, carcass percentage, and internal organ. One hundred and sixty unsexed broiler (Lohmann) were used in this research and designed by Completely Randomized design. The treatments was 80 % feed restriction for normal recommended feed consumption. Four levels of feeding were P0 (*ad libitum*), W3 (feed restricted on week 3), W4 (feed restricted on week 4), W5 (feed restricted for week 5). Results showed that there were no negative effects of quantitative restricted feeding on performance in broiler and internal organ weight. The treated chicks tends to have lower feed consumption and conversion, low abdominal fat carcass percentage, and no differences of growth performance, internal organ weight and physical carcass properties compared to control.

*Keywords : broiler performance, quantitative restricted feeding*

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## Allometric productivity forage and goat foraging behaviour in rangeland at Ebelo Amboasary in Southern of Madagascar

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### Abstract

Foraging activities rhythms of ruminants depend on biomass availability assessed by destructive and/or no destructive processes in rangelands. In Southern of Madagascar, relationships between forage availability (dry matter DM) and goat foraging behaviour with six goat adults such as bite rate have been analysed with allometric parameters such as leaf area index and branches number during two periods. In four identified pastureland vegetation groups, four dominant forage species such as *Acacia farnesiana*, *Poupartia caffra*, *Rhigozum madagascariense* and *Ziziphus mauritiana*. *Poupartia caffra* presented best value of leaf area index with  $26.47 \pm 3.54 \text{ m}^2$  ( $p < 0.05$ ). Available biomass was higher with significant difference ( $p < 0.05$ ) such as *Acacia farnesiana* with  $14.70 \pm 9.40 \text{ kg DM per plant}$ ; *Poupartia caffra* with  $71.52 \pm 47.38 \text{ kg DM per plant}$ ; *Rhigozum madagascariense* with  $6.04 \pm 3.41 \text{ kg DM per plant}$  and *Ziziphus mauritiana* with  $5.66 \pm 1.65 \text{ kg DM per plant}$ . Branches number parameter has been better for biomass estimation ( $r^2 = 0.92$ ) than leaf area index ( $r^2 = 0.04$ ). *Acacia farnesiana* range presents a best foraging and persistent daily bites ( $7\text{-}8 \text{ bites.mn}^{-1}$ ,  $p < 0.05$ ) with high availability of forages species. Primary productivity effects have been determinate by seasonality, rangeland ecology and defoliation. Plant – animal interactions allow selecting, developing best autochthonous forage species and restoring semi-arid rangelands.

**Keywords:** allometric, biomass, bite, goat, Madagascar.

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## Effect waste of cabbage on rabbit meat

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### Abstract

The research aims to study the pesticide residues in agricultural waste leaves of cabbage and meat rabbits consuming agricultural wastes cabbage leaf. The materials used are 12 New Zealand White rabbits weaning age of 1.5 months stratified by body weight. Rabbits fed cabbage waste maintained until the age of 3 months with the addition of concentrate feed in the form of concentrate. The method used is the exploration of the observed and variables are residues in meat, fat and water content of the meat. Results showed that there is some kind of pesticide residues in cabbage leaves that endosulfan, profenofos and klorprifos respectively of 0.0017; 0.0028; 0.0012 ppm. Rabbit meat contained pesticide residues, namely endosulfan, profenofos and klorprifos. The amount of pesticide residues in rabbits each major group (B) 0.00043; 0.00091; 0.0029 ppm. Groups are (S) .00035; 0.00040; 0.0015 ppm. Small groups (K) 0.00012; 0.0014; 0.0006 ppm The content of the fat content of meat rabbits fed forage kale waste is a large group (B)  $3.28 \pm 0.17\%$ ; moderate group (S)  $2.93 \pm 0.24\%$ ; and a small group (K) was  $2.80 \pm 0.08\%$ . Moisture content of meat from rabbits fed cabbage agricultural waste from a large group (B) of  $66.78 \pm 0.73\%$ ; moderate group (S)  $65.78 \pm 0.44\%$ ; and a small group (K)  $65.55 \pm 0.39\%$ . The conclusion of this study is commonly used cabbage leaves farmers as the primary forage feed rabbits are some pesticide residues, but still below the specified threshold so as not to endanger livestock that consume. Giving waste cabbage leaves do not affect the levels of fat and water content in meat rabbits. Advice can be given that agricultural waste which will be given to rabbits should be withering / inn a few days to lower the value of the level of pesticide residues.

*Keywords: Agricultural waste cabbage, New Zealand white rabbit, residual meat*

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## Nutrient utilization in grower pigs fed a protein concentrate blended with sweet potato roots either boiled or ensiled with or without vines

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### Abstract

Blending sweet potato (*Ipomoea batatas*, L. (Lam)) with a protein concentrate for pig feed is a common strategy used by small-scale livestock farmers across Africa, Asia and the Pacific. However, high dietary fibre in sweet potato (SP) forage may reduce nutrient utilization and energy metabolism and reduce the growth rate of young pigs. A 32 day metabolic trial with grower pigs using a 4 × 4 Latin Square design tested the hypothesis that there would be no difference in Apparent Total Tract Digestibility (ATTD) of nutrients, energy and N-balance in 25 kg grower pigs (Large White × Landrace × Duroc) fed diets with 57-60% of Dry Matter (DM) as SP roots, either boiled (SPBR43) or ensiled (SPERV40) with or without vines (SPER43), compared with a commercial pellet feed (STDPG). Blended SP diets provided about 14-15% CP, 16.1-16.3 MJ DE/kg DM and 0.52-0.54 g lysine/MJ.DE (on DM basis). The STDPG contained 16.5% CP, 14.8 MJ DE/kg DM, 0.58 g lysine/MJ DE. The major findings were: 1) DM intake was significantly higher ( $p < 0.05$ ) for SPBR43 than SPER43, SPERV40 and STDPG diets, which were similar; 2) DM ATTD and energy utilization were significantly higher ( $p < 0.05$ ) in pigs fed SP diets; 3) Carbohydrate (Nitrogen Free Extracts) ATTD was higher ( $p < 0.05$ ) in pigs fed SPBR43 and SPER43 diets while crude protein ATTD of both these diets was similar to STDPG and higher than SPERV40; 4) ATTD of fats (Ether Extracts), CP, carbohydrates (NFE) and total phosphorus was lower ( $p < 0.05$ ) on SPERV40, but crude fibre ATTD higher; 5) N intake and N retained were similar ( $p > 0.05$ ) for pigs fed SPBR43, SPER43 and STDPG diets but lower for SPERV40 ( $p < 0.05$ ). We noted that SP roots, either boiled or ensiled, nutrient and energy utilization in pigs were higher, but the inclusion of vines lowered ATTD, energy utilization and N retained in the mixed roots and vine diet. It is concluded that boiled or ensiled SP root are equally valuable as blended feed for grower pigs. However, a higher proportion of SP vine in ensiled feed tested in this work reduced nitrogen digestibility and pig performance.

*Key words: blend feeding, grower pigs, nutrient utilization, N retained, sweet potato*

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## Ileal and total tract digestibility in growing pigs fed rice bran supplemented with ensiled taro (*Colcacia esculenta*) leaves

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### Abstract

The aim of the study was to determine the nutritional value of ensiled taro (*Colcacia esculenta*) leaves by ileal and total tract digestibility in growing pigs. Taro leaves were ensiled alone or with equal parts of taro petioles or 5% molasses. After 21 days, the lactic acid concentrations (% on DM) were 1.27, 1.45 and 1.49, and pH was 4.5, 4.0 and 3.9, for leaves alone, leaves plus stems and leaves plus molasses, respectively. Ensiling the taro leaves reduced oxalate concentrations by 30% on leaves alone and by 50% when petioles or molasses were added. In order to evaluate the protein value of taro leaves, pigs equipped with T-cannula in the distal ileum were fed a control diet containing 95% rice bran and 5% rice wine byproduct or 50% of the control diet and 50% of taro leaf silage. The N retention increased from 15.9 to 21.9 g/day and the biological value of protein from 69 to 79% when the taro leaf silage replaced 50% of rice bran. Based on our findings, it can be concluded that ensiled taro leaves are a good and alternative dietary protein source for growing pigs when fed at level of 50% of diet.

*Keywords: Silage, taro leaves, ileal and total tract digestibility, oxalate, pigs*

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## Effect of maize cob and husk ratio in Pakchong 1 Napier grass silage on nutritive value and *in vitro* gas production in Thai native cattle

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### Abstract

This study evaluated the chemical composition and *in vitro* ruminal degradability of Pakchong 1 napier silage combined with maize cob and husk in different ratios. The Pakchong 1 napier grass was harvested at 45 days of maturity. The Pakchong 1 napier grass was ensiled with maize cob and husk at ratios of 1:5, 1:10 and 1:15. Three fistulated Thai native cattle (White Lamphun cattle) with an average weight of 154±4.7 kg were used to determine ruminal degradability by *in vitro* gas production technique. Gas production was recorded after incubating for 2, 4, 8, 12, 24, 48, 72, and 96h. The microbial biomass yield (MBY) was determined after incubating for 24 h. DM of maize cob and husk mixed with Pakchong 1 napier grass declined as the ratio of Pakchong 1 napier grass in both fresh and silage form. NDF and ADF of maize cob and husk mixed with Pakchong 1 napier grass silage declined as the ratio of Pakchong 1 napier grass. Gas production of maize cob and husk mixed with Pakchong 1 napier grass increased as the ratio of Pakchong 1 napier grass. OMD, ME and MBY did not differ.

*Keywords: Pakchong 1 Napier, Silage, Maize Cob and Husk, Ruminal Degradability, Thai native cattle*

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## Nutrient composition and *in vitro* ruminal degradability of selected local plants used as goat feed in Malaysia

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### Abstract

A comparative study of nutrient composition and *in vitro* ruminal degradability of selected local plants (*Macaranga* sp. and *Mallotus* sp.) and Napier grass (*Pennisetum purpureum*) used as goat feed were carried out. Napier grass was used as a control group as it is common and widely been used (e.g fibre source) in goats diet. All plants were analyzed for nutrient composition by proximate analysis (dry matter; crude protein; crude fibre; crude fat) and *in vitro* ruminal degradability was performed to determine the total gas and volatile fatty acids (acetate; propionate; butyrate) production. The result obtained from proximate analysis revealed that there were significant difference ( $P < 0.05$ ) of all nutrient composition for each local plant species against Napier grass. Dry matter content was highest in *Macaranga* sp.(50.92%) followed by *Mallotus* sp. (45.41%) and Napier grass (13.04%). Crude protein was highest in *Macaranga* sp. (7.18%) followed by *Mallotus* sp. (6.78%) and Napier grass (3.88%). *Mallotus* sp. has the highest crude fat content (5.22%) followed by *Macaranga* sp. (4.85%) and Napier grass (2.84%). As for crude fibre content, Napier grass showed the highest content (25.38%) followed by *Mallotus* sp. (15.47%) and *Macaranga* sp. (12.00%). For the *in vitro* ruminal degradability, the highest total gas production was shown by Napier grass (31.00ml), followed by *Macaranga* sp. (28.67ml) and *Mallotus* sp. (23.33ml). Acetate production was highest in *Mallotus* sp. (733.49mM/ml) followed by Napier grass (605.61mM/ml) and *Macaranga* sp. (599.85mM/ml) whereas propionate production was highest in *Mallotus* sp. (28.61mM/ml) followed by Napier grass (24.45mM/ml) and *Macaranga* sp. (24.23mM/ml). As for butyrate production, Napier grass showed the highest value (11.26mM/ml), followed by *Macaranga* sp. (11.19mM/ml) and *Mallotus* sp. (10.36mM/ml). However, there was no significant difference shown for acetate, propionate and butyrate production between all samples. Thus, based on the nutrient composition and *in vitro* ruminal degradability findings, it shows that these local plants could be used as a good feed source for goats. In addition, a proper feeding regime using these local plants need to be considered in order to ensure a balance diet for the goats.

**Keywords:** *Macaranga* sp., *Mallotus* sp., napier grass, proximate analysis, ruminal degradability

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## Effects of dietary *Bacillus*-based probiotics (Sanizyme®) on growth performance and digestibility in weaning piglets

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### Abstract

Sanizyme is the trade name for *bacillus subtilis*-based probiotics for alternative strategies to improve animal production and health. For this study, the experimental was evaluated the efficiency of probiotics Sanizyme supplements on weaning pigs. A total of 700 crossbred piglets [(Yorkshire x Landrace) x Duroc] with an initial body weight (BW) of 6.80± 0.5 kg at 21 days were allotted to five dietary treatments (35 piglets/pen, 4 pens/treatment) according to a randomized complete design. Dietary treatment included: 1) CON (basal diet); 2) Pro A (basal diet+*bacillus subtilis* [1x10<sup>12</sup> CFU/kg] at 0.1%) and basal diet+*bacillus subtilis*-based (1x10<sup>9</sup> spores/g) at levels 0.0125, 0.0250 and 0.0375% were representative in SZ1, SZ2, SZ3 respectively. During the experimental period, the results from these three levels supplementation Sanizyme in weaned or nursery feed showed improvement in digestibility of carbohydrate, fat and protein in feed components ( $P<0.05$ ) and remarkable improvement in body weight gain (BWG), average daily gain (ADG) and uniformity of body weight at termination (UBWT) ( $P>0.05$ ). Moreover supplemented with SZs showed linear benefit of feed efficiency (FCR) ( $P<0.05$ ). Addition SZs showed linear lower feed cost per kilogram body weight gain when increasing 3 graded levels of Sanizyme in feed and also graded increasing in both net profit per head and economic benefits return over those fed the unsupplemented CON treatment ( $P<0.05$ ). Addition of Sanizyme at the level of 0.0375% feed appears to be the maximum response on growth and feed utilization when compared with pigs fed the basal diet. The results showed that Sanizyme can be used for probiotics, assisted digestion and enhancer growth in weaning pigs.

**Keywords:** *Bacillus subtilis*, digestibility, growth performance, economic benefit, weaning pigs

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**Effect of crude glycerin supplementation on performance of dairy heifers**

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**Abstract**

Crude glycerin is a by-product of biodiesel production and has recently become more available as a livestock feed with the growth of the biofuel industry. The objective of this study was to investigate the effect of palm based crude glycerin as an alternative for energy feedstuff in dairy heifers. Twenty crossbred Holstein (87.5-93.75%) heifers,  $211.4 \pm 59.3$  kg initial body weight were used in randomized complete block design, composed of 4 treatments for 60 days period. The heifers were fed concentrate diet with increasing level of crude glycerin (0, 4, 8 and 12%). Napier grass was used as a roughage source, containing 60% of total DM of the diet. Increasing crude glycerin levels had significant differences in ADG (498.2, 574.0, 621.3, 579.5 g/d, respectively). However, There were no statistically significant differences on DMI, F:G and C:G among treatments. Therefore, inclusion of crude glycerin at low level can be beneficial to dairy heifer performance.

*Keywords: glycerin, heifers, performance*

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## Evaluation of urea-yeast fermented fresh cassava root as protein source by using *in vitro* gas production technique

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### Abstract

The objective of this study was to evaluate pattern of fresh cassava root fermentation to develop as protein source on nutritive values. Investigated 4 methods of ground fresh cassava root fermentation; thus, solely fermented fresh cassava root (FFCR) (T1), FFCR with urea (T2), FFCR with urea - yeast in closed system (T3), and FFCR with urea and yeast in opened system (T4). The experiment was arranged following Completely Randomized Design (CRD). It found that methods of cassava root fermenting were not affect on ash ( $P>0.05$ ). On the other hand, CP content was increased ( $P<0.01$ ) when urea was mixed in fermentations. The NDF of T3 and T4 was decreased lower than of T2 ( $P<0.01$ ). The *in vitro* gas production technique parameters were analyzed as following. Ammonia nitrogen ( $\text{NH}_3\text{-N}$ ) in fermented fluid of T1 was lower ( $P<0.05$ ) than of T2, T3 and T4 at 3, 6, and 9 hour of incubation time. At 12 and 24 hour of incubation time, the  $\text{NH}_3\text{-N}$  of T3 and T4 was higher than of T1 and T2 ( $P<0.05$ ). The kinetics of gas production, it found that, rate of gas production (c) were not differ among treatments ( $P>0.05$ ). Gas volume at 0 hour of incubation time ) a) of T2 was lower than of T3 and T4 ( $P<0.05$ ). Potential of gas production (d) and gas volume (b) of T1 was higher than the others ( $P<0.01$ ). It was conclude that incorporated urea with yeast in the fermentation could elevated CP level and decreased the NDF content in FFCR, furthermore, it could maintain  $\text{NH}_3\text{-N}$  level in the *in vitro* ruminal fermentation.

**Keywords:** cassava root, *in vitro* gas production, urea-yeast fermented

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## Effects of Gac fruit by product supplementation in layer diets on egg production and egg quality

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### Abstract

Yolk color is a valued important quality index for consumer. Pigments supplementation such as carotenoids can enhance the yolk color. Gac fruit (*Momordica cochinchinensis* (Lour.) Spreng.) is tropical fruit which rich of carotenoids and lycopene. The objective of this study was to examined the effects of supplementation gac fruit by produced (skin and pulp; GSP) as a source of carotenoids pigments on egg production and egg quality in laying hen diets. One hundred sixty, 56 week old of Esabrown were randomly distributed into 6 groups. Each groups had 3 replications and 9 layer hens per replicated. The dietary treatment were a basal diet without pigments as control or T1; T2 was control diet with addition 0.06% of synthetic pigments (SP) and T3 to T6 were control diet with addition 2, 4, 6 and 8% of GSP powder, respectively. Egg productive performance and egg quality parameters were that overall period (56-67wk) showed no significant differences ( $P>0.05$ ). Egg yolk color score were increased with increasing GSP supplementation (7.61, 8.20, 8.73 and 9.24, respectively) when compare with control (6.64), however, was lower than synthetic group (11.85). These data indicate that GSP in laying hen diet could provide adequate pigment supply for acceptable egg yolk color.

*Keywords: Layer hens, carotenoids, gac fruit*

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## **The effects of soybean meal treated with green tea marc crude extract on oxidative status and milk production of dairy cows**

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### **Abstract**

The objective of this study was conducted to evaluate the effects of soybean meal treated with green tea marc (GTM) crude extract in diet of transition dairy cows. Ten crossbred Holstein (>93.8%) cows in late gestation were paired according to expected calving date and randomly assigned to total mixed rations (TMR) containing either untreated SBM (control) or SBM treated with 5% GTM from 1 week prepartum to 3 weeks postpartum. The TMR contained dried para grass as roughage source. There was no statistically significant difference between treatments on dry matter intake, body weight, blood thiobarbituric acid reactive substance (TBARS), non-esterified fatty acids (NEFA) and  $\beta$ -hydroxybutyrate (BHB) concentration. However, milk protein yield at 2 and 3 week after parturition were higher for cows fed GTM diet than control group ( $P < 0.05$ ).

*Keywords: green tea marc, oxidative status, transition dairy cows*

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## Potential of seaweed as feed to make a healthy broiler meat chicken

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### Abstract

Based on the survey from WHO, countries who have population like Indonesia every year there are one million people who develop heart disease, 40 % died, 60 % of them helped and saved 10% of which will also be died. One possible cause is a buildup of cholesterol in the wall coronary arteries. High cholesterol in the body is because consumption broiler chicken meat contains a lot of saturated fat. To create healthy broiler chicken meat, feed engineering is required. It is required for eliminate adverse effects on consumers. Feed engineering can done in the form of addition of seaweed in broiler feed. Approximately 4.92 million tons of seaweed Indonesian untapped much is wasted into the waste often causes pollution environment. Seaweed is rich in dietary fiber that dissolves in water and can bind fat in the digestive tract to reduce fat in the body. This study aims to determine the effect of seaweed in lowering body fat broiler chickens. Research carried out experimentally by maintenance broiler chicken divided by two group, one group with usuall feed and one group with adding seaweed in the feed. Ration treatment consists of two kinds of treatment. Maintenance performed with broiler provision of commercial starter ration for 21 days and the separation to 20 according to treatment group, maintenance for 2 weeks. Measurement cholesterol levels, use Calorimetry Enzymatic method. The results of this study would be useful for seaweed product diversification for animal feed in order to function optimally. As well as reducing the risk of patient coronary heart disease through healthy chicken meat consumption in order to improve public health.

*Keywords: broiler, cholesterol, seaweed.*

## Effect of rumen content on the performance and external body measurement of sudanese desert kids

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### Abstract

Twelve Sudanese desert kids (less than one year old and of initial body weight 11.4 kg) were divided into three groups of equal number to study the effect of rumen content level on the performance and external body measurements. The study was conducted at small ruminant research unit in the Faculty of Agricultural Technology and Fish Sciences, Al-Neelain University Khartoum, Sudan. Three iso-nitrogenous diets containing graded levels of rumen contents (0%, 5%, and 15%) were randomly assigned to the kids groups. Feeding was on *ad libitum* base for 35 days. External body measurements of the kids were recorded at the start and the end of the experiment. Results revealed no significant differences between groups for feed intake and feed conversion ratio but the final weight gain is significantly decreased. External body measurements were significantly influenced by inclusion of rumen content.

*Keywords: sudanese desert kids, rumen content, performance, body measurement*

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## Effect dietary energy concentrate on birth weight and weaning weight of Sudanese Taggar goat kid's

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### Abstract

The objective of this study was to investigate the effect of supplementation nutrition on kid's birth weight and weaning weight of Taggar goat under traditional management in southern Kordofan state in west Sudan. Sixty three (63) kids of Taggar goats were used in this experiment. Animals were allocated to three feeding regimes in a complete random design. The results indicated that kids born to supplemented does secured higher birth weight compared with kids born to does unsupplemented (control group). Body weight at weaning was higher in kids born to supplemented does groups compared with kids born to unsupplemented does (control) group, also the daily body weight gain was higher for kids supplemented with concentrate rations as ay compared with control kids born to unsupplemented dose.

*Keywords: Taggar kids, concentrate ration, birth weight, weaning, Sudan*

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## **Efficacy of hydrate sodium calcium aluminosilicate and yeast cell wall (Fixar<sup>®</sup> Viva Dry) to ameliorate the toxic effects of aflatoxin in ducks**

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### **Abstract**

Aflatoxins are toxic metabolite produced by fungi that have serious problem for poultry production and human health. They have been associated various disease and abnormal signs. The aim of this experiment was to evaluate the efficacy of a hydrate sodium calcium aluminosilicate and yeast cell wall (Fixar<sup>®</sup> Viva Dry) to prevent aflatoxin toxicity in meat type ducks. Three hundred and thirty-six (336) one-day-old Cherry Valley ducks were randomly assigned to 7 dietary groups which consisted of 3 diets without adsorbent. Those are: <30 ppb (control), 60 and 120 ppb of aflatoxin in diets and 60 or 120 ppb of aflatoxin supplemented with Fixar<sup>®</sup> Viva Dry at either 0.05 or 0.10% in diets. Each treatment group was duplicated with 24 birds per pen (replicate). Feed and water were provided ad libitum throughout the 28 days trial period. The results showed that, Body weight gain were reduce by 11% and mortality was increased by 10% in duck fed diet contaminated with aflatoxin at 120 ppb compared to duck fed control diet. However, dietary Fixar<sup>®</sup> Viva Dry supplementation effectively alleviated overall toxicity induced by aflatoxin. Significant negative treatment-related changes in feather growth, eye necrosis, web-toe hemorrhage, leg deformity, tibia bone porosity, liver paleness and fat content, organ weight, serum biochemical values and decreased leak enzyme in blood serumas compared to the control were observed. Addition of Fixar<sup>®</sup> Viva Dry in the diets significantly reduced ( $P<0.05$ ) the adverse effects of aflatoxin on all the parameters measured near to those in the control group. This finding indicated that Fixar<sup>®</sup> Viva Dry, when added at the levels 0.05% in 60 aflatoxin diets or 0.10% in 120 aflatox in diets, could modulate the toxicity of aflatoxin. In conclusion, these results showed that Fixar<sup>®</sup> Viva Dry was effective in preventing the toxic effects of aflatoxin that may be present in poultry diets at the levels 0.05% feed

*Keywords: ducks, aflatoxin, absorbent, performance*

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## Effects of wet soya milk waste supplementation on feed intake and growth performance of goats fed corn stubble silage

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### Abstract

This experiment was aimed to study the effects of soya milk waste on feed intake and growth rates of post weaning goat were studied. Fifteen Boer x Saanen crossbred male goats, (4-6 month of age and average live weight of  $19.4 \pm 1.4$  kg) were used into three treatment diets under a completely randomized design (CRD) for 60 days study period. All animals were kept individually pen with free access water and mineral block. The goats fed *ad libitum* with corn stubble silage as roughage source. Three dietary treatments were commercial concentrate pellet diet (400 g), wet soya milk waste (800 g) and mixed commercial concentrate pellet diet and wet soya milk waste (200 g: 400 g), respectively. The results showed that feed intake, feed efficiency and body weight gain of goats were significant ( $P < 0.05$ ) different among the diets. Dry matter (DM), organic matter (OM), crude protein (CP), gross energy (GE), neutral detergent fibre (NDF) intake of goat fed commercial concentrate pellet diet were significantly higher than those of goat fed other diet. Average daily gain of goat fed commercial diet was higher ( $P < 0.05$ ) than those of goat fed soya milk waste diet and mixed commercial diet respectively. Feed efficiency was significantly higher in the soya milk waste diet.

*Keywords: Soya milk waste, Goat, Feed intake, Saanen crossbred, boer crossbred*

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## Effect of coconut oil supplementation on meal pattern, feed intake, and milk yield in early lactating crossbred dairy goat

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### Abstract

Coconut oil is one of coconut by products found in Thailand and it contains high amount of medium chain fatty acid. Feeding coconut oil as fat supplement improved lactation performance in dairy cattle. However, there was no information of coconut oil supplementation in dairy goat. Therefore, the current study aimed at investigating the effect of coconut oil supplement on feed intake, lactation performance and meal pattern in crossbred lactating dairy goat during early lactation. Six crossbred goats were used in the current experiment. Two week before parturition, animals were randomly divided into two groups (n=3). Treatments were control diet (44% corn silage and 56% concentrate) and 2% coconut oil supplementation diet (44% corn silage and 54% concentrate). Both diets are isoenergetic and isonitrogenous, each goat was fed ad libitum twice daily as total mix ration with free access to water for 5 weeks. Body weight, dry matter intake (DMI), DMI per body weight, milk yield and feed efficiency were not significant difference between groups. However, the results from meal pattern revealed the effect of coconut oil supplement. Meal duration was longer and meal size was greater in coconut oil supplemented group than in control group. The present experiment revealed that supplementation with 2% coconut oil in dairy goats during early lactation could not influence DMI and milk yield. However, coconut oil supplementation did change the meal pattern. The latter information suggested that coconut oil supplementation may influence the palatability and change eating behavior in dairy goat.

*Keywords: coconut oil, dairy goat, feed intake, milk yield, meal pattern.*

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## The effect of the use of cassava leaves silage in concentrate on goat performance

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### Abstract

The aim of this study was to know the optimal level of cassava leaves silage in concentrate for goat ration. The materials used were *Elephant Grass (EG)*, Concentrate (C), cassava leaves silage with cassava waste as additive (CLS) and 15 heads of Ettawah Crossbred Goat. The experimental design used was Randomized Block Design (RBD) with 5 treatments namely R<sub>0</sub> (EG *ad libitum* + 50% C), R<sub>1</sub> (EG *ad libitum* + 37.5% C + 12.5% CLS), R<sub>2</sub> (EG *ad libitum* + 25% C + 25% CLS), R<sub>3</sub> (EG *ad libitum* + 12.5% C + 37.5% CLS), R<sub>4</sub> (EG *ad libitum* + 50% CLS) and 3 replication as blocks based on initial body weight. The ration contained 13% CP. The ratio between forage and concentrate was 50% : 50% as dry matter (DM). Variables measured were feed intake, digestibility, N retention and daily body weight gain. The results of the research showed that the use of CLS in the concentrate on goat performance did not give significantly difference ( $P > 0.05$ ) on DMI, OMI, CPI, CPD, DDMI, DOMI, DCPI, N retention and daily body weight gain, but there were significantly difference ( $P < 0.05$ ) on DMD and OMD. The highest value of daily body weight gain was R<sub>2</sub> treatment (97.20 g/h/d). It is suggested that cassava leaves silage using cassava waste as additive could be used in concentrate up to 50% (R<sub>2</sub>) in goat ration.

*Key word: cassava leaves silage, cassava waste, goat performance*

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## **Effects of dietary pomegranate by-products on performance, immunity, intestinal microbiology and odorous gas emissions from excreta in broilers**

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### **Abstract**

The effects of dietary supplementation with pomegranate by-products (PB) on performance, immunity, intestinal microflora and odorous gas emissions from excreta in broiler chickens were investigated. A total of 240 day-old broiler chicks were fed three experimental diets (containing 0, 0.5 and 1.0% PB) until 35 days of age. The average daily gain was not significantly affected by dietary treatments, but the average daily feed intake and feed conversion ratio were reduced during the overall experimental period ( $P<0.05$ ). The concentration of serum IgA and IgG increased ( $P<0.05$ ) in response to both levels of PB. In the ileal digesta, the concentration of yeast and mold increased (0.5 and 1.0%), while decreased the *Escherichia coli* and *Salmonella* spp. ( $P<0.05$ ) concentration (1.0%) in response to dietary PB. In the cecal digesta, the concentration of *Bacillus* bacteria increased ( $P<0.05$ ) in response to both levels of dietary PB, while the concentrations of *E. coli* and *Salmonella* decreased when the diet was supplemented with 1% PB ( $P<0.05$ ). Dietary PB effectively reduced the emissions of ammonia and methanethiol from broiler excreta ( $P<0.05$ ). In conclusion, dietary PB improved immunity and the intestinal microbial ecosystem of broilers along with reduced odorous gas emissions from excreta.

*Keywords: pomegranate by-products, broiler, immunity, microbial ecosystem, odorous gas*

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## **Feed intake, digestibility, nitrogen retention and daily weight gain of steers fed on sugarcane stalk based complete diet silage**

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### **Abstract**

This research aimed to determine the effect of feeding sugarcane stalk as a silage complete diet on feed intake, digestibility, N-retention and daily weight gain of Frisian Holstein (FH) crossbred steers and to find out the ideal proportion of sugarcane stalk in the complete diet silage which gave economically the best performance of steers.

Nine FH crossbred steers, age 10-11 months, were allocated in randomized block design (3 treatments x 3 replications). The treatments were the proportion (% as feed basis) of sugarcane stalk and concentrate in iso-protein (12 % Crude Protein/CP content) complete diet silage (CDS), i.e. CDS1 (60% sugarcane stalk + 40% concentrate + 1.23% urea); CDS2 (50% sugarcane stalk + 50% concentrate + 0.62% urea); and CDS3 (40% sugarcane stalk + 60% concentrate). Parameters of the research were intake, digestibility, N retention and daily weight gain. Data were subjected to analysis of covariance with initial body weight as covariant.

The results showed that the treatments did not show a significant effect ( $P > 0.05$ ) on feed intake, N-retention and daily weight gain but showed significantly effect ( $P < 0.05$ ) on organic matter digestibility (OMD), crude protein digestibility (CPD) and crude fiber digestibility (CFD). With the same effects of the treatments on crossbred steers performance, hence, CDS1 had higher economically efficiency than the other treatments, especially when the price of sugarcane stalk was less than IDR 200.00/kg (1 USD = IDR 13.000). It could be suggested to consider the particle size of CDS materials, ensilage process and storage method for the best result of CDS.

*Keywords: total mixed ration, cattle, feed intake, growth, sugar cane*

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**Utilization of Paprika (*Capcicum annuum*) by product for ruminants feeding**

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**Abstract**

The use of agricultural by product in ruminant feeding is seen to be an approach in improving animal performance as well as low cost feed production. This study was conducted to evaluate the effect of paprika (*Capcicum annuum*) by product on ruminal fermentation using *in vitro* fermentation technique. *In vitro* trial was conducted by adding paprika by product silage with the total mixed ration (TMR). There were five diets provided without paprika by product silage (control), addition of paprika silage ensiled with *L. reuteri* IMAU 70164 16.4% (T1), 33% (T2), paprika silage ensiled with *L. plantarum* KCTC 3594 16.4% (T3) and 33.0% (T4). TMR and Paprika by product silage (DM 1%) was used as the substrate for *in vitro* rumen fermentation. One g DM substrate and 100 ml buffered rumen fluid (1:3 rumen fluid-buffer ratio) were placed in serum bottles and incubated for 0, 12, 24 and 48 h, during which pH, total gas (TG), ammonia-nitrogen (NH<sub>3</sub>-N), methane (CH<sub>4</sub>) and volatile fatty acids (VFA) concentration, DM and OM digestibility were monitored. Results show that pH was increasing along with control, T1, T2, T3, T4 treatments, respectively and significant differences were observed at 0, 12, 24 and 48h of incubation period. Acetate concentration (44.15mM) was significantly higher (P<0.05) in T4 while butyrate concentration (29.67mM) was significantly higher in T3 after 48h of incubation. Also, higher (P<0.05) total VFA was in T1(80.62mM), T2(83.21mM), T3(81.87mM) and tended to higher total VFA was in T4(79.81mM) than control(76.45mM). Accordingly, higher total VFA suggested that paprika silage can be a potential feed source for increasing productivity of ruminant animal.

**Keywords:** *In vitro*, paprika, ruminant, total gas, volatile fatty acid

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## Intake digestibility of summer fodders fed sheep and goats

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### Abstract

A study was conducted to compare the performance of sheep and goats fed on Maize (*Zea mays*), Sorghum (*Sorghum bicolor*) and Millet (*Pennisetum americanum*). For this purpose a total of 90 animals [female sheep (n=45) and goats (n=45)] were randomly selected and divided equally in six groups (n= 15) animals per groups having three replicates under 2×3 factorial arrangement. Three fodders (maize, millet and sorghum) were randomly fed to the respective replicates in both species. Dry matter (DM), crude protein (CP), NDF and ADF intake was similar (P>0.05) among both species on maize millet and sorghum. NDF and digestibility was similar on sorghum in goat and sheep while different (P<0.05) on maize and millet however, ADF digestibility were similar (P>0.05) among both species.

*Keywords: summer fodders, intake, sheep, goats and digestibility*

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## Effect of combination acidifiers-garlic-*Phyllanthus niruri* L. powder and encapsulated form in feed on production performance and egg quality of laying hens

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### Abstract

Effect of the combination of acidifier, garlic and *Phyllanthus niruri* L. in either powder or encapsulated form on layer performances and egg quality. One hundred ninety two laying hens were subjected to 8 different dietary groups, namely 2 forms of combination acidifier-garlic-*Phyllanthus niruri* L. (powder and encapsulated), and 4 levels usage in feed (L<sub>0</sub>=0%, L<sub>1</sub>=0,5%, L<sub>2</sub>=1,0%, L<sub>3</sub>=1,5%). Each treatment was repeated 4 times with 6 laying chickens each. Data were then analyzed by two-way Nested of Completely Randomized Design ANOVA and if there was significant effect followed by Duncan's Multiple Range Test. The results showed that combination of acidifier, garlic and *Phyllanthus niruri* L. in encapsulated form tended to decrease FCR and increase IOFC (P<0.01) and to increase (P<0.05) egg mass, but showed a no significant difference on feed consumption, HDP, eggshell thickness, color index of yolk and haught unit. Levels usage in feed of nested on forms gave significant results (P<0.05) on egg mass, but showed a no significant difference on feed consumption, HDP, feed conversion, IOFC, eggshell thickness, color index of yolk and haught unit. It is concluded that the use of combination of acidifier, garlic and *Phyllanthus niruri* L. in encapsulated form better than the powdered form. It is suggested to use 1.0% encapsulated of combination of acidifier, garlic and *Phyllanthus niruri* L. in laying hens diet.

**Keywords:** acidifier, garlic, *Phyllanthus niruri* L., powder, encapsulated

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## **Characteristics of fermentation kinetics and digestibility of PUFA saponification and aldehyd protected as cattle feed supplement by in-vivo**

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### **Abstract**

This study was conducted to evaluate the effect of different saponification and aldehyde protection for poly unsaturated fatty acid (PUFA) derived soybean groats and lemuru fish oil in the diet beef cattle on the characteristics of fermentation kinetics by *in vivo*. Invivo treatment using three cow cattle fistulated. Oil lemuru protected saponification using salt-Ca with 2.0% level and soybean groats protected using aldehyde content of 37% with a level of 2.0%. Experimental design 3x3 latin squares. R0 (control diet), R1 (R0 + 10% PUFA saponification protected), and R2 (R0 + 10% PUFA aldehyde protected). Measurement of the average and standard deviation of the kinetics ferment ability ration in the rumen on the hours to 0, 3, 6, 9, 12, and 24. Parameter research include rumen fermentation parameters are pH, VFA and microbial protein and digestibility are dry matter, organic matter and crude protein. Results of the study was the difference in treatment effect was not significant ( $p > 0.05$ ) on dry matter, organic matter and crude protein. Protection efforts on feed with PUFA additional protection soya groats aldehyde and lemuru fish oil saponification protected gives a good fermentation characteristics in creating rumen ecology and in accordance with the needs of the rumen microbes. Conclusions are protection of saponification and aldehyde effective for PUFA protection and can be used up to the level of 10% in the composition of beef cattle rations.

*Keywords: kinetics, digestibility, PUFA, saponification, aldehyde protected, in-vivo*

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## Effect of usage probiotics powder as feed additive on the eggs quality of laying hens

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### Abstract

The purpose of this study was to find the effect of probiotic level in feed additive on egg weight, egg mass, specific gravity, fat and cholesterol of egg yolk. The materials used in this experiment were 400 laying hens aged one year old. Feeds were used self mix feed concentrate and probiotic powder (lactobacillus sp). Graded levels of probiotic powder were added to dietary formula treatments consisted of four treatments. Probiotic powder is added at 0% in the feed (P0), 0.2% in the feed (P1), 0.4% in the feed (P2), and 0.6% in the feed (P3). Each treatment was repeated five times. The variables measured were egg weight (g/bird), egg mass (g/bird/day), specific gravity (g/cm<sup>3</sup>), fat (%) and cholesterol of egg yolk (100mg/g). Data were analyzed by analysis of variance of the Completely Random Design (CRD), if between treatment showed significant effect were analysed by Duncan's Multiple Range Test (DMRT). The result showed that the usage of probiotic powder in feed was significant effect influenced ( $P < 0.01$ ) by increase egg weight, egg mass and decrease fat and cholesterol content of egg yolk, but there was not effect on specific gravity ( $P > 0.05$ ). The addition of probiotic powder as feed additive as much as 0.4% gives best effect on egg weight, egg mass and yolk cholesterol content. It can be concluded that the addition of probiotic powder in feed can improve egg quality of laying hens.

*Keywords: probiotic, powder, egg quality, laying hens*

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## Supplementation of different sources of nitrogen and its effects on rumen microbial biomass and *in vitro* feed degradability parameters

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### Abstract

Rumen microbes have essential roles in supplying nutrients for the host animal, hence, the growth and activities of the rumen microbes affect significantly to ruminant animal performance. Non-protein nitrogen (NPN) that is easily converted to ammonia in the rumen is as main source of nitrogen for rumen microbes to grow. However, the efficiency of the ammonia utilization by the microbes must depend on some factors including the nitrogen sources. This experiment aimed to determine the effect of different sources of nitrogen on *in vitro* rumen ammonia concentration, rumen microbial biomass synthesis, apparent and true feed degradability. Completely randomized block design of six treatments and three replications were used. The treatments were the use of different form of nitrogen sources to supplement control diet (rice straw and concentrate at 1:1 ratio in DM basis). The nitrogen sources were only urea, ammonium sulphate (ZA), or NPK fertilizer, combination of urea, ZA and NPK (1:1:1 ratio N basis), and combination of urea, NPK, ZA at a total of N:P:S ratio of 12:2:1. The amount of nitrogen sources added was set to be equivalent to an addition of ammonia concentration into the rumen liquid as much as 2.5 mg NH<sub>3</sub>-N per 50 ml rumen liquid. Supplemented diets with different sources of nitrogen showed higher feed degradability, gas production, microbial biomass synthesis, and ammonia concentration than control diet. Among the nitrogen supplemented diets, diet supplemented with mixed of urea, NPK, ZA at N:P:S ratio of 12:2:1 showed the highest total microbial protein synthesis (11.2 g microbial N), efficiency of microbial protein synthesis (57.0 g microbial N/ kg FOMR), ammonia concentration (150.7 mg NH<sub>3</sub>-N/l), and feed degradability (61.9%) next to ZA supplemented diet. While, NPK supplemented diet showed the lowest total microbial protein synthesis (10.2 g microbial N), efficiency of microbial protein synthesis (45.6 g microbial N/ kg FOMR), ammonia concentration (111.1 mg NH<sub>3</sub>-N/l), and feed degradability (57.6%) that were close to the control diet. Supplementation of mixed nitrogen sources (urea, ZA, and NPK at total N:P:S ratio of 12:2:1) to diets should be used to support high rumen microbial growth and increase nutrient supply for higher ruminant productivity.

**Keywords:** urea, ammonium sulphate, NPK, microbial protein synthesis, degradability

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## Rumen adaptation for urea on feed intake, nutrient digestibility and microbial protein syntheses of swamp buffaloes

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### Abstract

Four, Thai – rumen fistulated swamp buffaloes male (*Bubalus bubalis*), about 5 years old with 390±18 kg liveweight, were randomly selected to investigate the rumen adaptation of urea from low to high level on feed intake and nutrient digestibility. All buffaloes were fed with rice straw *ad libitum* and supplemented with concentrate mixture containing 0% urea at 0.5% BW for a period of two weeks. Following adaptation to diet, all buffaloes were shifted to a step-up diet regimen by supplementation of concentrate mixture containing 2% and 4% urea at 0.5% BW for a period of four weeks each. The result shows that feed intake and nutrient digestibility were increased with increasing level of urea supplement. However, within two weeks of urea uptake, buffaloes could adapt well and utilized urea as N source. Increasing urea uptake for a period of two weeks increased microbial protein synthesis in swamp buffaloes especially at 4% urea. Based on this study, we could conclude that swamp buffaloes could adapt well with urea after two weeks uptake period. Moreover, urea supplement could increase feed intake, nutrient digestibility and microbial protein synthesis of swamp buffaloes. This study suggested that buffaloes could utilize urea at 4% within two weeks adaptation period.

*Keywords: swamp buffaloes, urea, rice straw, rumen adaptation*

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## **Effect of *Flemingia macrophylla* (FLM) as a protein source on rumen fermentation and microbial population in dairy steers**

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### **Abstract**

The objective of this research was to evaluate the effect of *Flemingia macrophylla* (FLM) as a protein source on rumen fermentation and microbial population in dairy steers. Four rumen fistulated dairy steers were randomly assigned to receive dietary treatments according to a 4x4 Latin square design. Four treatments were as follows; T1=control (no supplementation); T2=supplementation of cassava hay (CH) at 150 g/kg/d; T3=supplementation of *Flemingia* (FLM) at 150 g/kg/d and T4=supplementation of CH at 75 g/kg/d and FLM 75 g/kg/d )CHFLM( of total dry matter intake (DMI).The FLM contained 25.8% crude protein (CP) and 5.2% condensed tannins (CT). Rice straw, water and mineral salt block were offered *ad libitum*. The experiment was conducted for 4 periods, and each period lasted for 21 days, while the last 7 days was for sample collection. The study revealed that CH, FLM and CHFLM supplementation resulted in volatile fatty acid concentrations especially those of propionic acid were increased )P<0.05( by supplementation as compared to control group. Similarly, methane emission was reduced (P<0.05) in the CH, FLM and CHFLM as compared to control group. Based on this study, it could be concluded that FLM could be used as a protein source, while the combination of CHFLM could enhance the rumen fermentation in dairy steers

*Key words: Flemingia macrophylla, cassava hay, rice straw, rumen fermentation, dairy steers*

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**Efficacy of endogenous emulsifier in broilers diets on growth performance**

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**Abstract**

The effects of endogenous emulsifier bile acid on performance of broilers were assessed in evaporating house system. The bile acid was added 0.04% to the 3 levels deduction (0.70, 1.00 and 1.30%) rice bran oil from control diet with 3 periods of feeding, starter (1-21d), grower (22-35d) and finisher (36-42d) diet was formulated to contain ME 3,121 kcal/kg and 22.52 %CP, ME 3,175 kcal/kg and 20.7 %CP and ME 3,242 kcal/kg and 18.01 %CP respectively. For the overall period (1-42d of age) of testing, birds fed with 3 graded levels deduction rice bran oil from control diet showed linear ( $P < 0.05$ ) increasing final body weight (FBW) and body weight gain (BWG) but showed linear ( $P < 0.05$ ) reducing feed cost/kg BWG (FCG) leading to linear ( $P < 0.05$ ) increasing salable bird returns (SBR) and net profits return (NPR) and showed linear increasing return of investment on the 3 graded levels deduction of rice bran oil from the control diet. Feed efficiency ratio (FCR) and productive index (PI) also showed the same trends as FBW and BWG but not significant ( $P > 0.05$ ). Addition of 0.04% bile acid in 1.30% deduction rice bran oil from control diet showed the highest in broiler performance and showed the highest return of investment (ROI).

*Keywords: broilers, emulsifier bile acid, performance, return of investment*

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## Effects of fattening length and energy levels on meat characteristics of Iranian native lamb

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### Abstract

This study was investigating different levels of metabolizable energy (DME) (2.3 and 2.5) and fattening period (FP) (90 and 120 days) on carcass composition of Chalishtori male lambs. Rations were isonitrogenous (14% CP/DM) and used of completely random designs with factorial method (2\*2). Finally 32 lambs randomly slaughtered and data analyzed by SAS. Interaction between (FP) (120 days) in (DME) for final weight, metabolic weight and carcass weight had significant ( $p<0.05$ ). The mean of daily weight gain was 162.37g/d, interaction between (FP) and (DME) did not influence on daily weight gain and feed intake. The mean of dressing percentage was 53.7% and interaction between (FP) (120 days) in (DME) for dressing percentage was significant ( $p<0.05$ ). Interaction between FP in DME for surface of loin area and back fat thickness were significant ( $p<0.05$ ). The mean of total carcass meat, total bone, and total subcutaneous fat and fat tail percent were 46.9, 11.7, 15.9 and 22.9 percent respectively and interaction between FP and DME on carcass compositions. However, interaction was between FP and DME influence on some traits and recommended FP 90 days with 2.3 ME, because higher daily weight gain, lower daily feed intake, better of feed conversion ratio and other wise loin area surface and carcass composition were not significant.

*Keywords: fattening periods, energy, fat deposit, carcass*

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## Comparative efficacy of herbal methionine and synthetic DL-Methionine on performance in laying hen

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### Abstract

A feeding trial was conducted to evaluate the bioefficacy of herbal methionine (HM) compared with synthetic methionine (DLM) in the diets of laying hens. The HM (Methiomax), synthetic methionine (DLM) and equal mixture of both were added to a control basal diet at 0.11, 0.22 and 0.33% and fed to 270 laying hens. The birds were divided into 10 treatments of 27 birds each and each treatment group was replication 3 times with 9 birds per replication. Supplementation DLM, HM and their equal mixture with three graded levels of methionine showed better improvement ( $P < 0.05$ ) on production performance of egg production (EP), feed conversion efficiency (FCR), egg mass (EM), total number of eggs produced (TNEP) and also showed reduction in both abdominal fat content (AFC) and final body weight at termination (BWT) but showed higher feather weight at termination (FWT). In addition, there was no significant effect of methionine source or their equal mixture on all productive performance, BWT, AFC except for FWT which showed that HM and their equal mixture showed higher ( $P < 0.05$ ) FWT more than DLM. Three graded levels of methionine added in the basal control diets exhibited a linear increase with increasing methionine levels in the diets but no significant ( $P > 0.05$ ) influences on all productive performance, BWT, AFC and EWT or a source by level interaction were also observed. Based on this study, it was concluded that HM is an effective substitute for synthetic DLM for optimum production performance in laying hens.

*Keywords: laying hen, herbal methionine, DL-methionine, performance*

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***In Situ* evaluation of heat treated vegetable protein sources**

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**Abstract**

Fifteen different vegetable protein sources found in Pakistan were treated at the rate of 1 hour at 15 lb per 100 g crude protein (CP) and evaluated for ruminal degradability characteristics through *in situ* procedure using rumen fistulated Nili-Ravi buffalo steer. Samples of soybean meal, corn gluten meal 60%, maize gluten feed, guar meal, sunflower meal, rapeseed meal, rapeseed cake, canola meal, cottonseed cake, cottonseed meal, coconut cake, coconut meal, palm kernel cake, almond cake and sesame cake were obtained from 10 different locations. Crude protein (CP) ruminal degradability were determined at 0, 3, 6, 12, 24 and 48 hours in triplicate and fitted to Orskov and McDonald equation to determine fractions a, b, degradation rate and effective degradability at 2, 5 and 8 percent.

*Keywords: ruminal degradability, vegetable protein sources, undegradable protein*

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**Efficacy of probiotics (Sanizyme) on performance in broiler diets**

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**Abstract**

The effects of probiotics Sanizyme on performance of broilers were assessed in evaporating house system. The probiotics Sanizyme were supplementation with 4 graded levels (0.025, 0.050, 0.075, 0.100%) in control diet with 3 periods of feeding : starter (1-21d), grower (22-35d) and finisher (36-42d) diet was formulated to contain ME 3,121 kcal/kg and 22.52% CP, ME 3,175 kcal/kg and 20.7% CP and ME 3,242 kcal/kg and 18.01% CP respectively. For the whole period of testing (1-42d) feeding with 4 graded levels of Sanizyme in control no added group showed both significant ( $P<0.05$ ) linear and quadratic improvement of feed conversion ratio (FCR), feed cost/kg BWG (FCG) and also showed increasing linear ( $P<0.05$ ) and quadratic but not significant ( $P>0.05$ ) on productive index (PI) with the highest improvement FCR, PI, final body weight (FBW), body weight gain (BWG) and showed the lowest on feed cost/kg BW with the highest on salable bird return (SBR) and also showed the highest on net profit return when addition Sanizyme at the level 0.075% in the broiler diet when compared with the control no added group and showed the highest return of investment (ROI). The results from this study indicated that Sanizyme can be used for probiotics assisted digestion and enhancer growth in broilers.

*Keywords: broiler, probiotics, performance, economic benefits return*

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## **Efficacy of probiotics (Sanizyme) on performance and digestibility in weaning piglets diets**

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### **Abstract**

The experiment was evaluated the efficacy of probiotics Sanizyme with three levels (0.0125, 0.0250 and 0.0375%) in weaning piglets diets. The results from these three levels supplementation Sanizyme in weaned or nursery feed showed improvement in digestibility of carbohydrate, fat and protein in feed components and remarkable improvement in body weight, daily weight gain, better feed efficiency and uniformity of body weight at termination. linear lower feed cost per kilogram body weight gain when increasing 3 graded levels of Sanizyme in feed and also graded increasing in both net profit per head and economic benefits return over those fed the unsupplemented control group. Addition of Sanizyme at the level of 0.0375% feed appears to be the maximum response on growth and feed utilization when compared with the control unsupplemented group. The results showed that Sanizyme can be used for probiotics, assisted digestion and enhancer growth in weaning pigs.

*Keywords: piglets, probiotics, growth performance, nutrients digestibility, economic benefits return*

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## **Influence of rice straw treated on rumen fermentation and microbial population in swamp buffaloes**

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### **Abstract**

Four rumen-fistulated swamp buffaloes with initial average liveweight  $330 \pm 20$  kg, were used to study effect of rice straw treated on rumen fermentation and microbial protein synthesis in swamp buffaloes. Treatments were T1= treated rice straw, T2= urea 1% treated rice straw, T3= 1%urea+1%cassava ship powder treated rice straw and T4= 1%urea +1%cassava ship powder +0.1% yeast). All buffaloes were randomly allocated to receive diets according to a  $4 \times 4$  Latin square design. The present results revealed that ammonia nitrogen were increased by rice straw treated with urea and yeast. Furthermore, microbial population especially proteolytic bacteria and cellulolytic bacteria were increased in buffaloes consuming treated rice straw especially with 1%urea + 1% cassava ship powder +0.1%yeast (T4). Therefore, this study could that treated rice straw with urea plus with cassava chip powder and yeast could improve rumen fermentation and changed to microbial population of swamp buffaloes.

*Keywords: rice straw, rumen fermentation, rumen ecology, swamp buffaloes*

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## **A study on nutrient intake and digestibility, rumen environment and nitrogen retention of sheep fed different levels of ensiled water hyacinth in diets**

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### **Abstract**

Four growing sheep ( $19.8 \pm 0.43$  kg) were allocated in a 4x4 Latin square design with 4 treatments including Para grass (EWH0), replacement of 15% Para grass by ensilaged water hyacinth (EWH15), replacement of 30% Para grass by ensilaged water hyacinth (EWH30), replacement of 45% Para grass by ensilaged water hyacinth (EWH45). This study aimed to evaluate effects of replacement of ensilaged water hyacinth (*Eichhornia crassipes*) to Para grass (*Brachiaria mutica*) in the diets (DM basis) on feed intake, rumen parameters, nutrient digestibility and nitrogen retention of growing sheep. There was a supplementation of coconut meal, soybean cake and urea to adjust the CP content of diets being 17%. Each experimental period was 14 days including 7 days for adaptation and 7 days for sample collecting. The conclusion was that EWH could be used to feed growing sheep without adverse effects on rumen parameters, and the replacement level of 30% EWH to Para grass in diet gave a better result.

*Keyword: lamb, water hyacinth, supplements, diets, Para grass, replacement*

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## Effect of dried cassava chips in growing rabbit diets on meat performance and economic returns

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### Abstract

Sixty crossbred rabbits (local x New Zealand) with average initial live weight of  $735 \pm 4.64$ g and 8 weeks of age were allocated in a completely randomized design with 5 treatments and 3 replications and were fed 5 levels of dried cassava chips (0, 10, 20, 30 and 40 g/rabbit/day) as a supplement to Para grass fed *ad libitum*. Increasing the offer level of dried cassava chips in a basal diet of Para grass fed to growing rabbits led to linear increases in total DM intake, live weight gain, coefficients of apparent digestibility and N retention. There were positive linear relationships between coefficients of apparent DM digestibility and live weight gain and N retention. It was proposed that the determinant of rabbit growth rate in forage-based diets is the overall apparent digestibility of the diet rather than the composition of the diet in terms of the relative proportions of soluble and structural carbohydrates.

*Key words: carbohydrates, digestibility, N balance, Para grass*

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## Effects of wet soya milk waste supplementation on feed intake and growth performance of goats fed corn stubble silage

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### Abstract

This experiment was aimed to study the effects of soya milk waste on feed intake and growth rates of post weaning goat were studied. Fifteen Boer x Saanen crossbred male goats, (4-6 month of age and average live weight of  $19.4 \pm 1.4$  kg) were used into three treatment diets under a completely randomized design (CRD) for 60 days study period. All animals were kept individually pen with free access water and mineral block. The goats fed *ad libitum* with corn stubble silage as roughage source. Three dietary treatments were commercial concentrate pellet diet (400 g), wet soya milk waste (800 g) and mixed commercial concentrate pellet diet and wet soya milk waste (200 g : 400 g), respectively. The results showed that feed intake, feed efficiency and body weight gain of goats were significant ( $P < 0.05$ ) different among the diets. Dry matter (DM), organic matter (OM), crude protein (CP), gross energy (GE), neutral detergent fibre (NDF) intake of goat fed commercial concentrate pellet diet were significantly higher than those of goat fed other diet. Average daily gain of goat fed commercial diet was higher ( $P < 0.05$ ) than those of goat fed soya milk waste diet and mixed commercial diet respectively. Feed efficiency was significantly higher in the soya milk waste diet.

*Keywords: Soya milk waste, Goat, Feed intake, Saanen crossbred, boer crossbred*

## **The effect of *S. rarak* microparticles on blood profile and productivity of broiler chickens raised on litter system inoculated with *E. tenella***

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### **Abstract**

This study was conducted to evaluate the effectiveness of *S. rarak* microparticles (SRM) addition in feed on the blood profile and productivity of broiler chickens infected with *Eimeria tenella*. A total of 270 doc divided into 5 treatments with 6 replications (9 chicks per replicate) were reared in the litter system for 35 days. The treatments consisted of: R1 (without coccidiostat and SRM); R2 (coccidiostat, without SRM); R3 (SRM 1.25 g kg<sup>-1</sup> ration); R4 (SRM 2.5 g kg<sup>-1</sup> ration); R5 (SRM 5.0 g kg<sup>-1</sup> ration). The experimental design used was completely randomized design. At 14 days old, all chickens were infected with *E. tenella* by sprinkling 15,000 oocytes m<sup>-2</sup> on the litter. The parameters measured were blood profile, lipid profile, and body weight. The results showed that blood profile was not affected by any treatment. SRM treatment lowered cholesterol, LDL, and triglycerides, but increased HDL in the blood serum. Body weight and feed conversion in the 1.25 and 2.5 g kg<sup>-1</sup> SRM treatments were the same as those treated with coccidiostat treatment in broiler chickens infected *E.tenella*. It was concluded that the administration of *S. rarak* microparticles (SRM) 75 µm size could be used as a cholesterol reducer without affecting the productivity at up to 2.5 g kg<sup>-1</sup> dose in broiler chickens infected with *E. tenella*.

*Keywords: broiler chickens, E. tenella, S. rarak microparticles, cholesterol, productivity*

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## Enhancing the nutritional value of soybean through supplementation with new-generation feed enzymes for poultry –Review

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### Abstract

In terms of global gas emission, climate change and efficiency of feed utilization, poultry are the preferred farm animals to meet the high demand for animal protein foods. Soybean meal (SBM) remains the most important and the preferred plant protein feed source for animal feeding. However, supply of conventional SBM fluctuates while the price is on the increase due to demand, processing and transportation costs. Although there is a growing interest in the use of raw SBM for birds, the nutritive value is negatively affected by anti-nutrients. Heat treatment is advised to alleviate some of the anti-nutrients such as trypsin inhibitors and lectins, but both under- and over-processing of soybean tend to reduce the quality of the meals. Supplementing poultry diets with phytase and protease is a routine biotechnological intervention for improving the nutritional value of feed ingredients and reducing pollution. Proteases can breakdown both stored proteins and proteinaceous anti-nutrients in soybeans to improve bird performance and reduce environmental pollution. Phytase is also effective in breaking down the phytate associated with a number of nutrients, including minerals and protein. Recent *in vitro* and *in vivo* studies are showing that the use of microbial enzyme cocktails can reduce the negative effects of anti-nutrients in soybean meal for birds. This review provides information on how protease and phytase are contributing to the improvement of nutritional value and can obviate the need for pre-processing of soybean meals for poultry.

**Keywords:** *new-generation enzymes; anti-nutritional factors; soybean meal.*

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## **The effects of feed fermented by *Azotobacter* microbes culture on milk production and its feed efficiency at dairy cattle**

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### **Abstract**

The goal of this research was to know the effects of feed fermented by *Azotobacter* microbes culture on milk production and its feed efficiency at dairy cattle. Fermented feed, commercial concentrate and 10 heads of dairy cattles were used in this research. The treatment was feed fermented by 350 cc *Azotobacter* microbes culture per 100 kg feed compared to those normal condition. Measured variables were milk production and feed consumption. The data were analyzed by t-test. The everage total feed consumption of treatment feed and normal feed were  $13.26 \pm 1.29$  kg/day and  $14.02 \pm 1.58$  kg/day, respectively. The milk production of treatment feed was  $11,16 \pm 5,14$  liter/head/day compared to  $10,13 \pm 2,99$  liter/head/day of those that given normal feed. Statistic analysis shown that there was no significant different on feed consumption but significant different ( $P < 0.1$ ) on milk production.

Although feed consumption decreased by treatment feed but it still increased the milk production. It was due to increasing quality of treatment feed. The feed efficiency was  $1,26 \pm 0,44$ . It was concluded that feed fermented by 350 ml/ 100 kg feed of *Azotobacter* microbes culture could increase milk production while feed efficiency was  $1,26 \pm 0,44$ .

*Keywords: fermented feed, microbes culture, milk production and feed efficiency*

## Effect of spent rice straw in mushroom cultivation on growth performance and plasma metabolites in beef cattle

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### Abstract

Bangladesh is predominantly rice-based agricultural country and majority of ruminant feed comes from crop residues i.e. rice straw. In Bangladesh rice straw is being used as bedding materials for producing mushroom (*Agaricus biosporus*) which is a highly nutritious food with bioactive components. After harvesting the straw along with small particles of mushroom is either dumped or burned as fuel for cooking. The present experiment was designed to know the feasibility of using rice straw used as bedding for mushroom cultivation as climate smart cattle feed and its effect on the growth performance and plasma metabolites in twelve growing bull calves (BW 73±7 kg; 1 yr ) for 60 days each. The animals were divided into two groups and fed two diets using a crossover design. Diet one was composed of rice straw, dhal grass, wheat bran, and mustard oil cake (Rice straw-diet). In another diet the 50% of rice straw of Rice straw-diet was replaced by the rice straw used as bedding material (Mushroom straw-diet). In both the dietary treatments the animals were fed at 1.5 times of maintenance energy and protein requirement. The animals were weighed once a week throughout the experimental period, and the blood samples were collected on the day 60 of each experiment. The ADF was slightly lower and NDF was slightly higher ( $P < 0.05$ ) for Mushroom straw-diet compare to Rice straw-diet. The crude protein and crude ash contents were higher ( $P < 0.05$ ) in Mushroom straw-diet compare to Rice straw-diet. Body weight gain was greater for Mushroom straw-diet compare to Rice straw-diet. Plasma concentration of glucose, and blood urea were comparable between dietary treatments. Plasma total cholesterol, triglyceride, HDL-C, and LDL-C were lower in Mushroom straw-diet compare to Rice straw-diet. It could be concluded that, under present experimental condition, Mushroom straw-diet could be fed to cattle without any adverse effect rather positive impact on lipid profile.

*Keywords: Spent rice straw in mushroom cultivation, growth, plasma metabolite, cattle*

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## Supplementation of different sources of nitrogen and its effects on rumen microbial biomass and *in vitro* feed degradability parameters

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### Abstract

Rumen microbes have essential roles in supplying nutrients for the host animal, hence, the growth and activities of the rumen microbes affect significantly to ruminant animal performance. Non-protein nitrogen (NPN) that is easily converted to ammonia in the rumen is as main source of nitrogen for rumen microbes to grow. However, the efficiency of the ammonia utilization by the microbes must depend on some factors including the nitrogen sources. This experiment aimed to determine the effect of different sources of nitrogen on *in vitro* rumen ammonia concentration, rumen microbial biomass synthesis, apparent and true feed degradability. Completely randomized block design of six treatments and three replications were used. The treatments were the use of different form of nitrogen sources to supplement control diet (rice straw and concentrate at 1:1 ratio in DM basis). The nitrogen sources were only urea, ammonium sulphate (ZA), or NPK fertilizer, combination of urea, ZA and NPK (1:1:1 ratio N basis), and combination of urea, NPK, ZA at a total of N:P:S ratio of 12:2:1. The amount of nitrogen sources added was set to be equivalent to an addition of ammonia concentration into the rumen liquid as much as 2.5 mg NH<sub>3</sub>-N per 50 ml rumen liquid. Supplemented diets with different sources of nitrogen showed higher feed degradability, gas production, microbial biomass synthesis, and ammonia concentration than control diet. Among the nitrogen supplemented diets, diet supplemented with mixed of urea, NPK, ZA at N:P:S ratio of 12:2:1 showed the highest total microbial protein synthesis (11.2 g microbial N), efficiency of microbial protein synthesis (57.0 g microbial N/ kg FOMR), ammonia concentration (150.7 mg NH<sub>3</sub>-N/l), and feed degradability (61.9%) next to ZA supplemented diet. While, NPK supplemented diet showed the lowest total microbial protein synthesis (10.2 g microbial N), efficiency of microbial protein synthesis (45.6 g microbial N/ kg FOMR), ammonia concentration (111.1 mg NH<sub>3</sub>-N/l), and feed degradability (57.6%) that were close to the control diet. Supplementation of mixed nitrogen sources (urea, ZA, and NPK at total N:P:S ratio of 12:2:1) to diets should be used to support high rumen microbial growth and increase nutrient supply for higher ruminant productivity.

*Key words: urea, ammonium sulphate, NPK, microbial protein synthesis, degradability*

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## **The effect of different altitude to adaptability, feed consumption and weight gain's lactating ettawa's cross bred**

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### **Abstract**

Livestock productivity is influenced by genetic and environmental factors. Genetic factors contribute 30% and 70% environmental factors. Environmental factors, including: rearing management, feed, and livestock shelter (different lands or altitude). The difference in altitude could be expected to affect the productivity of livestock, especially lactating ettawa's cross bred (LEC) goat, including: adaptability, feed consumption and body weight gain. This research was conducted at the LEC Goat Ranch Paciran, Paciran Sub District, Lamongan Residence, Indonesia as lowland (2 m above sea level) and Agus Farm, Bumiaji, Batu, Indonesia as a highland (800 m asl). The purpose of this study was to compare the adaptability response (Heat Tolerance Coefficient–HTC), feed consumption and daily body weight gain in different land. The research materials in each land were 10 ewes with 2-3 years of age and 4-9 months of lactation. The research method used descriptive by direct observation. Data were analyzed by unpaired t-test. The results indicated that the different land did not effect the value of the HTC, feed consumption, and daily body weight gain. The future research recommended using lactating LEC goat and the same feed on different lands to accurately determines adaptability.

*Keywords: lowland, highland, respiratory rate, body temperature, enviromental temperature*

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## Differential level of plasma nesfatin-1, ghrelin and leptin for onset of puberty in Murrah buffalo heifers

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### Abstract

Water buffalo (*Bubalus bubalis*) is an important dairy animal, but has low reproductive efficiency when compared with the cattle species. The main problem is delay in attaining puberty. There are many factors which affect puberty. A study has to be made on some new endocrine factors like nesfatin, ghrelin and leptin which are directly or indirectly related with body weight and feed parameters, which in turn determine onset of puberty. For the present study twelve number of Murrah heifers were selected. Blood samples were collected. Hormones were estimated in the blood plasma. Animals were considered to be pubertal only when plasma progesterone level was > 1ng/ml and corpus luteum could be detected on palpation. Based on calculated dry matter intake, nutrient efficiencies were estimated. All the animals attained puberty, at the end of fourteen fortnights. Heifers of normal pubertal (NP) group attained puberty by 27 months as and those attaining puberty by 32 months of age (14 fortnights from the day of experiment) as delayed pubertal group (DP). In NP group nesfatin and progesterone concentrations were significantly higher ( $P<0.05$ ) and similar results were observed for nutrient efficiencies ( $P<0.001$ ) also, when compared with the DP group. Similarly at fifth fortnight also, all the Mean  $\pm$ SEM parameters were significantly higher ( $P<0.01$ ) for NP group when compared with the DP group except for ghrelin. It can be suggested that onset of puberty in buffalo heifers is also regulated by plasma nesfatin, ghrelin and leptin.

*Keywords: puberty, buffalo, heifer, nesfatin, ghrelin, leptin*

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## The effect of teat seal on milk microorganism number in postpartum cows

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### Abstract

The aim of the study was to examine the effect of teat seal on milk microorganism number in postpartum cows. Teat seal was inserted into teat canal during dry period for two months. During day 1- day 5 after parturition milk samples were collected for standard plate count analysis. Microorganisms were swabbed from teat orifice and stable ground floor to confirm that pathogens were present in the environment. Cows were divided into 5 groups; control (1), treated with antibiotics (2), treated with teat seal combined with 100% paraffin (3), treated with teat seal combined with 66.5% paraffin and 33.5% bismuth subnitrate (4), and treated with teat seal combined with 49.75% paraffin and 50.25% bismuth subnitrate (5). The results showed that in group 3 and 4 the number of microorganism deceased significantly when compared to group 1, but not significantly different when compared to group 2. It was also found that pathogens causing mastitis were found in both teat orifice and stable ground floor. Therefore, it can be concluded that teat seal was as effective as antibiotics and that teat seal can be used for mastitis prevention during dry period.

*Keywords: teat seal, microorganism, standard plate count, dry cow*

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## **Growth performances of PO cattle and its crossbred with European cattle (POE) maintained in different environmental conditions**

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### **Abstract**

This study was subjected to evaluate the effect of environment condition due to the different altitudes on the growth performances of PO cattle and its crossbred with European bull (POE). During August 2010 to January 2011 a survey study was conducted to collect the data on birth weight, weaning weight adjusted to 105 days, average daily gain 105 days (ADG-105), yearling weight (365 days) and ADG-365 on two breeds of PO- and POE cattle farmed in two different environment condition in Nguling District, Pasuruan (5 m above sea level, 32.5°C, 59.9% RH) and Poncokusumo District, Malang (700 m above sea level, 27.6°C, 76.8% RH). The growth performances were tended to be higher in POE cattle than those in PO cattle in both environment conditions of low land and high land. Similar of those that the cattle maintained in high land condition showed higher growth performances than those maintained in low land condition for both cattle breeds. Yearling weight of cattle maintained in low land was not significant difference for both breeds, however, in high land condition, yearling weight and ADG 365 of POE were significantly higher ( $P < 0.01$ ) than those observed in PO cattle. There was an interaction between genetic and environmental condition, where POE cattle showed more efficient farmed in high land condition than in low land condition one.

*Key words: growth performances, PO cattle, crossbred cattle, environment condition*

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## **The study of extracellular hsp70 & physiological parameters, the effect of feeding improvement of the Ongole crossbred & it's crossing breed**

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### **Abstract**

How is the expression of extracellular Hsp70 and the physiological parameters of Crossbred Ongole (CO or PO) and it's crossing breed (Limousine x PO= Limpo) in low land (5m above sea level) was investigate through this study. Also, whether the improvement of feeding through giving the concentrate to the animals could reduce the expression of extracellular Hsp70 and improve the physiological performance had been identified by this study.

The conclusion of this study is that PO in low land farm yard and low feeding level had better heat tolerance than Limpo. Concentrate treatment could eliminate the effect of breed to the heat tolerance of the animals. There was a positive correlation between HTC and eHsp70 expression. There was no effect of the treatment to plasma metabolites concentration except for NEFA. After the treatment, of PO breed plasma NEFA concentration in yearling cattle were higher ( $P < 0,05$ ) than calves ( $18,0 \pm 8,04$  vs.  $15,3 \pm 3,84$  pg/ml). Of Limpo's, plasma NEFA concentration in calves were higher ( $P < 0,05$ ) than yearling cattle ( $43,8 \pm 3,39$  vs.  $41,9 \pm 3,17$  pg/ml). The range of average plasma glucose and Hsp70 concentration was 68.9-101.2 mg/dl and 2.7-3.5 pg/ml.

The suggestion of this study is that calves of PO and its crossbred could be raised in low land ( $\pm 5$  m above sea level) with environment temperature of  $38^{\circ}\text{C}$  and 50 % RH until weaning periode without any physiological stress. Of the yearling's, the concentrate treatment should be add with other management to increase heat dissipation from animal body such water splasher, sprayer or sprinkle if it's possible.

*Keywords: extracellular Hsp70, physiological parameters, ongole crossbred*

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## Breeding soundness evaluation in Garut ram

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### Abstract

Breeding soundness evaluation of the male offers predictive information on expected performance that may enhance overall herd productivity. The aim of this study was to examine breeding soundness evaluation in Garut rams. Twenty four rams with aged of 10 month to 3 years were examined at Faculty of Animals Science, Bogor Agricultural University (IPB). Clinical examination was performed with each ram. External genitalia was examined by visual assessment and palpation for testicular tone. Scrotal circumference was measured using a metal scrotal tape. Semen was collected using artificial vagina and assessed on the basis of progressive motility, sperm concentration and sperm morphology. Result demonstrated that the average body weight of the 24 rams were  $29.85 \pm 3.13$  kg (range of 24-36 kg), scrotal circumference were  $25.35 \pm 2.10$  cm (range of 22-28 cm). Around 33.3% (8/24) rams producing semen with a progressive motility more than 75%, 54.16% (13/24) rams ranges from 60 to 70% and less than 12.5% (3/12) demonstrated < 60% motility. Four rams demonstrated the sperm concentration >  $4000 \times 10^6$  cell per ml, 13 rams ranges from 2000-4000  $\times 10^6$  cell per ml and only 1 ram demonstrate less than 2000  $\times 10^6$  cell per ml. All rams produced an excellent morphologically normal spermatozoa  $> 93.82\% \pm 2.03\%$ .

*Keywords: Breeding soundness evaluation, Garut ram*

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**Individual variation on the success of garut ram frozen semen production**

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**Abstract**

This research aims to study the individual variation on the successful garut ram frozen semen production. The semen were obtained from four sexually mature Garut ram (Sinta, Wulung, Jabar, Batara), at Artificial Insemination Centre (AIC) Lembang, Bandung. The semen was collected using artificial vagina and evaluated macro- and microscopically. The semen was diluted with andromed, packed into 0.25 mL mini straw (Combo System, Minitube Jerman), equilibrate at cooling cabinet for 4 hours, and freeze at automatic freezing machine (Digitcool 5300 ZB 250, IMV Prancis) according to AIC standard procedures. Data were analyzed with a linear model (GLM) and Duncan 's test. The result indicated that there were differences in raw semen quality. Wulung demonstrated the highest ( $P < 0.05$ ) raw semen motility (82.50%) and Batara has the lowest raw semen motility (75.50%). There were no differences in post thawing motility (PTM) in all ram. The PTM were between 40.00 to 41.67%. The recovery rate of sperms obtained from Batara ram was significantly higher ( $p < 0.05$ ) than the others. This research concluded that there was an individual variation on the quality of Garut ram frozen semen.

*Keywords: frozen semen, freezing capability, Garut ram, recovery rate*

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## On-farm cow-calf performance in response to pre- and post-partum concentrate supplementation in South Central Coastal Vietnam

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### Abstract

Supplementing cows with concentrate feeds in the last trimester of pregnancy and during lactation is important in maintaining cow body condition, positive energy balance and preventing the mobilisation of stored fat. However, there is a lack of information about the effect of supplementary feeding of beef cows during pre and post-partum periods on cow-calf performance in South Central Coastal Vietnam. Therefore, the main objective of this study was to evaluate the effect of pre- and post-partum supplementary feeding on cow-calf performance in an on-farm experiment. Twenty crossbred cows in the third trimester of pregnancy were randomly allocated into four pre- and post-partum treatment groups comprising: 1) Control diet only; 2) Control diet pre-partum and improved diet post-partum; 3) Improved diet pre-partum and control diet post-partum; and 4) Improved diets only. The control diet was a mixture of maize powder and rice bran offered at 0.25% of body weight (BW) pre-partum and 0.35% of BW post-partum. The improved diet was a mixture of maize powder, rice bran, peanut cake and cassava powder offered at 0.35% of BW pre-partum and 0.5% of BW post-partum. The improved diet had a significant ( $P < 0.05$ ) positive effect on calf weight, body length, and chest girth at birth, but not at 90 days. There was a significant effect of diet on average cow body weight, body condition score (BCS) and calving to conception interval (CCI). However, the timing of feeding the concentrate (pre- or post-partum) had no effect. The CCI was longer for cows fed the control diet (212 days) than for cows supplemented pre-partum (176 days). Cows supplemented post-partum had the shortest CCI (Av. 144.5 days). In conclusion, post-partum supplementation improved cow-calf performance and induced early cyclicity, thereby shortening the interval from calving to conception and overall reproductive performance under on-farm conditions.

*Keywords: concentrate, cow-calf performance, on-farm, supplementary feeding, Vietnam*

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## Noni effect on goat sperm motility after cooling

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### Abstract

Noni (*morinda citrifolia*) is the fruit of a tropical plant with content of alkaloids (xeronin), vitamins A and C which are antioxidants that effectively prevent and neutralize free radicals. This study was conducted to evaluate Noni effect on goat sperm motility after cooling. Semen was collected from 4 crossbreed etawah bucks using artificial vagina method. Fresh semen evaluated for colour, pH, volume, concentration, mass motility, motility, life sperm and sperm abnormality. Semen was diluted with tris-egg yolk-based extender supplemented with different levels of Noni (*morinda citrifolia*) extract (0, 10, 20 and 30 %) v/v with the ratio of 1 semen : 4 diluter. Semen used had mass motility of 2+ and motility of 70%. Immediately after dilution semen was stored in 3-5°C and sperm motility percentage were observed at 0, 24 and 48 h. The obtained data were analyzed with Analysis of Variant (ANOVA) and Least Significant Difference were determined. The experiment was designed using completely random design (4 treatments and 10 replications). The results showed that the level of Noni (*morinda citrifolia*) extract had very significant effect ( $P < 0,01$ ) on sperm motility percentage in 0, 24 and 48 h of cooling. It can be concluded that the best Noni (*morinda citrifolia*) extract level for resulting optimal sperm motility was 10%.

**Keywords:** AI, antioxidant, dilution, Noni extract, semen quality

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## **Productive and reproductive performance of indigenous Lime and Parkote buffaloes in the Western hills of Nepal**

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### **Abstract**

Livestock is an integral part for the most rural livelihoods in Nepal. A very high proportion of poor and marginalized farmers depend on livestock as main or supplementary source for their income. Cattle and buffalo contribute more than 70% to the livestock sector. The productive and reproductive performances of indigenous buffalo, Lime and Parkote, were studied in Regional Agricultural Research Station (RARS), Lumle in Nepal. The compilation of 14 years (2000 to 2014) lactation records of the indigenous buffaloes maintained at RARS livestock farm was collected and analyzed to assess the production and reproduction traits. Similar surveys were also conducted in Kaski and Lamjung districts of Nepal. The buffaloes were kept on-station with the basal diet of commercial concentrate, roughages and a supplementary grazing (2-3 hours per day). The productive performance of Lime was 964.1±33 litre/lactation and Parkote was 878.5±66.3 litre/lactation, while daily milk yields of Lime was 3.16±0.10 litre/day and Parkote was 2.88±0.21 litre/day. The milk constituent of Lime was (9.03%) fat, (9.21%) solid not fat & (3.84%) protein and Parkote was (8.91%) fat, (9.81%) solid not fat, & (4.02%) protein. The maximum mating (30%) was found in October, while the minimum mating (1%) was in June. The calving time of Lime and Parkote is maximum (36%) in the month of September. The farmers of mid hill were preferred (91.5%) farmers was natural mating system while (2.1%) artificial insemination and (6.4%) farmers have both artificial insemination & natural breeding in indigenous buffaloes. The survey of Kaski and Lamjung districts was summarized that 10.4% farmers had throughout the year fodder and forage availability, whereas 14.6% farmers have nine month, 68.8% farmers have six month & 6.2 % farmers have four month availability of forage and fodder. The Lime and Parkote buffaloes are highly potential milking animals in the western hills of Nepal. Furthermore, the value chain and organic production approaches would be very useful for the conservation and utilization of these indigenous buffaloes.

*Keywords: buffalo, Lime, Parkote, production, reproduction*

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## The Oocyte parthenogenesis stimulation by protein extract of goat spermatozoa

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### Abstract

The research purpose is to analysis the potential function of proteins sperm extracts in activation of oocyte resulted from *in vitro* maturation (IVM). Protein sperm extract was isolated from goat semen ejaculated. This sperm extract is expected to be utilized as a candidate natural activator for gamete cell activation. Laboratory experimental of IVM is carried out in medium TCM199 + 10% FBS + 10  $\mu$ l FSH + 25  $\mu$ l LH + gentamycin in 5% CO<sub>2</sub> incubator for 24 hours, and then selected for second metaphase (M-II) oocytes by 1<sup>st</sup> polar body extrusion. Main Treatments were ethanol activation followed by sperm extract supplementation were: Sperm Extract Alone (Po), Ethanol 7%+ Sperm Extract (P1), ethanol 7%+ 2 mM 6-DMAP (P2). The variables measured were the percentage of cells activated base on cleavage rate. The results showed that activation of the matured oocyte by both sperm extract alone (control) and use total protein sperm extract can be used in a system proven *in vitro* activation of M-II parthenogenesis oocytes. It was concluded that activation of M-II oocytes by chemicals and then supplemented by sperm extract indicates the best cleavage rate of about 34.48%. It is recommended for further basic research focused on specific protein concentration of extracts sperm to oocyte activation *in vitro*.

**Keywords:** Oocyte, Parthenogenesis, Activation, Sperm Extract, Goat.

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## Supplementation of L-Carnitine on matured goat oocyte *in vitro*

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### Abstract

To support the development and growth gamete cells utilize energy sources and nutrients in the culture medium *in vitro*. Gamete cells in the early phase of increased production of oxygen free radicals when cultured *in vitro*. Therefore needed antioxidants that can inhibit free radicals in the culture medium. L-Carnitine has antioxidant activity. The purpose of the study was to analyze supplementation of L-Carnitine on matured goat oocyte. Immature oocytes with compacted cumulus cell and homogenous cytoplasm performed for 26 h in basic medium TCM 199 + FCS 10 % + PMSG 10 IU + hCG 10 IU and supplemented with L-Carnitine 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4 mg/mL. The study design used was a completely randomized design using 10 replicates of each treatment. Evaluation of matured oocyte *in vitro* was percentage of completely expanded cumulus cell and metaphase II. The results showed that TCM 199 + FCS 10 % + PMSG 10 IU + hCG 10 IU and supplemented with L-Carnitine 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2 and 1.4 mg/mL yielded completely expanded cumulus cell was 62.5, 62.7, 67.8, 68.4, 70.1, 76.6, 91.3, 78.5 % and Mt - II oocytes was 59.1, 61.7, 58.2, 60.8, 66.4, 76.2, 88.7, 77.6 % respectively. There were significant differences ( $P < 0.05$ ) on completely expanded cumulus and metaphase II oocyte. It was concluded that supplementation of L-Carnitine increase the rate of matured goat oocyte *in vitro* and the best dose of L-Carnitine for *in vitro* maturation rate was 1.2 mg/mL.

*Keywords: carnitine, cumulus cell, goat, metaphase II, oocyte*

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## Effect of follicle size at the initiating of the ovulation-synchronisation protocol on ovulatory and oestrous responses in dairy heifers

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### Abstract

The objectives of this study were to 1) investigate the effect of follicle size at the beginning of the synchronisation regime on ovulatory and oestrous responses; and 2) evaluate the relationships among these variables of heifers with or without a follicle  $\geq 8$  mm at the initiation of the ovulation-synchronisation protocol. Twenty Holstein dairy heifers received a first GnRH injection and a P<sub>4</sub> device (750 mg of P<sub>4</sub>) on day 0 followed by a first PGF<sub>2 $\alpha$</sub>  and P<sub>4</sub> device removal on day 5, a second PGF<sub>2 $\alpha$</sub>  on day 6, and a second GnRH on day 8. At each scan, the number and diameter of all visible follicles and corpus luteum (CL) were determined. Ovarian follicles were categorised according to diameter as class I ( $\leq 4$  mm), class II ( $> 4$  to  $< 8$  mm), or class III ( $\geq 8$  mm). On day 0, heifers were also classified by the appearance (n=10) or disappearance (n=10) of a follicle  $\geq 8$  mm. Even though there were no differences in the numbers of class I and class II follicles at the beginning of the synchronisation protocol, the difference in the mean total number of follicles was significant ( $P < 0.05$ ) between heifers with and without a follicle  $\geq 8$  mm on ovary. The presentation of a follicle  $\geq 8$  mm at the start of the synchronisation programme increased the proportion of heifers with a newly formed CL ( $P < 0.05$ ) and number of CL ( $P < 0.05$ ) on the day of the first PGF<sub>2 $\alpha$</sub>  injection compared with heifers that did not exhibit a follicle  $\geq 8$  mm on the ovaries. Ovulatory response to first GnRH injection was increased ( $P < 0.05$ ) in heifers presenting a follicle  $\geq 8$  mm at the start of synchronisation programme. The oestrous response tended to be affected ( $P = 0.08$ ) by the presence of a follicle  $\geq 8$  mm at the initiation of the synchronisation protocol. On day 0, the diameter of the largest follicle in heifers with a follicle  $\geq 8$  mm was greater compared with heifers without a follicle  $\geq 8$  mm. In all heifers, a significant positive relationship ( $P < 0.05$ ) was observed between the diameter of largest follicle (DLF) on day 0 and the number of CL on day 5. In heifers with a follicle  $\geq 8$  mm, the DLF on day 0 was positively correlated ( $P < 0.05$ ) with the size of CL on day 5. Thus, these data highlight that ovulation in response to the first GnRH injection would be enhanced by the appearance of a follicle  $\geq 8$  mm along with the GnRH-based protocol in dairy heifers.

*Keywords: follicular size, synchronization protocol, ovulatory response, dairy heifer*

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## Character of kisspeptin receptors immunoreactions in pituitary glands of cycling buffaloes (*Bubalus bubalis*)

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### Abstract

The hypothalamic- pituitary- ovarian axis, which is the main pathway of reproductive function, is controlled not only by gonadotropin releasing hormone but also kisspeptin signaling. Kisspeptin plays a role via its receptors (Kiss1r) which can be found in the pituitary glands of mammals including, presumably, buffalo – although few researches have been done on them regarding this. The present study explores the character of Kiss1r in the pituitary glands in mature female buffaloes. Six cycling buffaloes were slaughtered and their pituitary glands were collected. The samples were preserved in 4% paraformaldehyde in a 0.1 M phosphate buffer (pH 7.2) and processed for paraffin blocks. A rabbit anti- KiSS1R antibody (Bioss, catalog number bs-2501R, MA, USA) was applied by standard immunohistochemistry to the kisspeptin receptors. Kiss1r immunoreactions were expressed in all 3 parts of the pituitary glands: pars distalis (80.4±5.3%; mean± standard deviation), pars intermedia (79.9±9.9%) and pars nervosa (100%). Kiss1r immunoreactions in the pars distalis were present in the nucleus of some basophilic cells (21.2±6.0%) and also the nucleus and cytoplasm of some acidophilic cells (59.2±10.7%) and expressed a varied intensity of reactions. In the pars intermedia, Kiss1r immunoreactions were expressed in only the nucleus of cells and the percentage of intense and moderate reactive cells was similar (31.3±8.3% VS 29.1±9.9%), with a statistically significant percentage difference only between the intense and the weak reactive cells (17.5±10.8%). The Kiss1r positive cells showed mostly intense and moderate reactions in the pituicytes in both the nucleus and cytoplasm in the pars nervosa. The present study indicates that the target cells in the pituitary gland of kisspeptin in matured cycling buffaloes vary in their Kiss1r immunoreactive intensity.

*Keywords: characterization, kisspeptin receptors, immunoreaction, buffalo, pituitary gland*

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## The acceptability of reduced sperm concentration in frozen buffalo semen

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### Abstract

This study was conducted to determine the conception rate and calving rate of animals inseminated with frozen buffalo semen out of the semen collected from Murrah buffalo bulls. This will be the first time that we are inseminating buffalo cows with less than 100 million per ml sperm cell/ml. of frozen semen. When these become acceptable, this will cause to have more cows to be inseminated.

The semen was extended with different sperm concentration of 50M, 45M, 40M, and 35M spermatozoa per dose (0.5 ml straw). There were about 37 buffalo bulls that were assigned to each concentration. The numbers of bulls depended on the number of cows to be inseminated and frozen semen doses. The number of semen donors has been identified and were given sperm doses with lower sperm concentration. Two breed types of bulls were used, the Indian Murrah and Bulgarian Murrah buffalo bulls. The number of doses produced depended on the motility and assigned to the treatment 1 (T<sub>1</sub>), 50M/dose; T<sub>2</sub>, 45M/dose; T<sub>3</sub>, 40M/dose; and T<sub>4</sub>, 35M/dose of each 0.5 ml straw. The number of ejaculates were recorded, processed and assigned to each treatment. The number of straws was 1,171 doses; 3,393 doses; 5,297 doses; and 4,454 doses for T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> respectively. They were used for artificial insemination by the Village Base Artificial Insemination Technicians (VBAIT) in the Provinces of Nueva Ecija, Bulacan, and Tarlac. The differences per treatment are presented.

Decreasing the sperm concentration showed higher number of doses for T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> with 1,171 doses, 1,258 doses, 1,454 doses and 1,705 doses respectively. The conception rate and calf drop with male and female offspring showed no significant differences. The significant difference in gestation period is normal because it is within the range of 320 ± 7 days and correlation is normal.

In conclusion, trying to see the cost of producing 0.5 ml straw with different sperm concentration and the number of buffalos to be inseminated showed that more semen could be used at 50 PhP per dose and could inseminate more animals. It is recommended that another study should be conducted by decreasing up to 15x10<sup>6</sup> sperm concentration/dose of 0.5 ml. straw.

*Keywords: vbait-village base artificial insemination technicians*

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## Reproductive performance of cattle and buffaloes treated with prostaglandin F<sub>2α</sub> and gonadotropin releasing hormone in Thailand and Philippines

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### Abstract

The use of hormones on the effect on reproductive performance of dairy cattle in Thailand and on beef cattle and buffaloes in the Philippines was made. Cloprostenol (PGF<sub>2α</sub>) are used in both countries. The reproduction in cows and heifer in Thailand and buffaloes and Beef Cattle in the Philippines were observed.

The estrous signs, conception rate, pregnancy rates and cost were determined. The first study was in Thailand with of 392 heads were used. There are 82 cows and 62 heads of cattle in Thailand and 160 buffaloes and 36 cattle with lutalyze and 45 buffaloes and 5 cattle in the Philippines for cloprostenol.

Chi-square and T-test in the Philippines and Chi square test analysis for factorial in CRD in Thailand. DMRT are used to determine for significant differences.

Results show that, dairy cows and heifers responded positively to the GnRH and PGF<sub>2α</sub> injection, resulting in higher incidence of estrus. Synchronization of estrus and ovulation by obsynch protocols could improve percent non-return to estrus and conception rate of dairy cattle. The pregnancy rate of dairy cows and heifer was increased by synchronization of estrus and ovulation.

The result shows no significant change in the reproductive performance of buffaloes using lutalyze or cloprostenol, similarly, dairy cows and heifer in Thailand is insignificant. The use of PGF<sub>2α</sub> and GnRH in Thailand are almost the same. Environmental condition does not affect their performance. The cost is likely to be used by the AI technicians in the fields. Both are the same in Thailand and Philippines.

It is recommended to use the hormone using the PGF<sub>2α</sub>. It is noteworthy to know that the price is cheaper and effective. It is easier to apply under field conditions; however, the technical knowledge of the AI technician in ovarian palpation is necessary.

*Keywords: pgf2α-prostaglandin f2alpha,gnrh-gonadotrophin releasing hormone, dmrt-duncanmultiflier range test*

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## Evaluation of processing techniques and sephadex filtration effects in buffalo semen quality

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### Abstract

The study investigated the effects of two semen processing techniques and Sephadex filtration on buffalo semen quality using RCBD. Two studies were performed; Study 1, focused on the evaluation of frozen buffalo semen quality through different processing techniques using Sephadex and study 2, on quality of frozen buffalo semen using different particle sizes of Sephadex G types. Semen collection was done three times from four selected AI bulls maintained at the National Bull Farm, Joson, Carranglan, Nueva Ecija. In the first experiment, 1 ml semen sample was taken from each bull ejaculated and divided into four fractions according to the semen processing technique namely: Treatment 1-PCM-Phase Contrast Microscopy (unfiltered), Treatment 2-PCM-Phase Contrast Microscopy (filtered), Treatment 3-CASA-Computer Assisted Sperm Analyzer Technique (unfiltered and Treatment 4-CASA-Computer Assisted Sperm Analyzer Technique (filtered).

In the first study, both unfiltered semen from CASA Technique obtained significantly higher ( $P<0.01$ ) sperm motility during the initial and post-thaw evaluation compared to PCM Technique in both unfiltered and filtered semen samples. On the other hand, sperm passage was not significantly different between PCM and CASA Techniques. Sperm concentration was significantly higher ( $P<0.01$ ) in the unfiltered than the filtered semen. High percentage of live and normal sperm cells were observed in the filtered semen, however, results showed that T4 was not significantly different with T1 and T3. On the other hand, T2 and T4 were significantly higher than T1 and T3.

In Study 2, results showed that using the CASA Technique of semen processing and filtration with Sephadex G-75-120 and G-100-120 filters resulted to significantly ( $P<0.01$ ) higher sperm passage, motility, viability, and morphologically normal sperm after filtration and freezing compared to Sephadex G-15-120 and G-50-150 filters. It is evident that Sephadex filtration can enhance buffalo semen quality. It is recommended that semen processing laboratories without the CASA can make use of the Sephadex G-75-120 and G-100-120 for objective evaluation of semen quality as alternative evaluation techniques.

*Keywords: casa-computer assisted sperm analyzer pcm-phase contrast microscopy*

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## **Morphometric dimensions of the spermatozoa in Thai native boar depend on the ejaculates**

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### **Abstract**

Size and shape of spermatozoa are known to be associated with the fertility. The objectives of this study were 1) to determine the sperm morphometric of Thai native boar and 2) to investigate the effect of ejaculates on morphometric traits of spermatozoa. Semen sample were collected for 5 consecutive weeks from 5 Thai native boars. Spermatozoa were fixed with formaldehyde after stained with Nigrosin-Eosin then smeared on replicated slides. Normal sperm morphometry characteristics were measured on computer screen by used microscope software. The sperm head dimensions by average were 8.67  $\mu\text{m}$  in length, 4.66  $\mu\text{m}$  in width, 0.30  $\mu\text{m}$  in elongation and 1.86  $\mu\text{m}$  in ellipticity. The tail lengths by average were 11.70  $\mu\text{m}$  in midpiece, 33.24  $\mu\text{m}$  in principal piece and 2.64  $\mu\text{m}$  in end piece. The sperm head dimensions including head length, head width, elongation and ellipticity were significantly differences between ejaculates. However, there were not significantly differences in tail lengths between ejaculates. The data suggest that differences in the ejaculates affects on sperm head dimensions in Thai native boar.

*Keywords: Ejaculates, Morphometric dimensions, Thai native boar*

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## **Effects of addition juice date palm to the extender on the percentage of live and motility of frozen thawed bull spermatozoa**

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### **Abstract**

The objective of the present study was to investigate the effects of supplementation of juice date palm to the extender on post-thaw percentage of live and motility in bull semen. A total of four Bali bull cattle was used to the study. Juice date palm was added at the concentration of 0.1%, 0.2%, 0.3% and 0.4% to bovine semen cryoprotective medium. The cryoprotective extender for the control group was the same as that for the treatment groups except that it was not supplemented with juice date palm. The results indicated that percentage of live sperm and motility on fresh sperm was no significant different ( $P>0.05$ ) between control and all treatments. Whereas, sperm motility of frozen thawed was significantly different ( $P< 0.05$ ) between control and all treatments. Furthermore, percentage of live sperm was no significant different ( $P>0.05$ ).

*Keywords: Juice date palm, spermatozoa, frozen thawed, percentage of live and motility*

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## Anticoccidial activity of *Trachyspermum ammi* extract against sporulation of coccidian oocysts

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### Abstract

Use of herbal and naturally driven products are economically cheaper and best alternatives to anticoccidial drugs for the control of coccidiosis in poultry as proven by several studies. Among herbal anticoccidials, *Trachyspermum ammi* commonly have antioxidant properties as it contains essential oils, with thymol as the major constituent. With reference to its antioxidant and different pharmacological applications, current study was planned to evaluate *in vitro* efficacy of *T. ammi* against sporulation of coccidian oocysts of poultry.

Sporulation inhibition bioassay was used to evaluate the activity of *Trachyspermum ammi* extract (TAE) on the sporulation of coccidian oocysts. In this assay, unsporulated oocysts were exposed to six concentrations of *T. ammi* in 10% Dimethyl Sulphoxide solution (w/v; 10, 5, 2.5, 1.25, 0.625 and 0.31%). The Petri dishes were partially covered to allow the passage of oxygen and incubated at 25-29°C for 48 h, providing 60-80% humidity. The sporulation of the oocyst was confirmed by examining sporocysts under inverted microscope at 40x.

Results showed anticoccidial activity of TAE against all *Eimeria* species as proved by its ability to inhibit the sporulation of the oocysts under laboratory conditions. Inhibition of sporulation was observed in dose dependent manner. TAE at higher dose also damaged the normal morphology and shape of oocysts of *Eimeria* species.

**Keywords:** *Trachyspermum ammi* extract (TAE), *in vitro*, sporulation, *Eimeria*, oocysts

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## **Estimation of requirement for productive beef cows stock to maintain population using natural increase data**

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### **Abstract**

Low reproductive performance of beef cows would disturb requirement of beef cows stock as replacement for the older and unproductive cows. This research was conducted to estimate the requirement of beef cows stock as replacement based on natural increase data. Three factors that affect the value of the natural increase are the percentage of adult cows, birth rate and mortality rates. The birth rate depends mostly on the composition of beef cows population and their productivity, mortality rate depends mostly on rearing management. A survey involving 200 beef cattle farmers as respondent was conducted to collect data on reproductive performance of beef cattle and natural increase estimation. Total of beef cattle reared by the farmers was 367 heads with composition of 54.76% adult cattle; 13.62% heifers or steers, and 31.60% calves. The average age of adult females or cows was  $3.53 \pm 1.42$  years; with average S/C  $1.98 \pm 0.78$  times; age at first calving  $2.46 \pm 0.53$  years, maximum number of calving and rearing period of cows were 6.0 calving and  $8.54 \pm 2.17$  years, respectively. Average age at first mating for heifer was  $21.32 \pm 3.27$  months; calving interval  $14.53 \pm 3.18$  months, hence the natural increase of the beef cattle population was 29.68%, and number of stock for young females (heifer) 17.21%. Based on the data, it was estimated that the requirement for heifers of 2 years old used as replacement was 8.95%, which is to replace culled cows as much as 8.10 % and there is an excess of 8.26% heifers, hence, the total output of females was 16.36%. Thus, it was concluded that for such beef cattle population, its structure, and reproductive performance, a minimum of 8.95 percent of females was required as replacement that must be supplied from the value of natural increase of 29.68 percent. If the results of this study will be used as the basic for breeding programs, then it is important to maintain such structure of cattle population. Age of productive females should be limited to a maximum of 8 years. Maximum number of cattle that can be extracted from the population without disturbing the population was up to 16.36%.

*Keywords: heifer, natural increase, out put, population structure, productive cows*

### Factors influencing the incidence of *Eimeria leuckarti* in horses

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#### Abstract

A cross sectional survey was carried out to determine the prevalence of coccidiosis in horses and risk factors associated with their prevalence in the district of Toba Tek Singh, Punjab from April, 2009 to March 2010. Faecal samples were collected from the whole the district using a two stage cluster random sampling method and analysed by standard parasitological procedures. Of the total 484 faecal samples examined for *Eimeria*, 244 (50.41%) were found infected with *Eimeria leuckarti*. Peak prevalence was observed in August (OR=1.156;  $\chi^2=20.055$ ) indicating higher prevalence at higher humidity while the least animals were found infected with *Eimeria leuckarti* in the months of April to June, being the driest period of the year in Pakistan. The wet season was found favourable for propagation of *Eimeria*. Foals (124/197; 62.94%; OR=0.422;  $\chi^2=20.825$ ) and mares (196/347; 56.48%; OR=0.512;  $\chi^2=13.265$ ) had a significantly higher prevalence ( $P<0.05$ ) of *Eimeria* than adults (120/287; 41.81%) and males (48/137; 35.04%) respectively. Among management and husbandry practices, farming type, feeding system and floor type strongly influenced the prevalence of *Eimeria*. Coccidiosis was more prevalent in mix farming enterprises, in animals fed ground feed, pond watered animals and in animals housed on non-cemented floor ( $P<0.05$ ) as compared to single enterprise farming operations, tap watered animals, trough fed animals and use of partially cemented floors respectively. Body condition of animals was not as a risk factor ( $P>0.05$ ) influencing the prevalence of *Eimeria*. This study reports for the first time in detail the risk factors influencing the prevalence of *Eimeria* in horses. Furthermore, this is the first report of the occurrence of *Eimeria* in horses in Pakistan.

**Keywords:** horse, eimeria, factors influencing, management

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### **Factors influencing the incidence of Babesiosis in sheep of district Toba Tek Singh, Pakistan**

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#### **Abstract**

The prevalence of Babesia was studied in sheep in district Toba Tek Singh, Punjab, Pakistan from 2009-2010. A cross-sectional survey was performed in order to determine the prevalence of Babesia and effect of various risk factors on its prevalence in sheep of district Toba Tek Singh. A total 43 (9.29%) out of 463 sheep showed the Babesia infection. Month wise peak prevalence was observed in July of 17.95%, while no positive case was registered in Dec-2009 and Jan-2010. The prevalence of Babesia was found to be significantly ( $P < 0.05$ ) dependent to age and sex. The prevalence of Babesia was found 14.18% and 13.67% higher adults and female verses young and male sheep. No correlation was observed between body condition and Babesia prevalence.

*Keywords: Sheep, Babesia, factors influencing, management*

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**The *in vitro* antibacterial activity of *Muntingia calabura* against *Staphylococcus aureus* and *Streptococcus agalactiae***

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**Abstract**

The present study investigated the possible antibacterial activity of methanol, ethanol and aqueous extracts of *Muntingia calabura* using *in vitro* discs diffusion method. The sterilized blank discs (5mm diameter) was impregnated with 10  $\mu$ L of the respective extract (the concentration: 10%, 20%, 30%, 40%, 50%, control (iodip) and tested against *Staphylococcus aureus* and *Streptococcus agalactiae* were obtained from fresh milk CMT scor 3. Statistical anaylisis showed that extract from methanol, ethanol and aqueous were effective in inhibiting growth of *Staphylococcus aureus* bacteria as control treatment at concentration 30% ( $6.85 \pm 0.35$ ;  $6.43 \pm 0.65$ ;  $6.62 \pm 0.19$  vs.  $6.34 \pm 0.07$  mm) respectively. Inhibiting zone for *Streptococcus agalactiae* from methanol and aqueous was effective as control at concentration 30% ( $7.42 \pm 0.62$ ;  $7.77 \pm 0.37$ ) while from ethanol it's effective as control treatment at concentration 30%,  $7.77 \pm 0.37$  mm. Inhibiting zone against *Streptococcus agalactiaes* slightly bigger compare to *Staphylococcus aureus*. The increasing concentrations of extract will higher inhibiting zone area. We concluded that *Muntingia calabura* has potency to be used as an antimicrobial activity against the *Staphylococcus aureus* and *Streptococcus agalactia*.

**Keywords:** antibacterial activity, *muntingia calabura*, *Staphylococcus aureus*, *Streptococcus agalactiae*.

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## Study of the optimal condition of RNA in situ hybridization for *HER-2/neu* in canine mammary gland

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### Abstract

The mammary gland tumors are the second most common occurring canine neoplasm. The investigation of *HER-2/neu* gene expression by chromogenic in situ hybridization was more valuable prognostic marker than protein expression by immunohistochemistry. Study of canine mammary gland tumor with chromogenic in situ hybridization (CISH) is rarely reported. The purpose of this study was to investigate the optimal condition of *HER-2/neu* gene expression by RNA CISH in canine mammary tumors. The canine mammary tissue samples were diagnosed with H&E stain then CISH for *HER-2/neu* was performed with RNA probe. The hybridization conditions were divided into 2 durations, 12 and 16 hours, each duration was divided into 6 groups with different concentration of antisense-sense probe and hybridization temperature as follows: 1:100-45°C, 1:100-55°C, 1:200-45°C, 1:200-50°C, 1:200-55°C and 1:200-60°C. The *HER-2/neu* mRNA signal visualization scored as follows: 0 = no signal; 1 = weak signal; 2 = moderate signal; 3 = strong signal. The best condition was 1:200-60 °C at 16 hybridized hours. The signals of benign tumor scored 1, tubulopapillary mammary carcinoma scored 2 and anaplastic carcinoma scored 3. The present study revealed the optimal condition of chromogenic in situ hybridization for detection of *HER-2/neu* mRNA by adjust 1) Duration of hybridization 2) Temperature of hybridization and 3) probe concentration. The *HER-2/neu* RNA CISH may play an important role as prognostic biomarker for the risk of developing metastasis in canine mammary tumor.

**Keywords:** *HER-2/neu*, CISH, canine mammary gland tumor

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## Study of differential protein composition of raw milk and processed milk by using SDS-PAGE and Native-PAGE

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### Abstract

This study was investigation the impact of the heat treatment of processed milk conducted at different processing temperatures, and the adding of demineralized whey on the protein solubility, soluble protein composition and interactions involved between proteins in a chemical complex. Commercial powder milk has been reconstituted and the soluble protein composition has been determined by the polyacrylamide gel electrophoresis with SDS-PAGE and Native-PAGE. Gel scans from SDS-PAGE and Native-PAGE patterns of powder milk samples were not showed low molecular weight complex as  $\beta$ -lactoglobulin (19 kDa) and  $\alpha$ -lactalbumin (13.6 kDa) while compared to raw milk. Protein bands of high molecular weight complex as immunoglobulins (75 kDa), lactoferrin (69 kDa) and serum albumin (60.6 kDa) in powder milk were absent except casein (~33 kDa) was slightly present in SDS-PAGE. Due to the different changes occurred heat and time during processing treatments. The disulfide interactions between denatured molecules of these proteins are mostly responsible for the formation.

*Keywords: cow milk, heat treatment, whey proteins, processed milk, native, sodium dodecyl sulfate polyacrylamide gel electrophoresis*

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## Development and production of Shrikh and by utilization of pomegranate fruit

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### Abstract

Shrikhand is an Indian sweet dish made of strained dahi. It is one of the main desserts in Kerala cuisine, Gujarati cuisine and Maharashtrian cuisine. Several attempts have been made to incorporate different additives into shrikhand to address the growing interest in the diversification of food products to attract a wider range of consumers. However, nobody tried to incorporate pomegranate in shrikhand. Therefore, present investigation was carried out to study the acceptability of pomegranate shrikhand. It can be concluded that the proportion of pomegranate pulp may be taken as 20 gm pulp and 80 gm of chakka for the preparation of pomegranate shrikhand which was superior over all combination for its organoleptic quality. It is also recommended that pomegranate can be effectively used for the production of this newly invented product.

*Keywords: Shrikhand, pomegranate, fermented milk product, traditional dairy product*

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**Physico-chemical quality of kefir of etawah crossbred goat milk**

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**Abstract**

A study was conducted to determine the effect of incubation time on pH, acidity, protein, fat and alcohol content of etawah crossbred goat milk kefir. The kefir was prepared using etawah crossbred goat milk and 4 % (w/v) kefir grain as starter, and incubated in five different time of incubations as treatments, i.e. 0, 6, 12, 18, and 24 hours. All treatments were repeated four times. Data collected were subjected to analysis of variance of randomized block experiment design. The results showed that time of incubation significantly affect ( $p < 0.05$ ) on pH, acidity, protein, and the ethanol content, while on fat content didn't significantly effect. Incubations time could reduce pH and fat content, while the acid content, protein, and alcohol has increased. It is concluded that 18 hours incubation resulted the best quality of etawah crossbred goat milk kefir.

*Keywords: incubation, kefir, etawah crossbred goat milk*

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## **Molecular signature of food borne pathogens in milk and meat of yaks, their products and natural excreta.**

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### **Abstract**

Traditional way of preservation of livestock products are common practice in highlanders of North- Eastern Himalayan region of India. Lack of scientific preservation of meat and milk products may sometime invite various food borne pathogens of zoonotic importance. The present endeavor has dealt with screening of 1130 samples of yak origin which were collected from Tawang and West Kameng district of Arunachal Pradesh, India. Faecal samples (148), meat (197), milk (346), paneer (221), churpi (55) and churkam (163)(regional yak milk products) were collected and processed for bacteriological isolation of *Escherichia coli*, *Salmonella* spp, *Streptococcus* spp and *Staphylococcus* spp. Isolation study revealed that 64.86%, 54.82%, 19.36%, 4.07%, 69.09% and 15.33% samples of collected faeces, meat, milk, paneer, churpi and churkam were positive for any type of bacteria respectively. Through multiplex PCR this was found that isolated *E. coli* contained *Int* (38.25%), *Stx* (56.18%), *StxII* (47.19%) and O157 (25.84%) genes. All the *Salmonella* positive samples showed presence of *invA* gene. Out of *Streptococcus* positive samples 74.28% and 68.58% were positive for 16SrRNA (long band) and 16SrRNA (short band) gene fragments, respectively. Amongst *Staphylococcus* positive samples 29.23%, 61.53%, 53.85% and 41.54% were found positive for 16SrRNA, *Sei*, *Seh* and *Sea* gene respectively. Therefore, the study suggested that the preservation method of livestock product in the region is unhygienic and the detected food borne pathogens may invite serious illness after consumption of contaminated food.

*Keywords: yak, products, meat, milk, food borne pathogens*

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## **Histological liver of mice (*Mus musculus*) consumption collagen extract of broiler's bone in South Sulawesi, Indonesia**

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### **Abstract**

The purpose of this research was to study the effect of the broiler's bone collagen extract consumption in different doses to the liver histology in mice (*Mus musculus*). A total of 30 male mice were used for the experiments and were randomly allocated into five groups (n=6 each group). Level doses of collagen were: Group A as control (0 mg/kg of Body Weight (BW)), dose of group B (5 mg/kg of BW), dose of group C (50 mg/kg of BW), dose of group D (500 mg/kg of BW) and dose of group E (5,000 mg/kg of BW). Microscopic observation in the liver of mice was done after the consumption of collagen extracts. The study of histological liver of mice that were given consumption of collagen extract from broiler's bone with level doses respectively: 0 ; 5 ; 50 and 500 mg/kg of BW indicated that the observation the level of damage to liver tissue <30%, but to level dose of 5,000 mg/kg of BW has shown the extent of damage >30% and has been characterized by inflammatory cell infiltration process. The results of this research showed that the dose limits extract collagen that is still acceptable of mice (*Mus musculus*) is 500 mg/BW.

*Keywords: liver, mice, collagen extract, broiler, bone*

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### Effect of jelly addition on kefir quality

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#### Abstract

This study aims to the effect of addition of jelly on physico-chemical and organoleptic quality of kefir. The research material is goat milk kefir and commercial jelly. The research method was an experiment with completely randomized design (CRD), 4 treatments, the addition of jelly concentration of 1%, 1.5%, 2% and 2.5%, 4 replications, followed by Least Significant Difference Test (LSD) if there different and to determine the best treatment. The results showed that the kefir added various concentrations of jelly showed different significant ( $p < 0.01$ ) in viscosity (4474.75 cP), fat content (3.545%), moisture content (68.76%), pH (3.99), but not significance ( $p > 0.05$ ) in fiber content (0.297%) and protein content (2,446%). Organoleptic qualities provide different significant ( $p < 0.01$ ) such as colour (3.24), flavour (3.26), texture (2.99) and taste (2.97). The conclusion is the addition of jelly on kefir is a different significant on the viscosity, fat content, moisture content, pH and organoleptic quality but not significance on the fiber content and protein content. Addition of the best jelly on goat milk kefir is 1.5%.

*Keywords: goat milk kefir, jelly, physico-chemical, organoleptic*

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### **Application of feed technology of quail (*Coturnix-coturnix Japonica*) using waste of Skipjack (*Katsuwonus pelamis*)**

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#### **Abstract**

Livestock of quail (*Coturnix-coturnix Japonica*) can be cultivated with not require a large area. Quail livestock enterprises have been introduced to the housewife, who joined the group of “dasa wisma”, with the aim to improve their welfare. Quail livestock enterprises will succeed one of which depends on the feed. The problem of knowledge housewife group “dasa wisma” is low, on the use of local resources in quail feed. Based on these problems, it has made the application of technology with the goal for utilization of skipjack waste in quail feed. Method of application is through extension and training. Housewives as a member “dasa wisma”, had trained preparing rations by utilizing local resources. One of the feed material used is meal from waste of skipjack. Fish waste is cheaper, than the meal of fish that must exist in the preparation of rations quail. Based on the results of the activities that have been carried out can be concluded that the application of technology by adding waste skipjack in rations can reduce feed costs. Suggestions submitted are necessary assistance both from local government and universities for the development of livestock quail by utilizing local resources.

*Keywords: quail, technology, feed, waste of skipjack*

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## Quality of protein concentrate from *Jatropha curcas* seed cake produced by chemical and biological processing

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### Abstract

The objectives of this study were to optimize the quality of protein concentrate from *Jatropha curcas* seed cake (JSC) that obtained by chemical precipitation and fermentation using lactic acid bacteria. This experimental research used Completely Randomized Design. The treatments were applied to *Jatropha curcas* seed cake with three time repetition. Six treatments were performed, which consist of : R0 (raw jatropha seed cake without treatment), R1 (Protein concentrate precipitation without fermentation), R2 (fermentation mediated by *Lactobacillus acidophilus*), R3 (fermentation mediated by *Bifidobacterium spp*, R4 (jatropha seed cake precipitation/R1 continued by *Lactobacillus acidophilus* fermentation), R5 (jatropha seed cake precipitation/R1 continued by *Bifidobacterium spp* fermentation). The observed variables were: crude protein, protein solubility, antinutritive compound (lectins, phorbol ester, and antitrypsin). The result showed that precipitation and fermentation increase protein content of *Jatropha curcas* with 32.79% to 48.21% for the control and fermentation, respectively. Fermented protein concentrate of JSC (R4, R5) showed a higher solubility than protein concentrate without fermentation (R1). Protein concentrate produced by precipitation and fermentation using *Lactobacillus acidophilus* (R4) showed the lowest antinutrient content (lectins, antitrypsin and phorbol ester). Based on the result, the conclusion is protein concentrate produced by precipitation and fermentation using *Lactobacillus acidophilus* (R4) showed the best quality in terms of nutrient and antinutritive content.

**Keywords:** *Jatropha curcas*, *L. acidophilus*, *Bifidobacterium spp*, protein concentrate

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## **Serum testosterone, testes size and semen quality of rams fed sugarcane bagasse treated with urea or pronifer**

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### **Abstract**

This study was to investigate the influence of sugarcane bagasse silage treated with urea, live yeast and pronifer on serum testosterone concentration, testes size and semen quality of rams. Sixteen Rahmani rams were used in four feeding groups, Group 1, untreated bagasse, Group 2, 3% urea treated bagasse; Group 3, urea and yeast (10 g per animal daily) treated bagasse and Group 4, urea and pronifer (2 g per animal daily) treated bagasse. Pronifer is feed additive made by specific lactic acid fermentation of heat-treated soy bean meal and malt. Blood samples were collected for serum testosterone level determination. Testes size was measured and semen quality was tested. The experiment lasted for six months. All results were analyzed using GLM procedure of SAS. Testosterone level in blood of animals fed urea treated silage with live yeast or pronifer have higher ( $P < 0.05$ ) values than those of control or urea group. No significant effects of urea supplementation on testosterone level, testes size and semen quality. No differences among treatments for testes size but semen quality showed that mass activity, volume and semen concentration for yeast and pronifer groups were higher ( $P < 0.05$ ) than those of control or urea treated groups. Pronifer supplement improve semen quality by decreasing total abnormalities and increasing mass activity ( $P < 0.05$ ). In conclusion, urea treated bagasse have no deleterious effects on semen quality, however, live yeast and pronifer can enhance ( $P < 0.05$ ) semen quality in rams fed urea treated bagasse.

*Keywords: testosterone, semen quality, urea, pronifer, Sugarcane bagasse.*

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## Estimation of methane emissions from local and crossbreed beef cattle in Dak Lak province of Vietnam

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### Abstract

A significant proportion of greenhouse gas emissions in Vietnam come from household farming systems in which beef cattle account for 55% of the total ruminant population. Identifying the scale of influence of feeding practices and cattle breeds on sustainable productivity is critical to increase the beef herd; and to make more informed decisions about socio-economic development and policy discussions. The study describes the use of household farming system (HFS) records from Local Yellow x Red Sindhi (*Bos indicus*; Lai Sind) and ½ Limousin, ½ Drought Master and ½ Red Angus cattle during the growth (i.e. 0 to 21 months) and fattening (i.e. 22 to 25 months) periods to better understand variations on meat productivity and enteric methane emissions in the Central Highlands region. Parameters were determined by the Ruminant model and data estimated with live weight (LW) at birth as a covariate and with breed and HFS as fixed effects. Dry matter (DM) intake was assumed to be 2.5% of LW and expressed by the alignment of grasses plus by-products (i.e. homemade concentrate). Four scenarios were developed: (HFS1) grazing from birth to slaughter on native grasses for ~10 h plus 1.5 kg DM/day (0.8 % LW) of a mixture of guinea grass (*Panicum maximum*; 19%), cassava (*Manihot esculenta*; 43%) powder, cotton (*Gossypium* sp., 23%) seed and rice (*Oryza* sp. 15%) straw; (HFS2) growth period fed with elephant grass (*Pennisetum purpureum*; 1% of LW) plus supplementation (1.5% of LW) of rice bran (36%), maize (*Zea Mays*; 33%) and cassava (31%) meals; and HFS3 and HFS4 computed elephant grass, but concentrate supplementation reaching 2 and 1% of LW, respectively. The fattening period for the last three scenarios considered the same supplementation offered in HFS1 as total diet in standard fattening cages. Results show that compared to HFS1, emissions ( $72.3 \pm 0.96$  kg CH<sub>4</sub>/animal/life; least squares means  $\pm$  SEM) were 15, 6 and 23% lower ( $P < 0.01$ ) for the HFS2, HFS3 and HFS4, respectively. The predicted emission intensities (CO<sub>2</sub>eq) per kg of LW at slaughter ( $4.3 \pm 0.15$ ), carcass weight ( $8.8 \pm 0.25$  kg) and kg of edible protein ( $44.1 \pm 1.29$ ) were also lower ( $P < 0.05$ ) in the HFS4. In particular, feed supply and ratio changes had a more positive impact on emission intensities when crossbred ½ Red Angus cattle were fed. It was concluded that a modest improvements on feeding practices and an integrated modelling framework may offer potential trade-offs to respond to climate change within the context of the Agricultural Synergies NORAD project in Vietnam.

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## **Study of local feeds potency for pig farming development in Manokwari, West Papua, Indonesia**

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### **Abstract**

A research was carried out to study the potential of local feeds for pig farming development in Manokwari. Descriptive method with technical survey was used to identify general characteristic of each farm and to identify the common local feeds using by the farmers in their pig rations, measure their quantity and quality and formulate appropriate rations for each growth stage by using available local feeds. All identified local feeds were analyzed for protein (%) and ME (kcal/kg) content to evaluate the feed status at each farm. Results showed that majority of the farmers kept less than 50 pigs in a flock with simple permanent housing. All of the farmers used local feeds in pig rations without formulating them properly. In fact these local feeds were found potential with daily production as follow: Fish waste 1000 kg, tofu waste: 2400 kg, soybean hull 55.5 kg,, mung-bean hull 83.4 kg,, rice bran 11,586.6 kg, banana peel 127.5 kg, taro peel 11.4 kg, market waste (vegetable stalks) 546 kg, and restaurant waste 2056.6 kg,. Only two farmers provided ration for their animals with enough protein and ME as required.

*Keywords: local feeds, pig farming, pig ration, by-product*

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## **A response of *in vitro* and *in vivo* methane production, nutrient digestibility and rumen parameters of sheep by Cat fish oil (CFO) supplementation**

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### **Abstract**

Two experiments (Exp) were carried out. The first one was the *in vitro* gas production experiment using 50 ml-syringes in a complete randomized design with 6 treatments and 3 replications. The treatments were 0, 1, 2, 3, 4 and 5 % of Cat fish oil (CFO) in the total substrate dry matter (DM). The substrate used in the experiment was Para grass. The second experiment was a 4 x 4 Latin square design with the growing sheep ( $19.7 \pm 1.43$  kg). The treatments were the supplementation levels of Cat fish oil of 0, 1, 2 and 3 % (DM basis) corresponding to the CFO0, CFO1, CFO2 and CFO3 treatment. Each experimental period was for two weeks including one week for dietary adaptation and another one for the sample collection. Methane (CH<sub>4</sub>) production was measured over a 24 h period while the sheep were in respiration chambers. The results showed that the *in vitro* CH<sub>4</sub> and CO<sub>2</sub> production from 0-96 h were significantly different ( $P < 0.05$ ) among the treatments (Exp 1), particularly there was a significantly gradual reduction of CH<sub>4</sub> ( $P < 0.05$ ) when increasing CFO levels from the CFO0 to the CFO5 treatment. In Exp 2, methane production was significantly higher ( $P < 0.05$ ) for the CFO2 and CFO3 treatments, while the daily weight gains were significantly different ( $P < 0.05$ ) among the treatments with the highest value for the CFO2. A gradual reduction of CH<sub>4</sub> by increasing the CFO in diets with a linear relationship of  $R^2 = 0.89$  was found.

*Keywords: ruminant, green house gas, fat supplementation, digestion, rumen environment*

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## Water footprint of milk production in Thailand

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### Abstract

The green, blue and grey water demand of a dairy farm plays a pivotal role in the regional water balance. Considering already existing and forthcoming climate change effects there is a need to determine the water cycle in the field and in housing for process chain optimization for the adaptation to an expected increasing water scarcity. Resulting investments to boost water productivity and to improve water use efficiency in milk production are two pathways to adapt to climate change effects. In this paper the calculation of blue water demand for dairy farming in Thailand in 2013 is presented. The water used for feeding, milk processing, and servicing of cows in 1 year was assessed in this study. The results of the calculation of the green, blue, and gray water footprint showed as 93.39, 6.16, and 0.46 % respectively. The total water for 1 kg milk production at farm gate was 366.22 kg. The water footprint of milk processing were 88.05 and 78.03 kg per pack of 200 cc UHT and pasteurized milk respectively. The major part of water footprint in milk production was green water footprint from rain using by forage crop production.

*Keywords: milk, water footprint.*

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## **Biogas unit, an alternative solution for reducing green house gas effect of animal waste**

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### **Abstract**

Animal waste is not only a major source of CO<sub>2</sub>, a green house gas (GHGs), but also a good source of manure and in 2014 a national survey in Indonesia estimated that its animal husbandry produced 180,000,000 tons of waste and 187,000,000 m<sup>3</sup> of CO<sub>2</sub> annually. It is imperative to find ways to reduce this and one way is to increase manure production and thus crop growth to take up as much CO<sub>2</sub> as possible. Therefore, the aim of study was to find ways of improving and speeding up manure production. They study was enacted in Bantur district, Malang Indonesia between June and November 2014. A randomized full design was employed with 5 treatments and 4 replications. Sludge was mixed with water to speed up anaerobic fermentation. Straw was added as fellows 1:1, 1:2, 1:3, 1:4 and 1:5, respectively. In conclusions biogas units can reduce GHGs by managing CO<sub>2</sub> production through anaerobic metabolism and the reabsorbs ion of CO<sub>2</sub> through encouraging more flourishing crop growth.

*Keyword: solid, sludge, organic, livestock, fish*

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## **Development of farmer champions and their role in progressing smallholder beef production in Vietnam**

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### **Abstract**

‘Farmer Champions’ have an important role in promoting adoption of best practice recommendations in the communities that participate in international research for development projects. This paper draws on qualitative data from in-depth interviews with two Farmer Champions and quantitative survey data originating from ACIAR project *SMCN/2007/109/3*. It describes how the role of these Farmer Champions developed and how they have progressed beef smallholder production in Cat Trinh, a commune of the Vietnamese South Central Coastal province, Binh Dinh. Farmer Champions firstly adopt or adapt project recommendations to improve their own farming systems. They are subsequently recognised as valuable sources of knowledge by surrounding farmers. Farmer Champions then facilitate significant spread (or ‘scale out’) of knowledge and practices to other farmers through informal and organised knowledge transfer channels. Understanding the development of Farmer Champions and how they influence scale out provides information to guide the knowledge transfer methods used in future research for development projects, with a goal of further improving adoption of best practice recommendations.

*Keywords: adoption, beef production, knowledge transfer, smallholder farmer, Vietnam*



## **The assessment of cattle and palm oil plant integration system in West Sumatera, Indonesia**

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### **Abstract**

A study has been undertaken in 2014 to assess the local cattle production using palm oil plant by products in a integration system in West Sumatera, Indonesia. The expected output was the utilization of feed technology and the utilizing of the organic fertilizer to increase production of oil palm plantation by based on oil palm plantation-cattle integration system. The study used 40 head of Pesisir cattle with the age of 2-3 years old, consisted of 36 females and 4 males. The pen using the group pen based on the Grati model. The feeds given to the animals consisted of 60% oil palm frond silage, 25% palm kernel cake, 10% molasses, plus 1 kg of fermented rice straw and 2,5 kg/head/day of fresh grass. Cattle manure was used as organic fertilizer for oil palm plants. The parameters observed include: feed consumption, animal growth, animal reproduction, animal manure produced, and palm oil fruit prduction. The results indicated that there was a potential to utilize oil palm plantation by-products for local cattle feed resources. The body weight gains of both heifers (0.19 kg/hd/day) and young bulls (0.085 kg/hd/day) were relatively small as the animals of small breed. Out of 36 cows, 26 head were pregnant (72%). The results from organic ferlizer applicaton indicated that the oil palm fruit production was increased by 50%. It is hoped that the research will accelerate the integration system of local beef cattle raise under the oil palm plantation in West Sumatera.

*Keywords: Local beef cattle production, Feeds, Oil palm plant by-products, Organic fertilizer, Oil palm fruit production*

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## Seasonal changes in pasture and animal productivity of Korean native goats grazed at different pasture type

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### Abstract

The objective of this study was to investigate seasonal changes in forage and livestock productivity of Korean native goats grazed at different pasture types. Four farms which have a certain size of animals (above 200 heads) and pasture (above 10 ha) were selected as experimental farms. Dry matter yield of pasture and average daily gain of goats were seasonally evaluated. Growing goats of farm A, C, D were grazed at rangeland and those of farm B were grazed at pasture. Forage productivity was high at farm B in spring and at farm A, C, and D in summer. Nutritive value of pasture was higher at farm B than at farm A, C, and D. Goats of all farms increased consistently body weight and daily gain of goats was high at farm A and C and was low at farm D. These differences were mainly attributed by differentiation of seasonal forage productivity and nutritive value between pastures. Therefore, it is greatly demanded that rangeland would be changed or improved to pasture type for effective grazing system of goats.

*Keywords: goat, grazing, pasture, seasonal changes*

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**North-Uruguayan Gauchos facing global agribusiness**

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**Abstract**

Since the beginning of the millennium, South-American funds are invested in Uruguay, focused on the agribusiness model of food commodities. Impacts are mainly significant on land use, supply chains, farm management, governance and policymaking and rural society. Based on a set of four surveys with local stakeholders and a follow-up of landscape, both developed between 2009 and 2013, and supported by PIC (1 & 2) Project and MOUVE/ANR SYSTERRA Project, the authors described the past, current and next changes such as there are mentioned by the local people. Landownership and rural labour are especially focused. With the same databases, the authors describe the main changes in the Gaucha society, especially the trend to go to live in urban areas. These changes deeply affect the society on the long term. For example, youth who grew up in the city less concerned than their elders regarding the specificities of gaucho life. However, the change due to globalization is a characteristic of Uruguay which always was opened to foreign investment and technology.

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**Characterization of native pig raisers and their current production systems in the integrated sweet potato –native pig production system in Baliem valley, Jayawijaya regency, Papua province, Indonesia**

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**Abstract**

Participatory Rural Appraisal approach was utilized to characterize and describe pig raisers and their families as well as their current management and production system. Result shows the characteristics of pig raisers in Baliem Valley as: 1) 46 to 55 years old, 2) having one big family called *Sili* with more than 2 household heads, 3) married with one wife but mostly having at least two wives, 4) mostly uneducated, 5) *Sili* size ranged from 8 to 28 members, and 6) *Sili* members, especially the women, serve as farming labor. Low education, lack of technical knowledge and skills, as well as very little effort brought about poor management and production performance of native pig in all levels (family- *Sili*-, and community-level) in the village. The main sources of *Sili* income were cultivating multi-crops (daily cash) and raising pigs (big amount of cash when need arises). Sweet potato tubers and vines, given uncooked and/or cooked at a frequency of twice a day, were the native pig's primary source of energy. Extensive rearing system was applied to satisfy its need for other source of nutrients especially mineral and protein (earthworm). Low technical knowledge and skill contributed to the inability of pig raisers to prevent and cure diseases, especially Hog Cholera (HC), that was associated with high mortality and culling rates. After 5 years of HC outbreak, the role of native pig used mainly for social capital declined by 42.67% while it increased by 19.86% and 22.81% for financial capital and consumption, respectively. In addition, the lack of effort of the pig raisers to supply enough quantity and quality of feed was also a major factor for the low reproduction efficiency. Mortality rate for pre-weaning, post-weaning and adult pigs in this study were 26.30 %, 11.40% and 5.98%, respectively; consumption rate for pre-weaning, post-weaning and adults pigs were 9.36%, 14.87% and 6.05%, respectively; social activity rate for pre-weaning, post-weaning and adult were 2.45%, 17.15% and 25.57%, respectively; and selling rate for pre-weaning, post-weaning and adult were 17.78%, 24.66% and 9.86%, respectively.

*Keywords: pig raisers, pig production system, baliem valley, sili*

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## **Meat quality of Bali cattle (*bos sondaicus*) from local farming system in Gianyar district Bali Island**

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### **Abstract**

This study was conducted to know the quality of meat from local farming system in Gianyar District Bali Island. Bali of male cattle choose by different age using dentition and local farmer from different location. Bali cattle traditionally maintained by farmers and feed the same relative to a different location. The animals were slaughtered at a commercial beef processing facility after 12 h rest in the paddocks with available water, following halal (Muslim) rules. The result of research has no influence between different ages and different locations as well as the interaction of body weight, carcass weight, the physical quality of the meat (pH, fat thickness, water holding capacity, lean eye area, tenderness), and chemical quality of meat (moisture , fat, protein, and collagen). Bali cattle carcass percentage of all ages showed the results above 54,39 %. This suggests that the Bali cattle good adaptability maintained wherever the location and capable of producing carcasses for meat in large numbers despite the traditional maintenance.

*Keywords: bali cattle, meat quality, local farmer*

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## Compared two different sheep breed in farming system in Huangcheng Town, Qilian Mountains, China

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### Abstract

Huangcheng town, located in SunanYugu Autonomous County, Qilian Mountains, Gansu Province, China, was selected as one sample to develop a set of researches coupling interdisciplinary methods and multi-scale approaches to better understand the diversity and the resilience of the socio-ecological systems in Qinghai-Tibetan Plateau by CaiYuanpei project. In this town, the use of the pasture is allocated to households. Each household has summer, autumn and winter pastures. There is fragile grassland ecosystem in this place and livestock is the main source of income for local residents. The cross breed, fine wool sheep (FWS) and the local breed, Tibetan sheep (TBS) are the main two types of sheep breed in Huangcheng town. 81% household keep FWS, and 44% household keep TBS in each family farm. The local government encouraged households to keep more FWS because of lots reasons. The objective of this study is to better understand and compare two different sheep breeds in farming system scales to found which breed of sheep is adapted to the local contexts. In this case, the livestock productivity, inputs and outputs data, subsidies and policy within each farm of the sample were fully collected, such as the size of pasture, supplementary feed, and family labor, the income of selling livestock, wool, and other products were assessed. In conclusion, TBS are more adapted to highland environment based on animal productivity, but FWS have more development potential because of better quality of animal production, especially the wool. The current results will provide references for local governance in order to explore a more rational policy in livestock management to implement sustainable economic development and maintain ecological environment.

*Keywords: Tibetan Sheep, Fine wool sheep, Farming system, Qinghai-Tibetan plateau*

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## Smallholder identified constraints to adoption of new forage options in South Central Coast Vietnam

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### Abstract

Adoption of new farming practices by smallholders is a complex process and service providers need to understand reasons for adoption and non-adoption to ensure that extension efforts can be targeted for maximum impact. This paper presents the adoption patterns of the tree legume *Leucaena leucocephala* cv. Taramba by 41 smallholder farmers in South Central Coastal Vietnam, where it was introduced in 2010-11 as an option to improve cattle nutrition. Smallholder farmers were interviewed in 2015 about their experiences with the establishment, management and use of Taramba *Leucaena* and how these experiences influenced their subsequent adoption decisions. Lack of labour and knowledge to manage seedlings, natural causes, perceived low feed provision and lack of land to manage mature stands were the main reasons for non-adoption. Successful adopters protected their seedlings from grazing and weed competition, carried out good cutting management, and were able to establish larger stands of mature trees. Future extension efforts should focus on how the long term introduction of Taramba *Leucaena* interacts with land, labour, and competing farm activities, in order to achieve more integrated and sustainable smallholder adoption outcomes.

*Keywords:* adoption constraints, new forage technologies, *Leucaena*, smallholders

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## **Studies on socio-economical profile of the dairy farmers in Latur district of Maharashtra state**

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### **Abstract**

Present investigation was carried out to know personal and socio-economic characteristics of dairy farmers. To achieve the objective of the present investigation data from 3000 dairy farmers were collected. It is observed from the present investigation that only 7% respondents observed below the age of 25. The highest number of respondents observed in above age level 46. However between age 26-35 only 26% were observed. About 53% of respondents fall below 5000 rupees per month income group. After this the income between the range of 5001-10000 rupees only 23 respondents were observed however between the income range 10001-15000 and above only 10 and 14 respondents were observed respectively. 81 percent of the respondents were educated up to primary level, whereas around 16% of the respondents had graduate level education and illiterate (3%). Regarding family structure, 1% was from the joint family and rest 99 % belonged to the nuclear family.

*Keywords: dairy farmer, respondents, illiterate, socioeconomic*

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## **Economic impact of spatial development on goat farming in Banjarnegara district Indonesia**

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### **Abstract**

Goats in Banjarnegara District, Indonesia are kept under varying ecological conditions consisting of the high land (>1000m), middle land (500-1000 m) and low land (<500 m). These conditions can lead to differences in the availability of feed, climate and culture that will affect profit ability and economic efficiency. The farmers in middle land has better profile (age, experience and education) compared to farmers in other ecological zones. The spatial differences in the development of goat farming would encourage income disparities of farmers and significant difference in the economic efficiency ( $p < 0.01$ ). Goat farmers in the middle land generate the higher income and economic efficiency compared to other spatial zones ( $p < 0.01$ ). Based on this analysis it can be concluded that spatial development of goat farming has significant economic impact. Spatially, goat farming would be more efficient and profitably performed at middle land. Strengthening human resources of goat farmers and their social resources must be conducted intensively and continuously to strengthen goat farm management.

*Keywords: spatial development, goat management, income, economic efficiency*

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## Effect of free-range raising system on egg performance and egg quality of layer hens

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### Abstract

The objective of this research was to investigate the effect of free-range raising system on egg performance and egg quality of layer hens. A total of sixty ISA brownlayer hens, at 60 weeks of age, were randomly located to 2 treatments: battery cage treatment (480cm<sup>2</sup>/hens) and free-range treatment, housing an indoor pen (1 m<sup>2</sup>/hens) with access to grass paddock (1 hen/m<sup>2</sup>). Each treatment was contained 30 hens individual. All hens were provided with the same diet and were raised for 12 week. For each individual, number of eggs (NE) from 60-72 weeks of age and feed intake (FI) were recorded, and egg quality traits including egg weight (EW), eggshell weight (ESW), yolk weight (YW), yolk color (YC) egg shell thickness (EST), albumen height (AH), Haugh unit (HU) were measured at 60, 64, 68 and 72 weeks of age. The results showed that the layer hens in battery cage treatment had egg production, higher than free-range treatment ( $p < 0.05$ ). But the FI of layer hens in cage treatment had egg production, higher than free-range treatment ( $p < 0.05$ ). The egg quality, EW, ESW, YW, EST, AH and HU were no difference between layer hens in the free-range treatment and battery cage treatment ( $p > 0.05$ ). However, the YC of the layer hens in free-range treatment higher than battery cage treatment ( $p < 0.05$ ).

*Keywords: free-range raising system, egg performance, egg quality, layer hens*

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## Pasture management and supplemented feed enhanced the performance of farmed buffaloes in Sabah, Malaysia

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### Abstract

A buffalo-breeding farm that practices extensive grazing system without supplementation was selected for this study. Farm records between 2004 and 2011 were analysed for selected parameters, particularly the calving rate, calving interval, daily weight gain of calves and calf mortality. Following the analysis, interventions were implemented in January 2012, which included the increased in pasture area from 399 to 441 acres followed by application of fertilizer. The selected breeder buffaloes were prepared for breeding by supplementing palm kernel cake-based feed at the rate of 1.5kg/animal/day for 2 weeks before breeder males were introduced at the rate of 1 male to 20 females. Prior to the intervention, proximate analysis of pasture revealed 7.6% protein content, 79% of breeder buffaloes were with body score of  $\geq 3$ , the average calving rate was 22%, the calving interval was  $24 \pm 11.2$  months, average daily weight gain of calves was  $0.89 \pm 0.21$ kg, the average birth weight was  $28.31 \pm 3.26$ kg and calf mortality was  $26.8 \pm 7.0\%$ . Following intervention, proximate analysis of grass revealed 12% crude protein. With feed supplementation, the percentage of breeder female with body score of  $\geq 3$  increased to 95% leading to an average annual calving rate of 50%. Average birth weight was significantly ( $p < 0.05$ ) improved to  $35.15 \pm 5.39$ kg while the average daily weight gain was  $0.95 \pm 0.32$ kg. Subsequently the average calving interval was reduced to  $15.2 \pm 9.2$  months. Similarly, the calf mortality rate was significantly ( $p < 0.05$ ) reduced to  $17.6 \pm 4.7\%$ . In conclusion, feeding intervention significantly enhances the performance of farmed buffaloes.

*Keywords: performance, farmed buffaloes, Malaysia*

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## **Developing technology and husbandry skills required for efficient animal production in villages in the highlands of Papua Indonesia**

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### **Abstract**

A participatory approach, using a multidisciplinary project team, was applied to improve the technology of pig production and pig husbandry skills of a group of farmers in the Baliem Valley of Papua Province in Indonesia. The multidisciplinary team included social scientists, agronomists, extensionists and specialists in animal production, health and welfare. A series of on-farm experiments and demonstration trials was used to develop the technology and husbandry skills required to produce pork efficiently and cost effectively. Once a sustainable confinement system had been developed and validated for pig production, the multidisciplinary team worked with farmers to diversify cropping from a monoculture of sweet potato production, to enable crop diversification to provide more balanced diets for humans, pigs and other monogastrics. When new crops had been established and farmers were competent at pig production, two other monogastric species, rabbits and village chickens, were introduced. Again a participatory approach was used to introduce the technology required and transfer husbandry skills acquired for pig production to rabbit and poultry production, including egg production. The experience from the field trials and demonstrations, together with the farmers' comments and assessments, were used to write a series of extension materials as a basis for training other farmers. The extension material consisted of two levels of information transfer. The first was a series of single one page documents with minimal descriptions, but suitably illustrated, to enable a basic understanding of how to establish and operate each facet of the production system, and published in a manual format with replaceable pages. The second was a book containing more detailed information including the concepts involved in each facet of production, as well as how to build, develop, operate and manage each system. A group of successful farmers was selected, and provided with the knowledge and skills required to train other farmers. Finally a series of training workshops was offered in each production system: pig production, village poultry production, rabbit production and various crop production systems. During a period of 5 months, training sessions (2 sessions for each crop and livestock system, 6 days/session, 3 days/week) were provided to farmers and their families and 309 individuals from 18 villages received training. Some chose only strawberries and pigs, while others chose multiple crops, as well as rabbits and/or poultry. The training sessions were divided each week between a day of class meetings, a full day practical session, and a full day field visit to a local farm. The model described proved effective in enabling farmers to move from subsistence to small commercial production systems.

*Keywords: farmer-training, multidisciplinary, pigs, poultry, rabbit*

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## **Partnership in broiler farm closed house system (case study at Tuban, East Java, Indonesia)**

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### **Abstract**

Study was conducted in the poultry farming partnership program of “Semesta Mitra Sejahtera” (SMS) company at Tuban Regency, East Java Province, Indonesia. The purpose of the research was to examine financial performance of broiler closed house system who involved in the meat chicken farming partnership system. Purposive sampling method was employed to select one plasma farmer who owned about 10,000 birds and employed broiler closed house scheme. In addition, farmer has seven broiler production periods (BPP) during one year. Data collections were held during a month from 21st August to 21st September 2014. Survey method using structured questionnaire were applied to interview farmers for gathering primary data, while secondary data were obtained from the “SMS” company and related sources. The data were analysed by descriptive analysis with applying economic equation involving production costs, revenue, profit, Break Even Point (BEP), and R/C ratio. Results discovered that BPP-1 required lower in production costs of IDR 13,181/Kg (US\$1.08) and obtained less revenue of IDR 15,049/Kg (US\$1.24) than other BPP during one year. The production costs of BPP-7 however, observed very costly ((IDR17, 372.03/Kg or US\$1.43) which can gain more revenue (IDR 17,767.79 or US\$ 1.46). In terms of income, BPP-7 was lower (IDR396/Kg or US\$ 0.03), while the higher profit (IDR2, 160.39/Kg or US\$ 0.18) come from the sixth broiler production period. The BPP-1 appeared more efficient in operating this poultry farm with IDR13, 181 of BEP per Kg and 1.141 of R/C ratio. In contrast, BPP-7 was inefficient based on per Kg BEP (IDR 17,372.03) and R/C ratio (1.03).

*Keywords: production costs, revenue, profit, production-period*

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## **Moving families from subsistence animal production to small commercial production using a participatory approach with a multidisciplinary team**

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### **Abstract**

Pigs and sweetpotato (SP) production are the dominant agriculture practiced in the highlands of Papua Indonesia. SP is the principal food for humans and pigs, and pigs provide the majority of social and economic capital for families. The dominance of the SP-pig system and the lack of agricultural diversity are key factors in childhood malnutrition. Without improved agricultural and husbandry technology, families are trapped in subsistence agriculture and lack the skills to move to smallholder commercial enterprises. Zoonotic parasite infections in pigs are also a major health risk for humans. A participatory approach, with a multidisciplinary team, was taken to improve husbandry skills and diversify animal production. Pig production technology and husbandry skills were improved and transferred to other monogastric species. Nutritional practices were improved through increasing dietary knowledge and developing more balanced diets through crop diversification. Pig health problems, including zoonotic parasites, were reduced by developing a sustainable pig confinement system (PCS). Pigs were housed in pens overnight and given access to high protein pastures during the day. Growth rates in PCS pigs fed diets based on silaged SP and supplemented with golden snails ranged from  $230 \pm 23.4$  to  $280 \pm 32.3$  g/day compared with  $110 \pm 26.5$  g/day to  $150 \pm 51.4$  g/day in pigs fed traditional uncooked diets. The prevalence of parasites was reduced in PCS pigs over an 18 month period to below 15% (0-15% depending on species) in PCS pigs, but increased (20-200%) in scavenger (non-PCS) pigs. More importantly, the prevalence of antibodies to *C. cellulosae* was reduced by 22% in PCS pigs but increased by 28% in non-PCS pigs. Once farmers were proficient at pig production, their new husbandry skills were transferred to rabbit and poultry production, which have similar dietary requirements to humans and pigs and need minimal land area. Based on current prices a household with 2 sows will recover cost of developing a PCS within 3 years. Households who adopted rabbit production produced up to 40 rabbits for consumption or sale/year and sold 3 month old kittens for around US\$ 30. Households who diversified into poultry production consumed eggs and sold the excess for US\$ 0.43.

*Keywords: diversification, pigs, monogastrics, malnutrition, health*

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## **Analysis of the resource potential of the coconut crop-cattle in the district of East Likupang**

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### **Abstract**

Coconut land in District of East Likupang, an area of 2,942 ha (8.3% of the area of North Minahasa Regency), mostly used for cattle development. The problem is, whether the coconut land has the potential to support the development of cattle in this area. The purpose of research that has been done is to analyze the potential of carrying coconut-cattle. The research method that has been used is a survey method. East Likupang districts have been determined by purposive, because it has the largest cattle population. Analysis of the data that has been used is the analysis of the Effective Potential of Livestock Development. The results showed that the maximum potential of land resources (PMSL), is equal to 2364.172 UT. That is, based on land resources, can still accommodate cattle of value PMSL. The maximum potential by farmers households (PMKK), is at 6627 UT. That is, based on the availability of labor, livestock population can be increased up to the amount of the PMKK. In conclusion, the land under a palm tree in the district of East Likupang, has the potential for development of cattle. It is, seen from the potential of land as a source of forage, and resource potential farmers. The role of government, is needed in order to increase the potential carrying capacity of land, environmentally friendly in this area.

*Keywords: potential, carrying capacity, coconut, cattle*

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## Utilization of cattle waste as compost fertilizer

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### Abstract

The government of North Mongondow Bolaang, continuously motivate farmers to develop farming of cattle, as an effort to increase their income. The problem, livestock revolution, can exacerbate environmental problems. Waste of cattle can cause pollution to the environment. The purpose of this research has been done is to analyze the benefits of cattle waste is used as compost. Methods of research that has been done is a survey method and direct observation. The location of this research sample, is the District Bintauna, with respondents who have been determined, is a member of the group Mototavia. The results showed that the cattle population in the District Bintauna, as many as 1579 tails, can produce wet feces as much as 6.82128 million kg / year or 3.97908 million kg / year dry feces. Cattle waste has been made into compost by members of the group, and is sold at a price of Rp 1500 per kg. In conclusion, cattle waste which was created as compost, beneficial for the improvement of soil fertility, and farmers can minimize expenditure for the purchase of inorganic fertilizers. Suggestions, need further research to demonstration plots crops by using compost from cattle waste.

*Keywords: waste, cattle, fertilizer of compost*

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## The Study of nutritive value of plant for goat in Pattani province of Thailand

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### Abstract

The purpose of this research was to study the nutritive value of plant that most famer used for raising goat in Pattani Province. The sample of 379 farmers was randomly selected from the population of 7,157 farmers in twelve districts of Pattani province. The research tool was a structural questionnaire and collected by interview. The statistic employ were frequency, distribution and percentage. The results revealed that most of the interviewed farmers were male, and 36-45 years of age. They were graduated in Primary education. The farmer raised their goats in barn, free ranch and tether in nature pasture. They also used leaf plant as 11 species for goat fed such as Leucaena (*Leucaena leucocephala*), Siamese rough bush leaf (*Streblus asper* Lour.), Jackfruit leaf (*Artocarpus heterophyllus* Lam), Coconut leaf (*Cocosnucifera* L. var. *nucifera*), Guava leaf (*Psidium guajava* L.), Napier Pak Chong 1 grass (*Pennisetum purpureum* x *Pennisetum americanum*), Manila tamarind (*Pithecellobiumdulce* (Roxb.) Benth.), Mango leaf (*Mangiferaindica* Linn.), Ubon Paspalum (***Paspalum atratum* cv. Ubon**), Ruzi grass (*Brachiaria ruzizensis*) and Para grass (*Brachiaria mutica*). The range of dry matter, crude protein, neutral detergent fiber, acid detergent fiber and ash were 17.67-45.74, 5.45-25.84, 20.38-55.85, 13.11-35.20 and 5.70-20.38% respectively.

*Key words: nutritive value, plant, goat*

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## **Impacts of improved extension services on awareness, adoption rates and farm productivity of small holder dairy farmers in Pakistan**

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### **Abstract**

The objective of the study is to demonstrate the impacts of improved extension services on awareness, adoption rates and farm productivity of small holder dairy farmers in Pakistan. Improved extension services were provided through the 'whole family approach' for five years. The data of improved extension services were collected from registered, non-registered and traditional farmers. Preliminary results indicated that overall awareness regarding all the extension messages of registered farmers were significantly higher ( $P < 0.05$ ) compared to the non-registered and traditional farmers. Furthermore, level of awareness of registered farmers were also significantly higher ( $P < 0.05$ ) compared to the non-registered and traditional farmers. Overall adoption rates of all the extension messages of registered farmers were significantly higher ( $P < 0.05$ ) compared to the non-registered and traditional farmers. Subsequently, registered farmers has shared these extension messages significantly higher ( $P < 0.05$ ) number of other farmers compared to the non-registered and traditional farmers. In conclusion, this study clearly indicates that improved extension services have a significant impact on awareness, adoption rates and farm productivity resulting in an increase in farm economics of small holder farmers. The data generated from this study will be helpful to devise better strategies for improved extension services in order to optimize the dairy production of small holder farmers and will have a ripple effect on the others to follow.

*Keywords: Extension services, awareness, adoption rate, productivity, small holder farmer*

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## Comparison of calves of cow-calf system and calves from cattle markets

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### Abstract

The objective of the study was to compare average daily gain (ADG), meat characteristics and profitability between cow-calves (n=7) with calves purchased from cattle markets (n=20). In cow-calf system calves were free to suckle their dams for 4-5 months along with starter/ TMR diet which was offered until 4 to 8 months. Market calves, product of small dairy farmers of 12-20 months of age were purchased from market then fattened for 2-3 months with limited milk suckling, used primarily for letdown of dam's milk early in life. Market calves hardly get balanced feed after weaning. Cow-calves were weighed monthly whereas market calves after every 10 days to determine ADG. Slaughtering\* of male calves with live weights ranging from 220 – 260 kg was carried out at an experimental slaughterhouse at University of Veterinary and Animal Sciences, Lahore and the carcasses graded using MSA (Meat Standards Australia). Market calves were 15-23 months old whereas cow-calves were 10-16 months old at slaughter. Both groups were crosses of varying degree of H. Friesian and local cattle.

Both cow-calves and market calves had an ADG of 900 g varying from 700-1100g; however, weight gain of cow-calf was earlier in life, at lower live weights than that of market calves. This led to lower cost of production for cow-calves than market calves. Dressing percentage of cow-calves was on average 3-4% higher than market calves, had higher fat thickness (4.5mm vs 2mm), whereas as carcass configuration, rib-eye area was comparable at 'O' and 5.6 respectively. Average marbling score was higher for cow-calves at MAS 1 (300) vs. MAS 0 (200) of market calves. Profitability in case of cow-calves depends on sale in the form of value added cuts as opposed to carcass sale which is the norm in Pakistan currently, whereas market calves can be sold in the form of carcass as well at a profit. Cost of mother and feed in the cow calves system resulted in break even at sale. In order for a cow-calve operation to be more profitable the calves should be sold in the form of value added cuts and genetic of calves can be improved by using beef bulls. Marketing of these high value cuts can help in improving viability. Partial sale of milk along with suckling can be a viable option as well.

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\*Slaughtering and meat grading was sponsored by a USAID project.

## Calf health, management and growth in smallholder dairy farms in Tanzania

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### Abstract

A longitudinal observational study on calf health, management and growth was conducted in smallholder dairy farms in Mvomero and Njombe districts, Tanzania to investigate whether calf growth in these regions was predominantly affected by clinical diseases or other factors. The clinical health, management and growth of 156 calves from 121 farms were monitored for one year. Routine clinical examinations, bodyweight measurements and management assessment were conducted by the same veterinarian at each of four visits to the study farms. Blood and faecal samples collected at each visit were screened for haemoparasites and gastrointestinal parasites.

Most of the calves (83%) were fed milk using a residual calf suckling; weaning age ranged between 3 and 8 months. Forage from natural pastures and crop residues formed the basal ration of the calves. Only few farmers (8%) provided maize bran in addition to grass, none of the farmers provided protein supplements. Calf mortality was 7.7 % and clinical signs of disease were observed in 5.7 %. Coccidial oocysts and nematode eggs were detected in 24.8 % and 14.8 % of 496 faecal samples, respectively, and haemoparasites in 16.9 % (n=498). Mortality, together with nematode and coccidial infections, were significantly associated with district and month of study. Bodyweight gain per week ranged from -2.2 – 7.2 kg (mean 2.1, SD 1.5) in female calves and -1.8- 8 kg (mean 2.3, SD 1.5) in male calves. An extended period of impaired bodyweight gain from birth to weaning was observed. Although the overall prevalence of clinical disease was low, calf growth rate was impaired. Inadequate feeding was considered the major factor for this observation and therefore it is recommended that calves are provided with nutritionally appropriate feed in order to attain adequate growth performance.

*Keywords: body weight gain, calves, diseases, management practices, smallholder dairy farmers*

## **Production performance of laying hen housing on litter system with different temperature**

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### **Abstract**

High ambient temperature in the cage system during rearing time of laying hens are causing high level of stress and low productivity. So the purpose of this study was to evaluate the response of laying hens with different rearing temperature in the litter system of housing toward the production performance and egg quality. A number of 36 laying hens with 30 weeks old were used. They were placed at 2 pens in small closed house (18°C and 30°C). This study used completely randomized design. Data of production performance was analyzed by t-test, whereas data of egg quality was analyzed descriptively. Performance of production included henday production, egg weight, egg mass and feed conversion ratio (FCR) of laying hens that reared in 18°C and 30°C were not significant different. The 18°C of rearing temperature produced income over feed cost (IOFC) of Rp 376/chicken/day, and it was only Rp 5 higher than 30°C. All of egg had the same value of Haugh unit (HU), thick and egg shell percentage and there was no broken or cracked egg. At 18°C rearing temperature, there was no dirty egg, but at 30°C there were 16.67% of dirty eggs. It can be concluded that the negative impact of high environmental temperature on the rearing of laying hen toward the production performance and eggs quality (except of dirty eggs) can be overcome by using the litter system of housing.

*Keywords: egg quality, income over feed cost, litter system, production performance*

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## **Use of agricultural by-product in pig ration to reduce feed cost in Manokwari Regency, West Papua Province, Indonesia**

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### **Abstract**

The paradigm of modern animal husbandry is based on zero waste concept. The use of agricultural and food industry by-products into valuable materials is an important issue that needs to be done. Pigs are the favorite animals for the Papuan because they are valuable in social, cultural and economical aspects. However, pig farm in Papua is constrained by providing concentrate ration because there is competition between pig ration and human food. The aim of this study was to know the potential of agricultural and food industry by-products as constituents of pig ration; and its possibility to reduce feed cost. This study was conducted at Manokwari regency, West Papua Province, Indonesia. The agricultural and food industry by-products used as pig ration constituents were collected from 2 traditional market, 5 restaurant and 15 small-scale food industries. The ingredients of ration comprised fish waste, soybean curd, taro skin, soybean skin, restaurant waste and commercial broiler ration. All materials used as ration were proximate analyzed to determine nutrition content. Feed cost was estimated using local market prices. Tabulation was used to analyse the data. Results of this study showed that crude protein and gross energy contents of agricultural and food industry by-products varied 4.26 to 31.21% and 3432.94 to 4950.57 kcal/kg, respectively. Use of agricultural and food industry by-products in pig ration reduced ration cost for phases of pre-starter, starter, grower, non lactation pig, gestation pig and lactation pig by 36.65, 38.58, 46.92, 55.00, 40.59 and 65.52%, respectively. It was concluded that agricultural and food industry by-products could be used as an alternative ration in order to reduce cost of ration in Manokwari Regency, West Papua.

*Keywords: agricultural by-product, pig, concentrate ration, ration cost, protein, gross energy*

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## Evaluation of goat milk quality to support dairy goat development

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### Abstract

This study was conducted to evaluate the factors affect the quality of milk produced by dairy goat farms, goat milk consumer's satisfaction, and technical response associated with goat milk quality. The research was conducted in three dairy goat farms that have 100 or more dairy goats. Thirty samples were determined using techniques judgment sampling for valuation goat's milk consumer's satisfaction. Data were analysed using a fishbone diagram and House of Quality matrix. The results showed quality of goat milk produced on the farms all already meet the standards especially seen from some of the main components in milk quality, i.e. density, fat content, dry matter, protein and non-fat dry materials. The quality of goat's milk was mostly determined by doe's quality, pregnancy status, number of kids born, shape and size of the udder, stage of lactation length, and health status. Goat milk attributes that considered important by consumers is the nutritional content, out-dated information, taste, ease of obtaining, aroma, practicality consuming, packaging design, packaging size, price and colour of goat's milk. Technical response that are major concern in ensuring goat milk quality include quality of breed and animal health conditions, skills and performance of farmers and employees, the quality of feed, hygiene and completeness of farm equipment, as well as the cleanliness and hygiene of the livestock housing and environment. Goat milk attribute that has been able to achieve customer satisfaction targets are nutrient content, packaging size and colour of goat milk. The quality and the health condition of livestock is the first priority for repair.

*Keywords: dairy goat, goat milk quality, fishbone diagram, consumer's satisfaction, technical response, house of quality*

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## Insight into broiler development in East Java

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### Abstract

The demand of chicken meat has been predicted to increase in the future in line to the increase of human population, of income per caput and of the awareness of nutrient sufficiency. However, with the population of 250 million, Indonesia was still classified as a low chicken meat consumer as compared to other countries. The province of East Java is one of the largest suppliers for the national chicken meat demand in Indonesia. This paper therefore tends to discuss broiler development in East Java including the production, consumption, constraints, and the alternative solution to the problems. The primary data were collected from broiler farmers who were interviewed using a questionnaire. Meanwhile secondary data were compiled from various references and related institutions. The results showed that broiler farming practices were formed in nucleus-client partnerships and self-financing business. Several regencies such as Blitar, Ponorogo, Jombang, Malang, Lumajang, Lamongan, Nganjuk, Pamekasan, Bojonegoro and Mojokerto were the largest broiler suppliers in East Java. Another findings showed that broiler meat production in East Java reached 168,306 tons in 2013 or grew as much as 1.33% for the last four years. Nevertheless, the percentage of meat consumption in East Java only had average growth 0.55% during 2010-2014. Farmers who raised broiler through nucleus-client partnership sold their products to the nucleus company such as poultry breeders, feed industries and poultry shops. Although the partnerships was able to minimize the business risks for small farmers, the partnership agreement however was still considered unfair because the price of feed, DOC and selling prices were set unilaterally by the nucleus company. It therefore needs a policy which protect broiler partnership scheme based on fairness principle for both nucleus and clients, strengthen each other, and provide benefit each other.

*Keywords: poultry, production, consumption, East Java*

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## Association among fat, protein, lactose and total solid of milk produced by farmers in central part of Thailand

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### Abstract

Composition of milk produced by farmers is used for price determination in dairy industry, and it is also considered as an indicator for management quality and health status of the dairy cattle. The objective of this study was to investigate the association among fat (F%), protein (P%), lactose (L%), and total solid (TS %) of milk produced by the farmers. Milk composition that evaluated from 40,511 milk samples was used in the study. These samples were taken from 432 dairy farms in Central part of Thailand during January 2012 and December 2014. Size of farms was classified into small (1 to 9 milking cows), medium (10 to 19 milking cows), and large size (20 to 90 milking cows). The mixed model considered milking year-season and farm size as fixed effects, and farm and residual as random effects. Least squares means were estimated for each factor and then they were compared using t-test. Association among F, P, L and TS were considered using correlation coefficients. Year-season and farm size had effect on all traits ( $p < 0.001$ ). The differences among individual farms associated with the variation of milk composition 30% for F, 25% for P, 34% for L and 27% for TS. A unit of TS composed 31% of F, 25% of P, 39% of L and 6% of the others. The correlation estimate was 0.88 for TS and F, 0.59 for TS and P, 0.31 for F and P, and 0.24 for TS and L ( $p < 0.001$ ) the others were close to zero. These results imply possibility to improve TS and others related milk component of the farmers for their sustainability.

*Keywords: dairy, raw milk, tropics*

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## A screening of health problem in a dairy goat farm in Malaysia: a case report

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### Abstract

In Malaysia, most of the small holders of dairy goat farms were not managed to the expectation due to poor knowledge and information in standard management practice for dairy goat. Indeed, low performance of dairy goats with respect to the growth performance, feed utilization, disease resistance and milk production was associated to improper rearing protocol specifically on herd health protocol. For this reason, a screening programme was done in a dairy goat farm to evaluate overall health status and common diseases occur in the farm. Indeed, the aim of this study is to educate and train the farmer to implement a proper herd health protocol for dairy goats in order to enhance the performance of the farm. This study was carried out at Tok Seri Buak Agrofarm, Labu, Negeri Sembilan by evaluating the health status record of the dairy goats followed by sampling of blood and faeces of the goats. Thirty goats were selected from the young, breeder and male group. Blood samples were collected from jugular vein using vacutainer and transferred into EDTA and plain tube. The blood samples were sent to Clinical Pathology Laboratory for haematology and biochemistry to establish minimum health status. Further, the blood samples were also examined using the thin blood film, wet mount and haematocrit centrifugation technique (HCT) to check for blood protozoa. Faecal samples were collected transrectally via digital evacuation and cultivated on blood agar to identify bacteria and examined through McMaster technique to calculate the worm burden. These screening activities involved the farmer in order to get a detail history as well as the current management practice of the farm. Results showed that 35% of the population of the goats were having Coccidiosis with 17.5% of the Coccidiosis from the young group and 17.5% from breeder group. For blood protozoal result, 47% of the population were having Mycoplasmosis with 17.6% of the Mycoplasmosis from the young group and 29% from breeder group. From bacterial culture result, 82% of the population were having Colibacillosis with 41% from the young group, 30% from the breeder group and 12% from the male group. For Salmonellosis, 29% of the population were having Salmonellosis with 23% breeder group and 6% from the male group. Thus, based on this screening study, it shows that the farm encountered health related problem such as Mycoplasmosis, Colibacillosis and Coccidiosis which could be due to lack of knowledge and improper farm management. Indeed, it is important for a farm to implement a proper farm management by following a standard herd health protocol as it helps to reduce mortality, stunted growth, low milk production and economic losses suffered by the farm. In addition, it is hoped that a formulation of a standard herd health protocol could be done in this study and implemented to the farm.

*Keywords: herd health, goat, Coccidiosis, Colibacillosis, Mycoplasmosis*

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## Application of PCR technique to detect *Staphylococcus aureus* that causes mastitis in dairy cows

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### Abstract

*Staphylococcus aureus* causes one of the most common types of chronic mastitis and difficult to control by treatment alone. Spread of infection can occur through milkers' hands, washcloths and teat cup liners during milking. Successful control is gained only through prevention of new infections and culling of infected animals to reduce bacterial numbers in milking process. Polymerase Chain Reaction has made bacterial detection possible without the need for bacteria isolation. It is fast, highly sensitive and specific assay compared to conventional culture. Generate PCR primers derived from staphylococcal species *coagulase gene* were used to amplify a target region of *Coa1 enterotoxin* product size is 821bp annealing temperature at 58°C and *Coa2 non enterotoxin* annealing temperature at 56°C and PCR product is 158 bp. The samples were swabbed from 21 risk points during milking process. The result of bacterial detection from plate count on egg-yolk mannitol salt agar found colony forming units of 7 samples to be similar with result from PCR amplified *Coa2 non enterotoxin*, showing the specificity and high sensitivity of the assay.

**Keywords:** polymerase chain reaction, *Staphylococcus aureus*, mastitis, dairy cows, *coagulase gene*

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## **Enhancing goat farm performance thru the farmer livestock school – goat enterprise management modality**

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### **Abstract**

The Farmer Livestock School-Goat Enterprise Management (FLS-GEM) Modality is an extension modality in which the farmers were trained the goat management interventions by attending barangay classes at their most convenient time. Initially, a curriculum was developed by a group of experts in the Philippines funded by Department of Science and Technology-Philippine Council for Agriculture Aquatic and Natural Resources Research and Development Council (DOST-PCAARRD). This curriculum served as the material in training the 12 national facilitators coming from 6 regions in the Philippines. After the national training, each set of regional trainers trained 25 regional facilitators the way they were trained during the national training. These regional trainers in turn trained at least 25 farmers on a scheduled basis based on the most convenient time of the farmers, preferably once a week for 4 hours. To assess the effects of the extension modality, 10% of the trained farmers served as cooperators in which monthly monitoring of their farm performance was done. The monitoring data included the inventory, dam performance, health, inflow and outflow.

Based from the results of the monitoring of farms, inventory of goats increased from an average of 5 does to 8 does at the backyard level, conception rate increased from 72% to 85% for the naturally-bred does, pre-weaning mortality was significantly reduced from 25% to 4.49% (t-test, .01), birth weight of goats increased from 1.50 kg to 2.25 kg, slaughter weight increased from an average of 18 kg to 22.50 kg.

This proves that the FLS-GEM extension modality is an efficient method of training farmers in the Philippines.

*Keywords: farmer livestock school-goat enterprise management, enhancing goat farm performance, curriculum*

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## **Constraints to improved productivity of smallholder cow-calf systems in South Central Coast Vietnam – insights from recent surveys**

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### **Abstract**

Growth in demand for beef in Vietnam has resulted in historically high prices for cattle, especially crossbred stock, across most age/size classes. Despite increasing live cattle imports, a significant proportion of cattle are still sourced from smallholders, especially for regional markets. Smallholder cattle producers have benefited from this rising demand for cattle. However, they face many challenges in order to meet the continuity of supply and product consistency and quality increasingly demanded by the market. In South Central Coastal (SCC) Vietnam, smallholder cattle production has traditionally relied on extensive grazing supplemented by crop by-products like rice straw. Decreasing access to common grazing land has exacerbated existing cattle nutrition and husbandry issues, contributing to long calving to conception intervals (CCI) and irregular calving, making it difficult for smallholders to coordinate calving with optimum seasonal feed supply. This paper examines results from two recently surveyed South Central Coastal Vietnam smallholder cow-calf producer communities which exhibited significantly different ( $P < 0.001$ ) CCIs. The survey found that the main contributor to CCI length was the interval between calving next heat detection (CNHDI) rather than number of inseminations before conception. Preliminary survey results indicated no significant correlation between CCI and key resource and production variables associated with cow-calf systems examined, despite there being significant ( $P < 0.005$ ) between-commune differences for many of these. The paper also considers the implications of these findings for future research into CCI related issues.

*Keywords: body condition, calving interval, cow-calf production, nutrition, smallholder*

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## **Efforts to increase production of cow's milk through the cooperation empowerment in Sinjai Regency**

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### **Abstract**

People needs of milk are not fulfilled because of low development of dairy cattle production. Therefore, it is necessary to be developed so the milk production meets the people needs of milk. The causing factors why milk production cannot fulfill demand for milk are small scale ownership of dairy cattle, low milk production ability, unprofitable milk price and high production cost. Dairy cattle business cannot be separated from cooperation existence. To improve the development of dairy cattle production needs the cooperation empowerment to increase business scale, improve milk production ability and reduce production cost. The cooperation empowerments are done by providing female dairy cows, quality feed and concentrate at affordable price, and cooperation business network development.

*Keywords: Milk production, empowerment, cooperation*

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## **Why analyse agribusiness value chains to understand an industry and its challenges?**

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### **Abstract**

In most developing countries the agriculture sector is dominated by smallholder farmer producers. This industry structure leads to production and sale of small quantities, which can only be efficiently collected and distributed by domestic marketing channels or value chains. The domestic chains are driven by what the consumers of the local fresh produce value. These chains lend an opportunity to study the agricultural industries to identify the challenges and opportunities offered by these agricultural and marketing systems. This research studies the Pakistani dairy industry using a value chain approach to demonstrate the identification of the farm to final consumer issues.

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## **Nutrition, fatty acid and cholesterol content of Garut lamb meat at different ages fed with diet containing mungbean sprouts waste**

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### **Abstract**

Garut lambs from two different ages, under five month old up to eight months old used for meat production, were fed a concentrate diet containing mungbean waste. The effect of different ages on nutrition, fatty acid composition, and cholesterol content were measured. After fattened about 3 months in individual cage, a total of six male lambs (3 lambs under five month old and 3 lambs up to eight month old) were slaughtered. Lambs meat was taken from *Longissimus thoracis et lumborum*. Nutrition content of lamb meat was quantified by proximate analysis. Fatty acid composition and cholesterol content were analyzed by gas chromatography. Analysis of variance was used to compare differences of age effect on nutrition, fatty acid composition, and cholesterol content. The different ages in this study had no significant effect on nutrition content, fatty acid composition, and cholesterol content ( $P > 0.05$ ). The total of SFA was higher than USFA in garut lamb meat.

*Keywords: nutrition, fatty acid, cholesterol, lamb meat, mungbean sprouts waste*

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## Some functional properties of beef liver protein concentrates

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### Abstract

This research was aimed to examine the functional properties of beef liver protein concentrates. The extraction was conducted as a function of pH and time. The pI method was applied in the purification of proteins from beef livers. Protein content of the beef liver was 68.69%. The functional properties of the beef liver protein concentrates were compared to those of some commercial ingredients such as whey protein concentrates and casein. Protein from beef liver exhibited better foaming properties than casein. Whey proteins exhibited the highest foam stability. The use of by-product proteins appears to be an interesting opportunity to obtain added value slaughterhouse by-products for economic and environmental reasons.

*Keywords: beef liver protein, functional properties, foaming ability and stability.*

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## Meat quality assessment in goats subjected to conscious halal slaughter and slaughter following minimal anaesthesia

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### Abstract

The study assessed the effect of conscious halal slaughter and slaughter following minimal anaesthesia on quality of goat meat. Ten Boer cross bucks were divided into two groups and subjected to either halal slaughter without stunning (HS) or minimal anaesthesia prior to slaughter (AS). At pre-rigor, HS had significantly lower ( $p < 0.05$ ) muscle pH and glycogen than AS. However, no significant difference was observed in the pH and glycogen content between the treatments at 1 and 7 d postmortem. The drip loss of HS was significantly lower ( $p < 0.05$ ) than that of AS. The treatments had no effect on cooking loss, colour and myofibrillar fragmentation index. In conclusion, goats slaughtered fully conscious and under minimal anaesthesia did not differ in physical and chemical quality of meat during the first seven days postmortem.

*Keywords: Goat, meat quality, traditional halal slaughter, minimal anaesthesia*

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## Effects of dietary blend of canola oil and palm oil on fatty acid composition, color and antioxidant profile of *biceps femoris* muscle in goats

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### Abstract

This study examined the effects of blend of 80% canola oil and 20% palm oil (BCPO) on lipid composition, antioxidant status, color and oxidative stability of *biceps femoris* muscle in goats. Twenty-four bucks were randomly assigned to diets containing 0, 4 or 8% BCPO, fed for 14 weeks and slaughtered. Diet had no effect on glutathione peroxidase, catalase and superoxide dismutase activities. Goats fed 4% BCPO had higher ( $p<0.05$ ) CLA cis-9 *trans*-11 while those fed 8% BCPO had higher C18:3n-3 compared to other treatments. The 4 and 8% BCPO meat had lower ( $p<0.05$ ) C14:0 and C15:0 and higher C22:5n-3 than did control goats. Dietary BCPO improved  $\alpha$  and  $\gamma$ -tocopherol, redness and lipid oxidative stability but did not affect total carotenoids,  $\delta$ -tocopherol, free thiol and carbonyl content. Dietary BCPO enhanced beneficial muscle lipids without compromising color and oxidative stability of chevon.

**Keywords:** antioxidants, carbonyl, free thiol, lipid oxidation, redness.

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## Vitamin D<sub>3</sub> supplementation and carcass electrical stimulation on blood and muscle calcium level and meat tenderization of spent chicken

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### Abstract

Tenderization of spent chicken meat has been attempted by many researchers either at pre-slaughter or post slaughter. This study was done to assess the effect of vitamin D<sub>3</sub> supplementation and carcass electrical stimulation on spent chicken meat tenderization. A total of 150 spent chicken at 80 weeks old and of uniform live weights ( $2.0 \pm 0.2$  kg) were randomly divided into 5 dietary treatment groups, namely C<sub>0</sub> (commercial finisher layer diet; without addition of vitamin D<sub>3</sub>, n=30), C<sub>50000</sub> (commercial finisher layer diet +  $50 \times 10^3$  I.U. vitamin D<sub>3</sub>, n=30), C<sub>75000</sub> (commercial finisher layer diet +  $75 \times 10^3$  I.U. vitamin D<sub>3</sub>, n=30), C<sub>100000</sub> (commercial finisher layer diet +  $100 \times 10^3$  I.U. vitamin D<sub>3</sub>, n=30), and C<sub>150000</sub> (commercial finisher layer diet +  $150 \times 10^3$  I.U. vitamin D<sub>3</sub>, n=30). Each dietary treatment groups were subdivided into two groups to either electrical stimulation (n=15) or non-electrical stimulation (n=15) post slaughtering. There is no significant effects of vitamin D<sub>3</sub> and carcass electrical stimulation on muscle calcium, myofibrillar fragmentation index (MFI) and shear force values. However, there is significant effects of shear force values ( $p < 0.01$ ) and MFI ( $p < 0.05$ ) on electrical stimulated birds. This is maybe due to more muscle fibre fragmentation and physical disruption caused by electrical stimulation and leads to an improvement in meat tenderization.

**Keywords:** *Electrical stimulation, meat quality, spent chicken, vitamin D<sub>3</sub>*

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### **Meat composition, fatty acid profile and oxidative stability of meat from broilers supplemented with pomegranate (*Punica granatum* L.) by-products**

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#### **Abstract**

The effects of diets supplemented with four levels (0, 0.5, 1.0 and 2.0%) of pomegranate by-product (PB) on meat composition, fatty acid profile and oxidative stability of broiler meat were evaluated. The crude protein and moisture contents were increased, whereas ether extract in breast, thigh meat and cholesterol in breast meat were decreased in response to dietary PB supplementation ( $P<0.05$ ). In breast and thigh meat, the sum of saturated fatty acids was lower, while the sum of mono-unsaturated and n-3 fatty acids were higher, alongside lower n-6/n-3 ratio in the 1.0 and 2.0% PB supplemented group ( $P<0.05$ ). The TBARS values of breast and thigh meat were reduced in all the PB supplemented groups ( $P<0.05$ ). Overall, the results presented herein indicate that supplementation of diets with up to 2% pomegranate by-products improved the meat composition, fatty acid profile and reduced lipid oxidation of broiler meat.

*Keywords: broiler chickens, fatty acids, meat composition, pomegranate by-products, TBARS*

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## **Drip and cooking loss of longissimus dorsi muscle under different levels of energy and protein in Iranian kid native breed**

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### **Abstract**

An experiment was conducted to evaluate the effects of three levels of metabolisable energy (2, 2.4 and 2.8 Mcal/kg DM) and three levels crude proteins (12.6, 14 and 16.8 percents) on drip and cooking loss to identified the optimum levels of dietary energy and protein of indigenous kid meat. One of the importance factors that effect on meat quality in red meat is amount of drip loss and cooking loss of meat. Meat nutrients, water holding capacity, flavor and taste have been important of quality index, health and barbeque index of meat. The 27 kid meat samples were taken of fattened carcasses under complete randomizes design with a factorial experiment of 3×3 with 9 groups for 4 months fattening period. Control group and other experimental groups of 1, 2, 3, 4, 5, 6, 7, 8, and 9 were fed by ration of energy to protein ratio of 1:1, 1:1.2, 1:0.8, 1.2:1, 1.2:1.2, 1.2:0.8, 0.8:1, 0.8:1.2 and 0.8:0.8 respectively by total mixed ration. After 24 hours slaughter were sampled of longissimus dorsi (LD) muscles. The muscle was vacuum- packaged and conditioned for 0, 7 and 14 days in a chiller at 4°C for measuring drip loss and cooking loss. Effect of different levels of energy and protein on drip loss, cooking loss in most of groups were not significant, but post-mortem aging time of different levels of energy and protein were significant ( $P < 0.05$ ). In general, it can be concluded that the diet with 2.4 Mcal/kg DM and 14% crude protein suggested as an appropriate diet.

*Key words: drip loss, cooking loss, Iranian native kid, protein and energy levels*

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## Status of buffalo diseases in Bangladesh in relation to casual agents and predisposing factors

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### Abstract

Among the livestock in Bangladesh, buffaloes play an important role in domestic economy and have the potential to be used as a tool for poverty reduction. Nevertheless, the research on buffalo diseases has been much neglected and is surprisingly scarce in Bangladesh. Therefore, the present study was undertaken to investigate the prevailing buffalo diseases in Bangladesh in order to unveil the status and to help develop appropriate control and prevention measures. Both retrospective and prospective investigations on the incidence and prevalence of different buffalo diseases were conducted for a period of two years in different selected areas of Bangladesh well known for buffalo production. Samples from individual dead/sick animals were collected and analyzed for the identification of causal agents. Samples from diarrheic animal were studied to isolate and identify causal organism. Milk samples were studied to determine the presence of subclinical and clinical mastitis. As high as 64.20% of the studied buffaloes were found infected with one or more species of gastro-intestinal parasites. Younger animals were found more susceptible to both parasitic and protozoan infections. The parasitic and protozoan loads were related to the age of the host animal but sex was found not to affect the incidence. Different microbiological study of a total of 72 fecal samples from diarrheic animals revealed the presence of *E. coli* in 62.5% cases and in *Salmonella sp.* (29.16%) cases. The prevalence of clinical and subclinical mastitis in buffalo was found to be 23.68% and 31.57%, respectively. Bacteriological analyses of milk samples revealed Coagulase Negative *Staphylococci* (CNS), *Streptococcus spp.*, *Bacillus spp.* and *Staphylococcus aureus* as the common causes of mastitis in Bangladeshi buffaloes. Among which CNS and Streptococci were more prevalent both in clinical and subclinical cases of mastitis. Hemorrhagic septicemia and calf pneumonia were reported to be the major disease problems by the farmers and local vets but no incidence of such cases was recorded during the study period. The study findings revealed high incidence of GIT parasitic and protozoan infestation, diarrhea and mastitis as the major disease problems for buffalo production. Thus, the study findings will serve as the key points to develop control and prevention strategies against the diseases of buffaloes in Bangladesh.

**Keywords:** GIT parasites, diarrhea, mastitis, buffalo calves, prevalence etc.

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**Is level of trace elements in hoof important for healthy foot in dairy cows?**

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**Abstract**

The aim of this study was to investigate and comparison the some trace mineral values on hoof in cows with lameness and hoof disorders. Twenty-three Holstein dairy cows (18 with hoof disorders, group hoof disease (HD); 5 control, group control (CN)) were studied. Cows were multiparous. Hoof pieces weighing 300-400 mg were taken once for determinate of trace minerals. Determinations of Fe, Mn, Ni, Zn, Cd, Pb and Cu in the samples were carried out by inductively coupled plasma optical emission spectroscopy. Lead, Fe, Ni, Cd, Cu and Mn values were higher in group HD than group CN, but just Pb, Ni, Cd, and Cu values were statistically significant. Zn value was lower significantly in group HD than group CN. Spearman's correlation coefficient showed significant positive relationships between hoof Pb and Zn, and Cu concentrations ( $P<0.05$   $r=0.947$ ;  $P<0.05$   $r=0.947$ ) respectively, Fe and Mn values ( $P<0.05$   $r=0.900$ ), Ni and Mn levels ( $P<0.05$   $r=0.894$ ), and Zn and Cu concentrations ( $P<0.01$   $r=1.000$ ) in group CN. Sole ulcer (7 cases, 39%) and heel erosion (5 cases, 28%) were the most prominent claw lesions in group HD. In conclusion, we found that cattle which has various hoof disease have lower level of Zn and higher levels of Pb, Ni, Cd, and Cu than the control group.

*Keywords: cow, hoof, trace mineral*

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### **Microbiological and chemical characteristics of probiotic goat cheese with mixed cultures of *L.rhamnosus* and *L.plantarum***

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#### **Abstract**

Probiotic goat cheese is one of probiotic bacteria application in food processing, in order to produce functional food. In this research, the microbiological and chemical characteristics of cheese made from goat's milk with *L. rhamnosus* and *L. plantarum* as adjunct starter were evaluated. The cheese was made by adding mixed culture of *L. rhamnosus* and *L. plantarum* at 2.5%; 5.0 %; 7.5% and 10.0% (v/v). Treatments were arranged in a completely randomized design (CRD). Fresh cheese was then stored for 10, 20 and 30 days in a cold room. The measured variables were the amount of lactic acid bacteria (log cfu/gr), yeast (log cfu/gr), titrable acidity (%) and pH. Each treatment has 3 replicates. Results showed that the effect of different concentration of lactobacilli cultures on cheese characteristics was not significant. The amount of probiotic lactic acid bacteria were ranged from 9.27 to 10.98 log cfu/gr and the amount of yeast ranged from 2.33 to 6.56 log cfu/gr of cheese. In addition, cheese has titrable acidity between 0.06 and 0.23 %, and pH between 4.91 and 6.56. In conclusion, cheese stored for 30 days had the most optimum microbiological and chemical characteristics.

*Keywords: cheese, L.rhamnosus TW2, L.plantarum TW14, lactic acid bacteria, yeast*

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**Production elasticity of broiler farming in blitar regency, East Java, Indonesia**

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**Abstract**

The objective of this research was to analyse some factors influencing broiler farming production and its elasticity. The research was conducted in Blitar Regency, East Java, Indonesia in July 2014. Sixty farmers of small broiler farming were chosen as respondents by purposive sampling method. Regression function of Cobb-Douglass model was used to determine some factor that influenced broiler production and its elasticity. The results showed that number of broiler, feed cost, the price of DOC, mortality and cost of production affected the production of broiler farm. Mortality showed negative elasticity but production cost showed unitary elasticity on broiler farming. The number of broiler, purchase of DOC, and feed costs is inelastic.

*Keyword : elasticity, small broiler farm, production factors*

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## **The differences of milk density and fat content in Tawang Argo Village compared with Indonesian National Standard**

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### **Abstract**

There is still limited information about how much the different between milk quality in local farmer with Indonesian national standard (SNI). Based on it, this study aims to provide some information on how much the differences of milk quality between local milk with SNI. The location used on this study was Tawang Argo Village for one month. The investigation was using field study with total purposive sampling. Variable used was milk density and fat content compared and analyzed separately with Indonesian National Standard using paired t-test using SPSS 16. The result showed that there were high significant different between both milk density and fat content with SNI. For milk density, the different was  $0.34 \pm 0.07\%$  below SNI standard while fat content was  $48.62 \pm 12.25\%$  above the standard. In conclusion, fresh milk fat content had already met with SNI but not for milk density in Tawang Argo Village.

*Keywords: fat content, fresh milk, indonesian national standard (SNI) , milk density*

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## **Marketing analysis of broiler farming system on partnership scheme in Ponorogo Regency, East Java Province, Indonesia**

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### **Abstract**

Broiler farming partnership become a popular farming scheme in Indonesia nowadays. This research was conducted at broiler farms member of DMC partnership in Ponorogo Regency from March to April 2013. The purpose of these study was to determine of marketing channel, marketing margin, and share profit. Method used in this research was case study. Data were collected by observation and direct interview to farmers (plasma) and broiler traders. Results showed that the partnership scheme has three marketing channel namely: 1) farmers to broiler traders to small slaughterers to retailers to consumers, 2) farmer to broiler traders to small slaughterers to consumers, 3) farmer to chicken carcass traders to consumer. The first marketing channel has a highest (Rp. 7,500/kg) marketing margin than others. While the third marketing channel indicated a highest (69,4%) marketing efficiency.

*Keywords: marketing margin, share profit, broiler farming partnership*

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## Physical properties and microstructure of dangke pipening, a traditional cheese of Enrekang Sulawesi Indonesia

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### Abstract

This research aims to determine the ability of edible coating to increasing quality the physical properties and microstructure of Dangke. This study was use agar, bee wax and CMC as edible coating. Dangke was made by clotting of milk using papaya extract as a clotting agent. Curd was formed in coconut shells have perforated and pressing by spoon. Dangke as soft cheese dipped in the edible coating solution, and then ripening at 5°C during 30 days. Parameter was measured hardness, microstructure, and organoleptics. The Data were analyze by Random analyzes. The Result shows that using edible coating can extend the shelf life of Dangke and increase the hardness, and shows the microstructure more compact, furthermore panelist evaluated that Dangke was white color, smelly milk, and smooth texture.

*Keywords: Dangke, Soft cheese, edible coating, physical properties, microstructure.*

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## **Studies in urban geography of latur city of maharashtra state of India with special reference to demographic features**

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### **Abstract**

The objectives are to study and focus attention on the manifold demographical problems of small town which are often overlooked because of their unimpressive sizes, compared to cities and metropolises. The degree of the problems remains acute to a great extent even in these small towns like Latur. Urban problems are acute because of lack of resources available with the municipal authorities. Various aspects of urban demographies have here been studied with the background of the region as a whole. It is concluded from the present investigation that the growth of population of Latur city shows ups and downs. Very lowest growth rate found during fifties and highest growth rate found during sixties. The areal population distribution of Latur is not uniform throughout the city. In general the concentration of population is heavy in the CBD region and thins out to the peripheries from the core.

*Keywords: Urban Geography, Demography, Sex ratio*

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## **Utilization of bondre-system for sustainable production of carrageenan-producing seaweed in Lombok (Indonesia)**

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### **Abstract**

Availability of quality potato seed tubers is a major problem in potato cultivation in Indonesia. This was partly caused by inadequate availability and high price of virus-free basic seeds for quality seed potato tuber production. Virus free basic seeds are produced from virus-free plantlet regenerated through meristem culture, a technique requires skill, specific equipments and time consuming. Recently, Indonesian Government placed a new regulation in seed potato production system in Indonesia at which the seed potato production system is up to G<sub>2</sub> tubers instead of G<sub>4</sub> tubers previously used as tuber for commercial cultivation. Consequently, larger quantities of G<sub>2</sub> tubers will be needed to adequately supplied farmers with quality seeds. This paper will discuss an approach for fast-production of virus-free plantlet, G<sub>1</sub> and G<sub>2</sub> tubers utilizing sprouts from certified G<sub>0</sub>, G<sub>1</sub> and G<sub>2</sub> potato tubers. Regeneration of virus-free plantlets *via* shoot-tip culture will be discussed, and compare with routinely used meristem culture. In addition, capabilities of sprouts cuttings from G<sub>1</sub> and G<sub>2</sub> tubers will also be presented. These approaches shall provide an efficient and fast multiplication of quality potato seed tubers in the areas where certified seed tubers are less likely to be available.

*Keywords: seed potato tuber, tuber sprout, shoot-tip culture, meristem culture, Sembalun*

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## Effect of herbal immunostimulant formulation with Newcastle disease oral pellet vaccine on immune response in native chicken

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### Abstract

Newcastle disease is endemic in many parts of the world and causes severe economic losses due to high mortality and reduced production. Vaccination has been reported as the only practical approach against endemic ND. In circumstances where the cold chain is weak or absent, the only reliable option will be the use of thermostable ND vaccines like oral pellet vaccine. Hence, the present study was designed to assess the effect on post vaccinated immune response of ND oral pellet vaccine in native chicken and correlation of immune responses with a herbal immuno-stimulant formulation. A total of 200 native chicks were allocated into 4 groups having fifty chicks in each group. The chicks in the first (I) group served as unvaccinated control and the chicks in the second (II) group was administrated ND oral pellet vaccine produced by Tamil Nadu Veterinary and Animal Sciences University, India on day 15 through drinking water. The chicks in the third (III) group were administrated Immular<sup>®</sup>; a herbal immuno-stimulant formulation at the rate of 3ml/50 birds/day from day 15 to 36 in drinking water. The chicks in the fourth (IV) group was administrated ND oral pellet vaccine on day 15 with Immular<sup>®</sup> of 3ml/50 birds/day from day 15 to 36. All the chicks were given feed and water *ad libitum* from day 1 to 36. Serum samples were collected on day 15, 22, 29 and 36 for antibody titre analysis through haemagglutination inhibition (HI) test. The results showed that the mean antibody titre of Group II, III & IV were elevated from day 22, but the difference was significant only on the day 29 and 36. The maximum level of antibody titre against ND was shown in group IV on day 36 which received oral Pellet vaccine supplemented with herbal immuno-stimulant formulation (Immular<sup>®</sup>) in diet. It could be concluded that the herbal immuno-stimulant formulation can improve the immune response of ND oral pellet vaccine.

*Keywords: Newcastle disease, immune response, herbal immuno-stimulant, native chicken*



## Effects of probiotics supplementation on nutrient digestability in captive asiatic elephants in temples of tamilnadu in India

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### Abstract

Probiotics are live microorganisms which have been found to confer a health on the host when administered in adequate amounts. This study was performed with the purpose of investigating effect of combinations of Probiotic preparation Genus *Lactobacillus* and Genus *Bifidobacterium* supplemented in temple elephants of Tamil Nadu. Before supplementation and after supplementation of probiotics, feed and dung samples were collected in 10 elephants the dry matter digestability was estimated by lignin as a internal marker. Over all Mean $\pm$ S.E. of dry matter digestability in temple elephants before and after probiotics administration were 31.89 $\pm$ 2.87 per cent and 42.65 $\pm$ 2.55 per cent respectively. Dry matter digestability values in per cent before and after the supplementation of Probiotic preparations were statistically highly significant variations ( $P\leq 0.01$ ). Mean  $\pm$  S.E. of dry matter digestability in young and adult temple elephants groups before and after probiotics administration were 18.49 $\pm$ 4.18 per cent and 6.82 $\pm$ 1.40 per cent respectively. Subsequent to the supplementation of Probiotics preparations, the dry matter digestability between young elephant (n=4) group and adult elephant (n=5) group revealed statistically significant variations ( $P\leq 0.05$ ).

*Keywords: dry matter digestibility, elephants, probiotics*

## **A retrospective investigation of co-endoparasitism of dog and cat patients in Nongchok subprovince, Thailand**

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### **Abstract**

Between 2000 and 2013, dog and cat fecal specimens were analysed for saturated salt centrifugation-flotation and centrifugal sedimentation (n=103). The most commonly detected endoparasites on float and sediment techniques were Strongyle-type egg (40.9%) and *Isosporacanis* (31.8%) of dogs, in cats was Strongyle-type egg (33.3%). Moreover, the characters of co-infection were found 3 types in dog and only a type in cat patients. On the classification, the helminth eggs of the order Strongylida were found higher than the other of the both fecal pets. The Strongyle-type egg was detected in the highest of the proportion of samples in the both population study. This study highlights on the importance of specificity when interpreting diagnostic examinations of the illness domestic pets. Especially, the co-parasitism information could provide to prevention and treatment successfully.

*Key words: nongchok, endoparasitism, dog-cat, co-parasitism*

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## Quality of chicken eggs in the flea market, KamphaengSaen district, NakhonPathom province, Thailand

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### Abstract

The objective of this study was to evaluate the quality of chicken eggs sold in the flea market. One hundreds of chicken eggs were randomly sampled from each of ten (10) flea markets located in the area of KamphaengSaen district, NakhonPathom province, Thailand. The quality of egg was evaluated in terms of albumen height (mm.), haugh unit, albumen pH, yolk color, egg shell thickness (mm.), specific gravity, and the ratio (%) of yolk, albumen, and egg shell per egg. The results showed that the values of mean ( $\pm$ SD) and maximum-minimum of albumen height, Haugh unit, albumen pH, egg shell thickness, specific gravity, and yolk color were 4.13( $\pm$ 0.45) and 5.89-2.69mm., 56.05( $\pm$ 6.39) and 74.26-36.47, 9.19( $\pm$ 0.02) and 9.39-8.34, 0.36( $\pm$ 0.03) and 0.38-0.35mm., 1.089( $\pm$ 0.01) and 1.100-1.072, and 10.55( $\pm$ 0.77) and 12.00-9.00, respectively. Additionally, the average values ( $\pm$ SD) of the ratio (%) of yolk, albumen, and egg shell per egg were 27.76 $\pm$ 0.59, 59.55 $\pm$ 0.31, and 12.69 $\pm$ 0.24, respectively. The parameters of albumen height and Haugh unit are important keys to describe the freshness of edible egg. The result of this study indicates that chicken eggs sold in the flea markets, settled temporarily outdoors, have high variations of freshness. These are possibly affected by the factors of temperature control and time during the transportation, storage, and distribution.

*Keywords: chicken egg, quality, Haugh unit, flea market*

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**Effect of carbon and nitrogen sources on growth of *Alternaria solani*  
(Ell. & Mart.) Causing early blight of Tomato**

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**Abstract**

In Present investigation the effects of carbon and nitrogen nutrition on seven isolates of *Alternaria solani* isolated from different varieties of Tomato (*Lycopersicon esculentum* Mill.) was studied at 28°C for ten days at pH 6.0. Among the seven carbon sources glucose for the isolate I, Lactose for isolate III and IV, Gelatin for isolate I and II, Mannitol for III, V, VI and Sucrose for the isolate II, IV and VII were found to be the best sources. Among the seven Nitrogen sources Potassium nitrate was the best sources for the growth of isolate II, IV, VI, Peptone for the Vth isolate, Ammonium Chloride for VII and Ammonium Molybdate for III isolate were found to be the best Nitrogen sources.

*Keywords: Alternaria solani, tomato, carbon, nitrogen.*

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## Effect of dairy extension training on technical knowledge of female farmers and factors affecting their participation level in extension program in Pakistan

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### Abstract

The aim of the study is to find out the effect of dairy extension training on technical knowledge of female farmers and factors impacting their participation level in an extension program in Pakistan. Regular monthly training sessions were conducted to upgrade farmer's knowledge on dairy farm practices to improve their farm productivity. The participation of registered female farmers ( $n=460$ ) at monthly training sessions was recorded over a two year period. Substantial variation was observed in the extent of participation of female farmers in the extension training across the year. A structured questionnaire comprising of key extension messages (shared within the extension program) was designed to assess the technical awareness level of female farmers. Another part of the survey process identified the key factors affecting the extent of participation of female farmers in the monthly training program. A total of 315 randomly selected registered and traditional female farmers were interviewed to collect data. Preliminary results indicate that overall awareness regarding the extension messages of registered farmers were significantly higher ( $P<0.05$ ) compared traditional farmers. Furthermore, attendance rates were positively associated ( $P < 0.0001$ ) with awareness level. The decision making power of the woman, and the time spent working on the farm were significant factors affecting the attendance percentage of women at extension program. The outcomes of this study will be helpful in devising improved extension strategies for female farmers in rural areas of Pakistan.

*Keywords: extension training, women, dairy, technical knowledge, limiting factors*

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## **Prevalence of parasite infection of puppy dogs to 2 months under animal hospital institute, Udon Thani Rajabhat University**

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### **Abstract**

This study was to investigate the prevalence of parasite infection in puppy dog under animal hospital institute, Udon Thani Rajabhat University, Udon Thani province. Eighty, puppy dog to two month age were used in the experiment. The study was run in five months and fecal samples were collected during December 2014 to April 2015. Each month, 16 sample of fecal was collected by rectal sampling at examination room. All samples were smear with 0.9% normal saline in glass slide closed with cover glass for measuring egg parasite by direct fecal smear with 4x, 10x and 40x microscopy, respectively. It was found that puppy dog in Udon Thani province were prevalence of *Toxocara canis* 37 )46.25%(, *Difilidium caninum* 5 )6.25%(, *Strongyloides* spp. 6) 7.5%(, *Ancylostoma cainum* 2 )2.5%( and *Ascarid* spp. 1 )1.25%( . Based on this study could be concluded that the most prevalence of parasite infection of puppy dogs to 2 months under animal hospital institute was *Toxocara canis* 37.

*Keywords: parasite, prevalence, dog, Udon Thani*

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## Antibiotic usage patterns in selected broiler farms of Bangladesh and their public health implications

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### Abstract

Antibiotic resistance in disease causing organisms has been recognized as a serious global health hazard that adversely affects public health. The major antibiotics used for humans are usually the same as those used in veterinary medicine. Therefore, usage patterns of veterinary drugs possess significant impact on public health. But surprisingly enough, no/very little work has been documented till to date on the usage patterns of veterinary drugs, especially the antibiotics in Bangladesh. Therefore, the study was conducted on antibiotic usage pattern in selected poultry farms in Bangladesh in order to unveil the antibiotic usage patterns in poultry industry in the country. A total of 73 poultry farms were randomly surveyed from different regions of Bangladesh to explore the pattern of antibiotic usage. Five chickens ready to be marketed were randomly selected in each farm and samples from the breast and thigh were collected. Samples were studied for the presence of antibiotic residues following the microbiological method of four plates. The study revealed that all the 73 (100%) poultry farms used one or more antibiotics. Antibiotics were commonly administered either for therapy (43.84%), prophylaxis (31.51%), or both (47.95%) and to lesser extent for growth promotion (8.22%). The combined preparations of broad spectrum antibiotics consisting either of fluoroquinolone and polymyxin, polymyxin and sulfur drugs or the combination of macrolides, tetracyclines and polymyxin were found to be the commonest antibiotics used. Fluoroquinolones were the class of antibiotics commonly used as single preparation. Twenty eight different patterns of antibiotic usage were observed among the poultry farms of which approximately 70% followed multi-drugs practice. Most of the farmers (>60%) used antibiotics without the prescription of the veterinarians. Laboratory analysis of meat sample showed existence of residual drugs belonging to seven families of antibiotics; aminoglycosides, macrolides, fluoroquinolones, sulfonamides, beta lactam, polymyxin, and tetracyclines. Residues of tetracyclines, aminoglycosides and fluoroquinolones were found in most of the cases. Presence of antibiotic residues in chicken carcasses poses significant health risk to consumers such as antibiotic resistance, teratogenicity, carcinogenicity, hepatic and renal failure. This study has provided information on commonly used antibiotics and reasons for their use in the study location. It is anticipated that the findings of this study will contribute to the development of strategies for prudent use of antibiotics in poultry farms.

**Keywords:** Antibiotics, Antibiotic usage pattern, Bangladesh, Poultry farms, Residual antibiotics.

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## Mitigation of greenhouse gas emissions from cattle production in Asia

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### Abstract

There is an urgent need to implement more effective measures that would mitigate the emission of greenhouse effect gases (GHG) from livestock industry. Dairy cattle and beef cattle are particularly one of the biggest emission sources of GHG in the agriculture sector. On the other hand, it is projected that the world food supply would become tighter as the world population increases. Therefore, it is crucial to harmonize mitigation technologies for GHG emissions from livestock industry with the food security measures required to meet increasing food supply demands.

GHG emissions from animal industry originate from several sources: 1) feed production, 2) animal management, 3) manure treatment, and 4) distribution and processing of ingredients and products. The present study reviews methods for reducing GHG emissions focusing on farm sources, ranging from feed production to manure treatment, and using the Japanese dairy and beef cattle industry as an example.

- i) Feed production stage: Fertilization is responsible for most of the nitrous oxide ( $\text{N}_2\text{O}$ ) emitted during this stage, which accounts for 1/6<sup>th</sup> of the total  $\text{N}_2\text{O}$  emission originating from farms.
- ii) Animal management stage: The largest farm source of methane ( $\text{CH}_4$ ) is ruminal fermentation, with dairy and beef farming contributing 143.2 Gg $\text{CH}_4$  and 148.3 Gg $\text{CH}_4$ , respectively, in 2012; it accounts for 96% of the total  $\text{CH}_4$  emissions from enteric fermentation.
- iii) Manure treatment stage: The composting process results in the emission of large quantities of  $\text{CH}_4$  and  $\text{N}_2\text{O}$  particularly in the Asian dairy and beef cattle farms.

The  $\text{CH}_4$  emission that originated from enteric fermentation in the dairy cattle industry in 2012 had decreased by 23% when compared with that in 1990, mainly by reducing the number of animals in the herd. In spite of this fact, the total milk production had declined by only 6.8%, suggesting that the improvement of productivity within the dairy industry has contributed to the mitigation of GHG emission per unit of livestock product.

Driven by the rapidly expanding population, consumer demands for milk and beef are expected to grow, consequently resulting in increase in GHG emissions in Asia. Therefore, it is necessary to develop novel GHG mitigation technologies that will support more efficient productivity, and thus, lead to reduction in GHG emissions. On this occasion, it is important to tackle these issues at individual farm stages as well as between stages (total production system).

*Keywords: dairy and beef cattle, methane, mitigation, nitrous oxide, productivity*



## **Efforts to mitigate enteric methane emission in Japan: measurement method, mitigation technique, inventory and policy**

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### **Abstract**

Enteric methane emission accounts for about 21% of total methane emission in 2013, of which approximately 26% came from the agriculture sector in Japan. The enteric methane emission is decreasing every year mainly due to the declining number of cattle as a consequence of increased productivity.

To date, many studies have been carried out to quantify the production of methane from various sources. In our study, methane production from ruminants was measured by using a respiration trial system with an open circuit respiration chamber, which is installed at NARO Institute of Livestock and Grassland Science in Japan. Shibata and co-workers measured methane production from several livestock: dairy cattle, beef cattle, sheep, and goat; and they also created a calculation formula for methane which takes dry matter intake as a variable. This calculation formula is now used for estimating enteric methane production in Japan.

Quantification of methane production, elucidation of the factors influencing methane production, and the search for mitigation techniques to reduce methane production have been the subjects of many studies concerning ruminant methane production. Recently, we have conducted a study on the effect of cashew nut shell liquid (CNSL) on the reduction of methane production in dairy cattle. Our results showed that CNSL addition during the non-lactating period caused methane production to decrease by approximately 20% and in milking dairy cattle, by less than 7% without negatively affecting feed digestibility and milk production. It became clear that in cattle whose rumen liquid has high propionate molar ratio, the methane production was low. Furthermore, we found that the methane reduction effect of CNSL in the cattle with low methane production was little. Our results also demonstrated that the amount of methane produced during the lactating period (305 days) can be decreased by adding distiller's dried grains with solubles (DDGS) to the feed.

Recently, Japanese dairy farmers have been facing a tough financial situation due to price hikes of commercial feeds. For this reason, in routine feeding management programs, it is difficult to handle the problem of methane reduction at an extra cost. Thus, it is necessary to address the issue of methane reduction side-by-side with the enhancement of cattle productivity. From this context, economic support from the government is also considered necessary.

*Keywords: cattle, emission, methane, mitigation*

## Effect of whole kapok seed or chitosan supplementation on feed intake and methane emission of Thai native beef cattle fed rice straw

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### Abstract

The objective of this study was to determine the effect of kapok seed (*Ceiba pentandra*, Gaertn.) or chitosan (N-acetyl-D-glucosamine polymer) powder supplementation on feed intake and enteric methane emission of beef cattle fed rice straw based diets. This experiment was conducted at Khon Kaen University, Thailand (16.46 °N and 102.82 °E) from July to August 2012. Six Thai native beef cattle bulls (*Bos indicus*; body weight 181.4 ± 69.2 kg) were subjected to a digestion trial according to a replicated 3×3 Latin square design. Dietary treatments were T1 (control) = concentrate 1% BW + ad libitum rice straw, T2 = control + chitosan 0.04 g/kg BW/d and T3 = control + kapok seed 1.00 g/kg BW/d. The animals were placed in a metabolic pen equipped with a ventilated head box respiration system to determine feed intake and enteric methane emission. Dry matter intake (kg DM/d) and methane emission (kJ/kg BW<sup>0.75</sup>/d) were significantly different (P<0.05) among treatments compared with control. Chitosan did not affect (P>0.05) dry matter intake, but significantly reduced (P<0.05) enteric methane emission by 5.46%. Kapok seed supplementation had a greater improved (P<0.05) dry matter intake (6.1%) with the reduced (P<0.05) enteric methane emission (13.75%) when compared with control diets. Our results demonstrate that Chitosan or Kapok seed can be a potentially strategic feed supplementation used in beef cattle diets for improve animal productivity and environmental sustainability.

**Keywords:** chitosan, feeding, greenhouse gas, Kapok, Zebu

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## Methane conversion factors for gas emissions from cattle in Thailand and Vietnam

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### Abstract

Methane is recognized as the second most important greenhouse gas (GHG) emitted from anthropogenic sources, next to carbon dioxide. Methane emission originating from enteric fermentation in ruminants contributes 19% of the total anthropogenic GHG emissions in Southeast Asia. Methane conversion factor (MCF), which is expressed as methane energy (MJ/day) per gross energy intake (MJ/day) in percentage, is used for the construction of national GHG inventories. To determine MCF in Southeast Asia and the factors affecting MCF, metadata analysis was carried out using the data obtained from Thailand and Vietnam.

For this study, 306 and 56 individual data were collected in Thailand and Vietnam, respectively. The experimental animals used were Thai native, Brahman, Lai Sind, Charolai crossbred and Japanese black crossbred. They were fed with locally available roughage and agricultural or food manufacturing by-products in each country, such as rice straw, rice bran, cassava pulp, and brewers grain. Forage ratio in the experimental feed on a dry matter (DM) basis ranged from 6.0% to 100%, with a mean of 62.5%. Three to 5-day continuous measurements using ventilated head box system were obtained to collect emitted methane. Live weight of animals ranged from 64 kg to 536 kg, with an average of 303 kg. The mean neutral detergent fiber (NDF) and ether extracts contents of experimental feeds accounted for 55.6% and 3.3% of the dry matter component, respectively. The mean MCF was 8.14; it is higher than the default value (6.5%) set by the Intergovernmental Panel on Climate Change (IPCC) in 2006. The present MCF was also higher than the other MCFs which were obtained from Europe and the U.S.; for example, 6.80% for dairy cattle and steers in the U.K. (Yan et al., 2000) and 6.34% for steers in the U.S. (Luis et al., 2014). On the other hand, the present MCF is close to that for grazing steers in Australia (Tomkins et al., 2011). Significant differences in MCF among cattle breeds were not detected. MCF correlated negatively with digestible energy intake per metabolic body weight and with ether extracts content of feeds, but no correlation was found with the NDF content. These results indicate that MCF could be affected by the energy value of feeds given to the cattle.

*Keywords: metadata analysis, methane conversion factor*

## A summary of study results on *in vivo* methane production of growing Lai Sind cattle fed levels of different oils in Mekong delta of Vietnam

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### Abstract

Three 4x4 Latin square experiments of methane emissions by different oils supplementation to Lai Sind male cattle were carried out. In Exp 1 average live weight of Lai Sind male cattle was  $180 \pm 11.2$  kg (X $\pm$ Std) and 4 treatments were rice straw and concentrate, rice straw, concentrate + 1% fish oil, rice straw, concentrate + 2 % fish oil and rice straw, concentrate + 3% fish oil corresponding to the CFO0, CFO1, CFO2 and CFO3 treatments. In Exp 2 the average live weight of Lai Sind male cattle was  $213 \pm 27.6$  kg (X $\pm$ Std) and 4 treatments were rice straw and concentrate (CCO0), rice straw, concentrate + 1% coconut oil (CCO1), rice straw, concentrate + 2 % coconut oil (CCO2) and rice straw, concentrate + 3% coconut oil (CCO3). In Exp 3 the average live weight was  $267 \pm 31.2$  kg (X $\pm$ Std) and the treatments were rice straw + concentrate ground nut oil (GO\_0), rice straw, concentrate + 1% ground nut oil (GO\_1), rice straw, concentrate + 2 % ground nut oil (GO\_2) and rice straw, concentrate + 3% ground nut oil (GO\_3). In all three experiments, rice straw was fed *ad libitum*, while concentrate (14.4 % CP and 3000 Kcal/kg DM) was fed at a level of 1 kg per 150 kg LW. The experimental period was 14 days with 7 days for adaptation and then 7 days for sampling. CH<sub>4</sub> and CO<sub>2</sub> production, which will be measured over a 24 h period with two consecutive days, while the cattle heads were in ventilated hood. Concentrations of CH<sub>4</sub> and CO<sub>2</sub> in chamber were automatically recorded during the measurement period by using Infrared Gas Analyzer, Model IR200, Style: S3; YOKOGAWA, Japan.

The results indicated that in Exp 1 Supplementing catfish oil to basal rice straw diets of cattle from 1 to 3 % (DM basis) was gradually reduced methane production and did not cause any negative effects on feed intakes, nutrient digestibility and rumen parameters. The studies of supplementation of catfish oil more than 3 % in the cattle diets should be considered to evaluate GHG emissions and growth performance for farmers' practices. In the second experiment the supplementation of coconut oil to cattle diets from 1 to 3 % (DM basis) gradually reduced methane production and did not have any negative effects on nutrient digestibility, however a reduction of feed and nutrient intake was found. However, in Exp 3 we did not find any significant difference in methane production and nutrient digestibility among the 0, 1, 2 and 3% ground nut oil treatments. For three experiments the CO<sub>2</sub> emissions were proportionally linear relationship with CH<sub>4</sub> production. The conclusion was that supplementation of fish oil and coconut oil should be considered to reduce methane production in cattle raising.

**Keywords:** feed utilization, greenhouse gas, *in vivo* experiment, lipid, nutrient digestion

## The relationship between rumen fermentation parameters and methane emission in Lai Sind cattle fed total mixed ration

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### Abstract

Methane emissions from enteric fermentation are occurred during fermentation of rumen contents in cattle. To evaluate the relationships between rumen fermentation and methane emissions, we conducted meta-data analysis using data from two studies which were carried out to evaluate the effects of fermented total mixed ration (FTMR) containing fresh rice straw (study 1) or brewers grain (study 2) on digestibility, ruminal fermentation characteristics, and methane emissions. Four Lai Sind cattle steers were assigned according to a cross-over design for each experiment. For study 1, non-fermented TMR (control) contained 30% dried rice straw on a dry matter (DM) basis were compared to FTMR which components had the same proportion as those of non-fermented TMR; but contained fresh rice straw instead of dried one. For study 2, non-fermented TMR (control) contained 28% dried brewers grain on a dry matter basis were compared to FTMR which components had the same proportion as those of non-fermented TMR; but contained fresh brewers grain instead of dried one. Each experiment was carried out over a period of 14 days, and was followed by a 5-day data collection period. At collection period, the amount of excreted feces and urine, and methane emissions were measured by using the ventilated hood respiration chamber system. Rumen fluid was orally collected before feeding and at 4 hour later after feeding at the last day of collection period. Volatile fatty acids (VFAs) were determined using high performance liquid chromatography.

Mean ( $\pm$ SD) crude protein, ether extracts, and neutral detergent fiber contents (%) in experimental feeds were  $11.8 \pm 0.5$ ,  $5.3 \pm 0.7$ , and  $50.2 \pm 5.5$ , respectively. Mean live weight, DM intake, methane emission, and methane emission per DM intake were  $191 \pm 45$  kg,  $3.5 \pm 0.6$  kg,  $86.1 \pm 30.5$  L/day, and  $24.3 \pm 5.8$  L/kg, respectively. Total VFA content, and acetic and propionic contents in Total VFA were higher at 4 hour after feeding than that before feeding ( $93.4$  vs.  $63.3$  mmol/L,  $59.9$  vs.  $54.8\%$ ,  $27.3$  vs.  $20.8\%$ , respectively). Acetate to propionate ratio before feeding and 4 hours later after feeding was  $2.8 \pm 0.8$  and  $2.2 \pm 0.4$ , respectively. For the rumen fluid before feeding, methane emission per DM intake (L/kg) correlated with acetate content in total VFAs (mmol%;  $r = +0.513$ ,  $P < 0.05$ ) and propionate content in total VFA (mmol%;  $r = -0.533$ ,  $P < 0.05$ ), and acetate to propionate ratio ( $r = +0.672$ ,  $P < 0.01$ ). For the rumen fluid at 4 hour after feeding, methane emission per DM intake (L/kg) correlated with acetate content in total VFA (mmol%;  $r = +0.589$ ,  $P < 0.05$ ). Those results indicate that acetate to propionate ratio of rumen fluid before feeding is to be good predictor to estimate methane emission.

**Keywords:** Lai Sind cattle, methane, ruminal fermentation, total mixed ration

**GHG emissions from manure management-Japan Experience-**

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**Abstract**

NILGS is the Japanese scientific research agency for livestock production. It promotes the technical developments that integrate studies on grassland, animal feed production, livestock production and animal waste treatment and reuse. In our section (Animal Waste Management and Environment Research Division), we aim to develop technologies for pollution control and resource recovery in animal production, animal production technology using self-supporting natural energy, and measurement systems and mitigation options for dealing with greenhouse gases from the livestock sector.

In recent years, global warming phenomenon has begun to be called in question. According to IPCC AR5 (2014), the Agriculture, Forestry, and Other Land Use (AFOLU) sector is responsible for just under a quarter ( ~10 – 12 GtCO<sub>2</sub>eq / yr) of anthropogenic GHG emissions mainly from deforestation and agricultural emissions from livestock, soil and nutrient management.

About 94 million tons of livestock wastes are excreted annually in Japan. Suitable processing and adequate usage of livestock excrement are serious issues which affect ongoing livestock farming systems. Our research has identified most of the emission factors for CH<sub>4</sub> and N<sub>2</sub>O associated with each manure treatment method and type of livestock. The gas-specific emission factors for each treatment system should be established in light of each country's usual procedures and general conditions, because these parameters might vary widely between countries. Each country needs specific, appropriate methods for measuring and calculating GHG emissions, for use not only in inventories but also in the development of regulations and technologies that address specific emissions. In this report, I would present the importance of measurement and evaluation systems for GHG emissions. In addition, I would introduce our recent results concerning the GHG mitigation technologies we have developed.

*Keywords: livestock, manure management, methane, mitigation, nitrous oxide*

## Manure management and greenhouse gas mitigation in beef production

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### Abstract

The calculation of GHG emissions, energy, nutrient balances and costs of the individual farming activities were linked in order to assess the environmental and economic effects of mitigation measures for whole farm systems. During last 10 years, there has been a growing pressure on land resources for production of food and feed for livestock and, increasingly, crops for energy production. To fulfill the demand for meat, milk and eggs, livestock production in Thailand is expanding, and worldwide becomes more specialized. In consequence of these trends, increasing volumes of livestock manure are produced, which are a source of greenhouse gases (GHGs) contributing to radiative forcing. Using a life cycle approach, the relative contribution of global livestock production to anthropogenic GHG emissions was estimated to be 18% (Steinfeld et al., 2006), whereas bigger than analysis for Thailand arrived at 3.75%.

This study focuses on greenhouse gas (GHG) emissions from beef cattle production Lao Khwan District, Kanchanaburi Province, Thailand, in 2010. The farmers produced organic compost from beef cattle manure to replace chemical fertilizers in their crop land. The beef cattle in Lao Khwan District were composed of Native and their crossbreds. The number of beef cattle was 38,755 heads. There are 1,753 farmers. They produced organic compost 28.57 % of total manure.

The microbial ecology of manure environments is critically important for proper estimation of GHG emissions from manure management, and for efforts to predict effects of management changes and develop GHG mitigation strategies. Greenhouse gas emissions from beef cattle in Lao Khwan District, Kanchanaburi Province, main sources of emissions are enteric CH<sub>4</sub> production, 69.09 and 80.85 % for non compost and compost manure management respectively. N<sub>2</sub>O emissions from manure management are 29.09 and 17.02 % for non compost and compost manure management respectively. Total GHG emission from non organic compost manure management was greater than organic compost manure management (0.055 vs 0.047 Mt CO<sub>2</sub>eq/year).

*Keywords: beef, manure, methane*



## Greenhouse gas emissions from cattle manure management in Vietnam

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### Abstract

In Vietnam, eighty percentage of the residence living in rural areas involved husbandry activity. Livestock production contributed about 29% of the output value to GDP of agriculture sector. Small-scale householders account for about 85% of the cattle, 80% of the poultry population and 75% of pigs. Cattle production is mainly based on a low-input/ low-output system that is often labor intensive, except in dairy cattle production. Feed resources are from the natural pastures, agricultural by-products (mainly rice straw), and foliage. The distinction between draught cattle and beef cattle is not clear as they are always considered as dual "purpose". A big program on improvement of cattle productivity implemented by the government was to improve cattle growth performance. On the contrary, livestock sector is one of the major causes of the pressing environmental problems. Greenhouse gas emission from livestock production cause potentially global warming effect. Cattle and buffalo produce methane (CH<sub>4</sub>) as part of their digestion, and it represents almost 90% of the emissions from livestock enteric fermentation. In addition, annual volume of manure was estimated approximately 85 million tons, of which there were 20 million tons for cattle production. Cattle manure was stored in heaps or holes, then is widely used as fertilizer for agriculture. Some manure was discharged into the environment. The way in which manure from livestock is managed also contributes to CH<sub>4</sub> and N<sub>2</sub>O emissions.

Livestock production was estimated a contribution to 17% of GHG emissions within agriculture sector. Enteric fermentation and manure management released 8.46 and 4.7 Tg CO<sub>2</sub>eq.yr<sup>-1</sup> (based on average of period from 1990-2014), respectively. Emissions from manure management increased gradually with growth rate of 3.8% per year (167 Gg CO<sub>2</sub>eq.yr<sup>-1</sup>) from 1990 (3.0 CO<sub>2</sub>eq.yr<sup>-1</sup>) to 2007 (5.9 Tg CO<sub>2</sub>eq.yr<sup>-1</sup>) and fluctuated slightly from 2005 to 2014. The average emissions of cattle manure were 0.98 Tg CO<sub>2</sub>eq.yr<sup>-1</sup> and growth rate being 3.6% per year during the period 1990-2014. Emissions from cattle manure accounted to 21% of CO<sub>2</sub>eq emissions of livestock manure management. Cattle manure released more nitrous oxide as compared to methane. In 2014, methane and nitrous oxide emissions from cattle manure was 219 and 933 Gg CO<sub>2</sub>eq, respectively. In conclusion, greenhouse gas emissions from cattle production in Vietnam were from not only enteric fermentation but also manure management. For the latter, strategy of GHG mitigation should be focused on the following issues: (1) evaluation of current GHG emission situation of cattle manure management methods and determining solutions (animal manure and waste utilization, treatment and risk reduction for a sustainable agriculture); (2) enhance farmers' understanding about the effect of manure management to human health, the environment and climate change; (3) the association of small householders in manure management and application to use manure nutrients effectively (due to some householders lack of land for manure treatment).

*Keywords: cattle, emission, greenhouse gas, manure management*



# Poster Presentation

## Mulberry silkworm (*Bombyx mori*) pupae enhance Omega-3 fatty acids in Nile tilapia (*Oreochromis niloticus*) fillet

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### Abstract

The aim of the present 56 d-experiment was to investigate the optimal level of mulberry silkworm (*Bombyx mori*) pupae to promote growth performance and to increase omega-3 fatty acids in Nile tilapia (*Oreochromis niloticus*) fillet. A total of 240 tilapia with an average initial weight of  $227.9 \pm 7.04$  g. were randomly distributed in equal numbers to 12 tanks of 1,500 L (20 individuals per tank), at  $27.0 \pm 2$  °C and dissolved oxygen content of  $>5.0$  mgL<sup>-1</sup>. Three replicate tanks were assigned to one of the four isonitrogenous and isocaloric diets of  $30 \pm 1\%$  crude protein and  $3,000 \pm 50$  Kcal DE Kg diet<sup>-1</sup>. The dietary treatments comprised of mulberry silkworm pupae at different levels, A) a control diet with no pupae, B) diet with 10% pupae by weight C) diet with 20% pupae by weight and D) diet with 30% pupae by weight. Floating extruded feed was fed to tilapia twice daily in a closed system. According to a feeding plan, daily feed intake ranged between 3 and 4% of body weight. Growth, and feed conversion ratio ( $P \leq 0.05$ ) were significantly affected by treatments. The specific growth rate was 0.16, 0.25, 0.31 and 0.11 %d<sup>-1</sup>, respectively, while feed conversion ratio was 2.01, 1.47, 1.25 and 2.52, respectively, for treatments A, B, C and D. Treatments have no effects ( $P > 0.05$ ) on survival rate, carcass composition and sensory test scores. Total omega-3 fatty acids and DHA levels in tilapia fillet increased ( $P \leq 0.05$ ) with increasing inclusion levels of silkworm pupae in the diet with  $4.07 \pm 0.01$ ,  $4.34 \pm 0.16$ ,  $5.24 \pm 1.09$  and  $6.52 \pm 0.00$  mgg<sup>-1</sup>, respectively for treatments A, B, C and D. Concentrations of linolenic acid were  $1.39 \pm 0.10$ ,  $1.54 \pm 0.29$ ,  $2.06 \pm 0.43$  and  $2.59 \pm 0.14$  mgg<sup>-1</sup>, respectively and those of DHA were  $2.59 \pm 0.14$ ,  $2.69 \pm 0.43$ ,  $3.18 \pm 0.50$  and  $4.93 \pm 0.00$  mg g<sup>-1</sup>, respectively, for treatments A, B, C and D. It is concluded that supplementation of mulberry silkworm pupae at 20% by weight of the diet can promote growth performance and enhance omega-3 fatty acids in fillet of Nile tilapia.

**Keywords:** mulberry silkworm pupae, *Bombyx mori*, omega-3 fatty acids, fillet, Nile tilapia, *Oreochromis niloticus*

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**Use of *Bacillus* spp. as probiotic in feed on snake-head fish  
(*Channa striata*) culture**

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**Abstract**

The experiment was conducted to determine the optimum level of probiotic supplement, *Bacillus* spp., in feed on growth and survival of snake-head fish. Fish with initial weight 2.50-3.50 g were raised in 250 liters fiberglass tanks, 3 replication per treatment. Concentration level  $3.0 \times 10^7$  CFU/g of *Bacillus* spp. 0, 2, 4 and 6 grams were added to 1 kg of commercial fish feed and feeding for 60 days. The result showed that using 6 g of *Bacillus* spp. in 1 kg of feed is the best for increasing weight gain, length gain and growth rate of snake-head fish (*Channa striata*) at the level of  $6.62 \pm 0.44$  g/fish,  $3.13 \pm 0.45$  cm/fish and  $2.06 \pm 0.02$  g/day, respectively with statistical significantly different ( $p < 0.05$ ), but the survival rate were not. The result of water quality analysis exhibited that there is no statistical significantly different between the groups ( $P > 0.05$ ). In conclusion, using 6 g of *Bacillus* spp. as feed additive on snake-head fish (*Channa striata*) culture is the best for increasing weight gain, length gain, and growth rate in snake-head fish.

*Keywords: Bacteria, Bacillus spp., Probiotic, Snake-head fish (Channa striata)*

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### **Aquaculture in a protected gulf: The case of Amvrakikos (Greece)**

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#### **Abstract**

Amvrakikos is a protected gulf by the Ramsar convention in the Region of Epirus (NW Greece). It covers an area of 530 km<sup>2</sup> with a maximum length of 35 km and maximum width 20 km and it is one of the most important fish producing areas in Greece. Fishing, aquaculture (traditional in lagoons, intensive finfish culture in floating cages and mussel farming in long-lines), as well as processing of fishery/aquaculture products are important activities related to the gulf. However, serious anthropogenic impacts have negatively affected the ecological status of the aquatic environment leading to eutrophication and deterioration of the sediment quality. This situation is reflected on the overall fishery productivity which is gradually reducing during the last 20 years. Taking into consideration the important socio-economic value of the gulf to the local communities, urgent actions are needed including sustainable fisheries management and environmental-friendly aquaculture.

*Keywords: aquaculture, eutrophication, fisheries, lagoons, protected gulf*

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## **Study of humoral immune response using IBD Blen® and Vaxxitek HVT-IBD® vaccines even high maternal derived antibody in broiler chickens**

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### **Abstract**

Infectious bursal disease (IBD) also known as Gumboro disease is an important viral disease in poultry industry due to significant economic losses resulting from high mortality and immunosuppression. The disease can only be controlled and prevented by proper vaccination and biosecurity. Nine hundred broilers were divided into 3 groups for present study. The first group was not vaccinated with IBD vaccine, the second was vaccinated using IBD-Blen® (Merial, USA) by drinking water at 2-week-old. Another was vaccinated using VAXXITEK® HVT+IBD (Merial, USA) by subcutaneous route at 0-day-chick. Broiler sera of thirty birds were collected at 1, 2, 3, 4 and 5-week-old, antibody titer was measured using IBD enzyme-linked immunosorbent assay (ELISA) test kit by ProFLOK® PLUS (Synbiotics Corp, USA). Antibody titers of VAXXITEK® HVT+IBD vaccinated group was not significant difference with IBD-BLEN® vaccinated groups. However, both vaccinated groups were significant difference with unvaccinated group since 3-week-old. These results indicated that VAXXITEK® HVT+IBD and IBD Blen® could provide better response to broiler chicken, in term humoral immunity, even in the presence of high maternal derived antibody.

*Keywords: Infectious bursal disease, VAXXITEK® HVT+IBD , IBD-Blen®*

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## Reliable monoclonal antibodies for immunodiagnosis of fasciolosis in both animal and human

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### Abstract

Tropical fasciolosis is a disease caused by two major species of trematode parasites, i.e., *Fasciola hepatica* and *F. gigantica*. Although fasciolosis is primarily a ruminant disease, human infections have been also reported by the World Health Organization. The current diagnosis of fasciolosis is often unreliable and has low sensitivity, as fluke's eggs are not found during the pre-patent period and shedding of parasitic eggs is intermittent. The antibody detection for fasciolosis in animals has been developed and used for a number of years. This antibody detection is not a direct indicator of active infection, and cross-reactivity with other parasites' antigens is often difficult to differentiate. Therefore, antigen detection assay is considered to be better as it can identify animals with pre-patent or occult infection, which could not be detected by the usual parasitological test. Furthermore, the antigen detection can give a more accurate indication of current infection. In the present study, we have produced the monoclonal antibodies (MoAbs) specific against *F. gigantica* somatic antigens using the *in vitro* hybridoma technique by fusion of the immunized spleen cells and myeloma cells. Reactivity and specificity of these MoAbs were examined by ELISA and immunoblotting assays. Seven stable clones, namely PA01, PA02, PA03, PA04, PA05, PA06 and PA07 were obtained from the hybridoma cells. It was found to be IgG<sub>1</sub> and  $\lambda$  light chain isotypes. All of these MoAbs exhibited no cross-reactions with other parasites' antigens. For immunolocalization, *F. gigantica* somatic antigens were present in the caecal epithelium and caecal lumen of the fluke. Thus, it is possible that these MoAbs could be a good candidate for immunodiagnosis of fasciolosis in both ruminant and human.

**Keywords:** *Fasciola gigantica*, monoclonal antibody, ELISA, immunoblotting, immunolocalization

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## **Vitrification of mouse embryos: comparison of Cryotop and hemi straw closed system methods**

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### **Abstract**

Cryopreservation plays a key role in long-term cell preservation. The invention of vitrification was a milestone in the history of cryopreservation technique. In this study, mouse embryos were produced from fresh oocytes by intracytoplasmic sperm injection (ICSI) using Piezo micromanipulator, the embryos were vitrified at 2-cell, 4-cell, 8-cell, morula and early blastocyst stages either on Cryotop or hemi straw closed system (HS-CS) in 15% EG, 15% Me<sub>2</sub>SO and 0.6 M sucrose. Vitrified-warmed embryos were further cultured to expanded blastocyst stage. No significant difference was found in survival rate and embryo development rate after thawing between the Cryotop and the HS-CS methods from different stage of vitrified embryos. The results indicated that the HS-CS method is as effective as the Cryotop method in both embryo survival and embryo development after warming. Furthermore, the expanded blastocysts rate derived from vitrified-warmed embryos was not significantly different from that of fresh embryos in terms of cell number and ICM/TE ratios. In summary, HS-CS method is an effective method, which is very simple to operate, inexpensive to establish and minimizes the risk of contamination. We believe it is the time to move toward to use as the standardized method of embryos cryopreservation.

*Keywords: mouse embryos vitrification, cryotop method, hemi straw closed system method.*

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## Genetic improvement of production performance for Yorkshire

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### Abstract

The study was conducted to assess heritability estimates and genetic correlations of growth and carcass traits of Yorkshire, as well as genetic improvement of those traits in the past ten years. A total of 120,161 heads of Yorkshire from commercial farm in South Korea were used in this study. Basic statistical analysis was done using SAS version 9.3 and genetic traits were calculated using *remlf90* and *blupf90* according to mixed animal model. Production parameters included days at 90 kg (D90), average daily gain (ADG), lean percentage (LP), eye muscle area (EMA) and Backfat thickness (BF). Heritability estimates were 0.41, 0.39, 0.27, 0.27 and 0.43 D90, ADG, LP, EMA and BF respectively. Moreover, genetic correlations were significantly high between ADG and BF with -0.96, and between ADG and EMA with -0.662. Growth parameters (D90 and ADG) showed negative correlations with carcass traits (LP, EMA and BF). Genetic improvement was recorded in ADG with increase of 5g per day, followed and in D90 with -0.88 d/year genetic trend. Moreover almost no trend was noted to EMA, LP and BF. Heritability and correlation is useful to improve growth traits and carcass traits especially those with low genetic improvement.

*Keywords: genetic improvement, heritability, production performance, Yorkshire*

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## Genetic parameters and trends for growth and carcass traits of Landrace in Korea

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### Abstract

The objectives of this study were to obtain heritability estimates, genetic correlations and genetic trend for economic traits using data from 2004 to 2013. Animal records of 37,984 heads of Landrace from commercial farm in South Korea were used in this study. Data included age at 90 kg (A90), average daily gain (ADG), lean percentage (LP), eye muscle area (EMA), and backfat thickness (BF). Statistical analysis was performed using SAS version 9.3 and genetic estimates were calculated using *gremlf90*, *blupf90* following mixed animal model. Results revealed heritability estimates ( $\pm$ SE) of  $0.45 \pm 0.02$ ,  $0.43 \pm 0.04$ ,  $0.47 \pm 0.03$ ,  $0.24 \pm 0.03$  and  $0.48 \pm 0.02$  for A90, ADG, LP, EMA, and BF, respectively. Furthermore, genetic correlations revealed low positive correlation to highly negative correlation between five traits. Highest negative correlations were found between age at 90 kg and ADG of  $-0.95 \pm 0.01$ , likewise high negative genetic correlations were observed between LP and BF with  $-0.66 \pm 0.01$ , and between ADG and EMA with  $-0.32 \pm 0.02$ . Genetic trend observed were  $-0.35 \pm 0.10$  d/year,  $2.07 \pm 0.08$  g/day,  $-0.05 \pm 0.007\%$ /yr,  $-0.12 \pm 0.02$  mm/yr and  $0.007 \pm 0.01$  mm/year for A90, ADG, LP, EMA, and BF, respectively. Findings suggest that genetic improvement favored age ADG trait that showed high heritability estimates.

*Keywords: genetic trend, genetic estimates, economic traits, Landrace*

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**Effect of sex and carcass weight on pork belly characteristics of Large White**

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**Abstract**

The objective of this study was to evaluate the effect of sex and carcass weight on pork belly traits as well as to assess phenotypic correlations of pork belly traits. A total of 676 heads Large White were used in the study. Data were recorded immediately after slaughtering which included carcass weight, backfat thickness, belly weight, belly thickness, belly length, belly width and muscle percentage. Traits were analyzed using SAS version 9.3. Barrow showed statistically higher carcass weight (90.11 kg) and backfat thickness (21.06 mm) ( $P>0.01$ ) than the gilt with 97.55 kg and 17.63 mm for carcass weight and backfat thickness, respectively. Furthermore, belly weight of 7.47 kg and belly length of 559.29 mm ( $P>0.01$ ) of barrow were significantly higher than 6.86 kg belly weight and 546.74 mm belly length of gilt. However, muscle percentage of belly was recorded statistically higher in gilt with 54.89% ( $P>0.01$ ) than barrow with 48.72%. Moreover, carcass weight has significant effect on belly characteristics. Carcass weight of 100 kg and above ( $P>0.01$ ) showed the highest value for backfat, belly weight, belly thickness, belly length, and belly width however highest muscle percentage of belly ( $P>0.01$ ) was recorded to carcass weighing below 79 kg. Positive correlations were observed between carcass weight and belly traits except for muscle percentage of belly with -0.32 phenotypic correlations ( $P>0.01$ ).

*Keywords: sex, carcass weight, pork belly, Large White*

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**Influence of sex and carcass weight on pork belly muscle of Large White**

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**Abstract**

A total of 676 heads of Large White were used to assess the effect of sex and carcass weight on belly muscle characteristics. Statistical analysis was performed using SAS version 9.3. Parameters included carcass weight and pork belly muscle traits such as deep pectoral muscle area, latissimus dorsi muscle area, cutaneous trunci muscle area, rectus abdominis muscle area, internal and external abdominal oblique muscle area, total muscle and total fat. Effect of sex was significant on total belly muscle characteristics. Total muscle area (2307.53cm<sup>2</sup>) and muscle percentage (54.89%) of pork belly were statistically higher in gilt than barrow. On the other hand total fat area of 2384.51 cm<sup>2</sup> of pork belly was statistically higher in barrow than gilt with 1928.78 cm<sup>2</sup>. Moreover, effect of carcass weight on the pork muscle characteristics was also significant. Result showed highest muscle area were found in carcass weighting 100 kg and above, however statistical analysis revealed that total muscle percentage in the pork belly was decreasing as the carcass weight increases. Highest muscle percentage of 52.38% was recorded on carcass weighting below 79 kg while lowest muscle percentage of 48.29 % was noted on 100 kg and above carcass weight.

*Keywords: pork belly muscle, sex, carcass weight, Large White*

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## Genetic diversity of mitochondrial DNA D-loop sequences in Vietnamese swamp buffalo

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### Abstract

According to biological characteristics and chromosome karyotype, Vietnamese water buffaloes belong to swamp buffalo type. However, no report is available on origin and genetic diversity of buffalo in Vietnam. This study was first conducted to analyze the mitochondrial DNA D-loop sequence diversity of 66 buffalos from three geographical populations which locations in northern, central and southern Vietnam. We sequenced and analyzed the variation in 754 bp of D-loop region. The results revealed 26 mitochondrial haplotypes with 30 polymorphic sites. The average nucleotide diversity and haplotype diversity were 0.01107 and 0.858, respectively. In phylogenetic analysis, the Vietnamese swap buffalo samples were clustered into two genetic lineages. These two lineages were similar to mitochondrial DNA lineage A and lineage B that was reported in Chinese swamp buffalo. The results from our study showed that Vietnamese swamp buffalo had a high mitochondrial diversity and had at least two different maternal lineages.

*Keywords: Vietnamese swamp buffalo, mitochondrial DNA D-loop, haplotype, genetic diversity.*

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### **Annual trend of genetic improvement for production performance of three swine breeds**

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#### **Abstract**

This study was conducted to determine the annual trends of improvement for Korean swine test traits. Loin depth (LD), meat percentage (MP), eye muscle area (EMA), days at 90kg (D90), and modified backfat at 90kg (BF) were used for Landrace, Yorkshire and Duroc breeds from South Korea Stock Farms. Basic statistical analysis was done using SAS version 9.1 on 592,965 animal records collected over a 25 year period (1991 to 2014). Highest LD was 60.68 in 1992 and decreased to 48.36 in 2015. MP and EMA values showed similar to the LD. Highest value of EMA was 39.0 in 1992 and this decreased every year. D90 showed an increasing trend. There was no clear trend for BF with big differences among years. Least squares means for all other test traits decreased except for D90 and BF. D90 had a cubic equation trend. LS means for D90 decreased from 1991 to 1999. D90 increased until 2000 then decreased the following years. LS means for BF followed a decreasing trend. LS means for BF were 16.17 and 13.17 in 1991 and 2014. D90 and average daily gain improved over the period under study, contributing to increase in per capita pork consumption. Consumers prefer belly to loin meat portions leading to decrease in LD, EMA and BF. Korean swine breeders' goals need to be focused on improving LD or EMA and meat quality to meet consumer demands.

*Keywords: annual trend, test traits, production performance, least square means*

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## Genetic diversity analysis in six Vietnamese indigenous pig breeds using 20 microsatellite markers

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### Abstract

The objective of study was to assess the genetic diversity and genetic variation of six indigenous pig breeds in central and southern Vietnam (Ba Xuyen, Co, Chu Prong, Meo, Soc and Van Pa). A total of 204 pigs were genotyped using 20 microsatellite markers. A total of 259 alleles were detected and average number of alleles per locus was 12.95. The mean number of alleles per locus of each breed ranged from 6.1 (Co) to 9.85 (Meo). The expected heterozygosity value for each breed ranged from 0.59 (Co) to 0.73 (Meo) and the mean value of heterozygosity was 0.69 over all breeds. The genetic variation between pig breeds with  $F_{ST}$  value ranged from 0.07 (between Meo and Van Pa breed) to 0.28 (between Ba Xuyen and Co breed). The results of this study confirmed high level of genetic diversity and provided useful information for conservation and management of Vietnamese indigenous pig breeds.

*Keywords: Genetic diversity, pig breed, microsatellite*

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## Performance testing of Kamphaeng Saen bulls

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### Abstract

Kamphaeng Saen (KPS) beef cattle found since 1969 by a group of animal scientists from Kasetsart University (KU) is the first registered in Thailand. With The long-term research genetic improvement and performance testing of KPS bull project, the KPS breed is a composite of 25% Thai native cattle breed, 25% Brahman and 50% Charolais breed. The young bull was selected after weaning at 7-8 months old from beef farms across the country. The KPS bulls were brought to testing station from farm members with specific criteria of the project. From 1999 to 2012, there were sever performance testing lots, 40,50,50,50,50,48 and 50 weaning young bull station-tested. The bulls in each lot were placed into individual pen under the same management and feeding systems for 120 days. These traits were weighted according to relative importance in selection in order to calculate grade point average (GPA) of each bull for kept frozen semen. The KPS bulls had 30.02+4.03 kg for average birth weight, 193.09+45.19 kg for adjusted 205-day weights and 344.31+77.95 kg for adjusted 365-day weight. When the KPS bulls was one year of age, there were measured 136.24+9.67 cm for body length, 125.70+6.06 cm for hip height and 28.00+3.82cm for average testicle circumference. The KPS bulls in feed lot was 1.34+0.20 kg for average daily gain (ADG), 5.57+1.03 for feed conversion ratio (FCR) and 3.06+0.46 for GPA. The KPS breed are indicated in this paper the results of potential genetic growth under local farm condition in Thailand.

*Keywords: Kamphaeng Saen beef cattle, performance testing, ADG, FCR*

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### **Modelling genomic selection strategies to improve genetic gain in swine breeding programs using ZPLAN+**

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#### **Abstract**

The objective of this study were to evaluate the present conventional selection program and to compare with the new selection strategy that uses genomic enhanced breeding value (GEBV) as selection criteria to improve the genetic gain in swine breeding program. The software ZPLAN+ was used to calculate and compare the generation intervals, genetic gain, total cost, return and profit of each selection strategy. The first strategy reflected the current conventional breeding program which was a progeny test system (CS). The first genomic selection strategy was a selection scheme strictly based on genomic information (GS). The second genomic selection scenario was a mixture of genomic information and progeny tests (MS). The results showed that the mean generation intervals of CS and MS were the same, which was 1.88; while GS was 1.67. The annual monetary genetic gain of GS and MS were 30 percent and 20 percent higher, respectively, when compared to CS. Additionally, the discounted profit per year of GS was 21 percent higher than CS. However, MS was less profitable than CS. In comparison among genomic breeding scenarios, GS was advantageous than MS based on profit. The genomic selection schemes especially GS were clearly superior to conventional scheme in terms of generation interval, annual monetary genetic gain and profit.

*Keywords: breeding program, ZPLAN+, genomic selection, genetic gain*

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## Effects of endophyte-infected tall fescue seed on forestomach epithelial gene expression in steers

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### Abstract

This study was conducted to determine whether there are differences in gene expression related to VFA absorption between steers dosed with endophyte-infected (E+; 4.45 mg ergovaline/kg) or endophyte-free (E-) tall fescue seed. Twelve ruminally cannulated Angus steers (BW = 547 ± 9 kg) were stratified based on BW and randomly allocated to 6 blocks. The steers were fed alfalfa cubes at 1.5 × NE<sub>m</sub> and dosed (1 kg/d) with ground tall fescue seed via rumen cannula once daily for 21 d. On d 14, rumen fluid was collected prior to feeding and every 2 h for the subsequent 8 h period. Rumen contents were dumped out prior to morning feeding on d 16 for evaluating of ruminal fill, and then the rumen contents were placed back to the rumen with a probe for continuous monitoring of ruminal pH, temperature and pressure. On d 22, the steers were slaughtered and tissue samples were immediately collected from rumen, reticulum, omasum, and abomasum for measuring gene expression associated with VFA absorption. Dry matter intake and average daily gain were not different between treatments (P = 0.989 and 0.439, respectively). Dry matter of rumen contents were higher (P = 0.041) for E+ dosing than E- dosing. Total VFA, acetate and butyrate concentration, and acetate:propionate ratio were higher (P = 0.084, 0.075, 0.001, and <0.001, respectively) for E+ dosing than E- dosing. Ruminal pressure was lower (P < 0.001) for E+ dosing than E- dosing. Serum prolactin concentration was lower (P < 0.001) for E+ dosing than E- dosing. The levels of monocarboxylate transporter1 (MCT1) and MCT4 expression were lower (P < 0.05) in the rumen tissue of steers dosed with E+ seed, whereas MCT2 was not different. The expression of sodium hydrogen exchanger2 (NHE2) was lower (P < 0.05) for E+ steers. The levels of down regulated in adenoma (DRA) and anion exchanger2 (AE2) expression were lower (P < 0.05) for E+ steers in the rumen epithelium. Expression of these genes in reticulum, omasum, and abomasum epithelia were not affected (P > 0.05) by seed treatment. These data indicate that endophyte-infected tall fescue seed may contribute to depression of ruminal VFA absorption in a dissociated state (pH > 5.8) by the depression of MCT1 and MCT4 in the rumen associated with NHE2, DRA and AE2. Consequently, this may contribute to decreased gain associated with fescue toxicosis in cattle.

*Keywords: steer, VFA transporter, gene expression, tall fescue*

## Effect of microbial mixture on survival of fermented juice of epiphytic lactic acid bacteria (FJLB)

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### Abstract

This study was conducted to evaluate the effect of microbial mixture on viability of fermented juice of epiphytic lactic acid bacteria after freeze drying. Three types of mixed FJLB cultures were prepared as microbial mixture with skim milk, maltodextrin and starch. Those were freeze dried and stored at 4 °C for 30 days. FJLB with all microbial mixtures were determined viability, immediately after freeze drying and at day 30 during storage by counting number of colony forming unit per milliliter (CFU/ml) on MRS agar medium. FJLB mixed with skim milk and maltodextrin had higher survival of FJLB after freeze drying than FJLB mixed with starch (89%, 88% and 75%, respectively). These results suggested that, skim milk and maltodextrin are good microbial mixtures for freeze dried FJLB.

*Keyword: Lactic acid bacteria, Freeze dried, Protectants*

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## Effects of storage time on external and internal characteristics of lutein eggs

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### Abstract

The effects of egg storage time were studied on the external and internal characteristics of lutein eggs. A total of 330 lutein eggs were stored at room temperature (30°C) for periods of 0, 3, 5, 7, 9, 11, 13, 15, 17, 19 and 21 days, respectively. At the end of each storage period, 30 lutein eggs were evaluated for egg quality. Storage time from 0 to 21 days did not affect the eggshell thickness, shell ratio or yolk color ( $P>0.05$ ). The effect of days in storage was statistically significant on the albumen ratio and Haugh unit ( $P<0.05$ ) which both decreased with increasing days of storage. Conversely, egg water loss and the yolk ratio increased with increasing days of storage ( $P<0.05$ ). At the end of storage, the lutein value in the eggs was close to the value at the beginning of storage. The results indicated that storage time did not produce an adverse effect on the eggshell thickness, shell ratio, yolk color and concentration of lutein in lutein eggs.

*Keywords: storage time, characteristics, lutein eggs*

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## Efficacy of probiotic *Enterococcus mundtii* in dried form in broilers

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### Abstract

*Enterococcus mundtii* is a beneficial microorganism found in the faeces of the poultry raised in the western part of Thailand. If its easy powder form can be developed, this will allow farmers to get an easy-use and -access to the product. The objective of this research was to examine the safety of this probiotic for broilers and the efficacy of its powder form on growth and immunity boosting after vaccination in the animal. In the production procedure of the probiotic powder, the probiotic was prepared in Man, Rogosa and Sharpe (MRS) broth. The precipitate obtained was dissolve in NaCl solution (0.9%) and then mixed with methylcellulose 1.25% and broken milled rice decontaminated with steam sterilization. The mixture was then dehydrated in a decontaminated hot air oven at 45°C during 3 days and tested with 60 male broilers, which were raised separately into 2 groups with 2 replications for each groups and 15 birds per replications. The research was used completely randomized design (CRD). The broilers were fed according to their nutrition requirement as follows; the commercial feed group and the commercial feed supplemented with powdered probiotic of 10<sup>6</sup>cfu/g. The experimental period was done for 28 days with a vaccination against Newcastle disease. 3 broilers (13.34%) in the control group were found dead. The average daily gain was statistically different. However, feed intake, feed conversion ratio (FCR), and the immunity level against Newcastle disease were not difference. In conclusion, although the average daily gain was higher in the control group, but no broiler was dead in the probiotic group. This allows the farmers to earn more from selling benefits and implies that the powdered probiotic is safe and can be used to feed broilers.

**Keywords:** *Enterococcus mundtii*, beneficial microorganism, poultry, broilers, probiotics

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## **Improvement of sugar palm peel silage by using fermented juice of epiphytic lactic acid bacteria (FJLB)**

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### **Abstract**

The objective of this study was conducted to evaluate the improvement of sugar palm peel silage using fermented plant juice of epiphytic lactic acid bacteria. This study comprised of three treatment groups (no additive, 1% FJLB, 1% molasses) with 3 replicates per treatment. Results of pH values, chemical compositions, *in vitro* dry matter digestibility (IVDMD) and gas production were recorded. Results showed that T2 (1% FJLB) has lower pH values at day 7 and 14 as compared to other treatments ( $P<0.05$ ). Chemical compositions of sugar palm peel silages were significantly different among treatments ( $P<0.05$ ). At day-7, sugar palm peel silages were high crude protein and fiber content such as hemicellulose and cellulose. T3 (1% molasses) had higher crude protein and lower NDF, ADF, hemicellulose and cellulose than other treatment. IVDMD of T2 (1% FJLB) and T3 (1% molasses) at day-7 was significantly higher than T1 (no additive) ( $P<0.05$ ). Conversely, gas production of sugar palm peel silages were significantly different among treatments ( $P<0.05$ ) with gas production of sugar palm peel silages was the highest at day-7. Based on the results, it can be concluded that fermented plant juice of Napier grass was suitable to be used to improve sugar palm peel silage, chiefly due to the low pH, shorter fermentation time and increase digestibility.

*Keywords: Sugar palm peel, Epiphytic lactic bacteria and Fermented plant juice of Napier grass*

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## Growth response of purebred Merino and crossbred prime lambs from feed supplemented with canola and flaxseed oils

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### Abstract

Innovative feeding and dietary supplementation opportunities for optimal lamb growth and early attainment of slaughter weight are core components of a profitable prime lamb enterprise. Australian dual-purpose sheep producers are constantly exploring the best combination of genetics and dietary supplementation options for producing consistently high quality lambs. Oils from flaxseed and canola are energy-dense supplements ideally suited for the intensive finishing of lambs in feedlots. However, there is limited on-farm research on the appropriate supplementary levels of these oil sources in prime lambs with different genetic backgrounds. Therefore, the objective of this study was to evaluate the influence of flaxseed and canola oil supplementation on the growth of genetically divergent prime lambs. Seventy-two weaner lambs comprising purebred Merino and first generation Corriedale crosses with Merino and White Suffolk were randomly distributed into six treatment groups, balanced by breed and sex. The six different treatments fed daily to each group were 1 kg pellets supplemented with either flaxseed or canola oil and an unsupplemented control, at both low (25ml/kg) and high (50ml/kg) oil levels. Each group was also provided with *ad libitum* access to the basal diet of lucerne hay and water over a ten-week period. Results demonstrated that while gender had an inconsequential impact, significant differences in average daily gain (ADG) were attributable to level of dietary oil supplementation (animals fed high levels of canola and flaxseed oils had the highest ADG of 189 and 188g/day respectively) and breed of lamb (189g/day in White Suffolk x Corriedale and 156g/day being the lowest in purebred Merino lambs). The data also conclusively showed that lamb breed exerted the most significant influence on liveweight and body condition score as White Suffolk x Corriedale crossbred lambs had the heaviest liveweight (45.7kg) and best body condition score (3.5). The main finding is that both flaxseed and canola oils can be effectively utilised in intensive feed-lotting/finishing supplementation regimes to improve lamb growth rates and slaughter weights. Furthermore, the appropriate level of these oil sources that can be incorporated into the diet of prime lambs over a ten-week supplementation programme for an optimal growth response from sheep of different genetic backgrounds is 50ml/kg. White Suffolk x Corriedale crossbred lambs elicited the best growth performance in this study.

**Keywords:** *flaxseed oil, canola oil, supplementation, prime lambs, growth.*

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## Effects of supplementation of guinea grass silage on growth performance of Lao native cattle fed rice straw diet

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### Abstract

The aim of this study was to evaluate the effects of supplementation of guinea grass silage (GGS) on growth performance of Lao native cattle fed with rice straw diet. Guinea grass was harvested at the same stage of maturity and chopped to 3 – 8 cm length, compacted and maintained in air tight plastic containers for 21 days. Twelve Lao native cattle of 2 years old with initial weight  $130.0 \pm 29.6$  kg were randomly allocated to four dietary groups: T1, control (rice straw (RS) ad libitum); T2, RS ad libitum + 1kg GGS; T3, RS ad libitum + 1.5kg GGS and T4, RS ad libitum + 2kg GGS in a 21 weeks feeding trial. The experimental data was subjected to analysis of variance (ANOVA) in randomized completed block design (RCBD). The results showed that DM, OM, CP, EE, CF, NDF, ADF and ADL were 91.13 and 18.36, 84.23 and 89.58, 4.36 and 8.68, 2.55 and 3.75, 35.27 and 36.58, 42.05 and 40.57, 63.51 and 61.92, 40.05 and 38.47, 11.57 and 12.26, respectively for RS and GGS. The acetic acid, butyric acid, and lactic acid of GGS were 4.68, 2.23 and 0.11%, respectively. The pH value of GGS was 4.84. Feed intake of cattle fed 1.5 kg and 2.0 kg GGS supplementation diets were significant higher ( $P < 0.01$ ) than control and the 1.0kg GGS treatment. Cattle fed diet supplemented with 1.5 kg GGS had highest ADG (0.25 kg/day) and most efficient FCR (22.60) ( $P < 0.01$ ).

*Keywords: Lao native cattle, growth performance, guinea grass silage, rice straw*

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## **Effect of bee pollen as a natural antioxidant on the performance, carcass and antioxidant status of V-line rabbits**

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### **Abstract**

The present study was conducted to determine the effect of supplementing bee pollen (BP) as a natural growth promoter and antioxidant on growth performance, carcass traits, lipid profile and lipid peroxide (Malondialdehyde) of growing V-line rabbits. A total number of 27 V-line rabbits at 5 weeks old with average initial live body weight of  $731.18 \pm 26.86$ g were divided into three groups (n=9 rabbits/group). Each group was subdivided into three replicates with three rabbits each in a completely randomized design. The first group received basal diet free of BP. The second and third groups were fed diets containing 0.1 and 0.2 g BP/kg diet, respectively. The results indicated that body weight and feed intake were not affected by treatments; however, feed conversion ratio was significantly improved by Bp supplementation. Carcass traits were not affected by treatments. Bee Pollen diets significantly ( $P \leq 0.01$ ) lowers the level of serum total lipids and low density lipoprotein, however, it had insignificant decreasing effect on total cholesterol and triglycerides and had numerically increasing effect on high density lipoprotein as compared with the control group. Serum malondialdehyde significantly ( $P \leq 0.01$ ) decreased by Bp supplementation in blood serum as compared to the control group. It is well demonstrated in the present study that the consumption of BP has positive effects on rabbits' performance, had a beneficial effect on blood lipid regulation which was demonstrated to be ascribed to their antioxidant activity and on lipid peroxide of growing V-line rabbits.

*Keywords: rabbit, bee pollen, performance, carcass, blood constituents.*

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**Crude protein requirements for maintenance of Elk (*Cervus canadensis*)**

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**Abstract**

This study was conducted to determine crude protein requirements for maintenance (CPm) of elk. Three elk ( $331.6 \pm 7.2$  kg) were allocated randomly to diets with three levels of crude protein in the concentrate by replacing pellets: 16.0% (LCP), 19.8% (MCP) and 24.9% (HCP), respectively. Elk in each treatment were fed diets containing timothy (40%) and pellets (60%). Daily gains of growing elk were 5.15, 5.14 and 5.15 kg/day for LCP, MCP and HCP. CP intake was 7.5, 11.21, and 12.72 g/BW<sup>0.75</sup> for LCP, MCP and HCP, respectively. Protein balance was 3.38, 5.41 and 6.94 for LCP, MCP and HCP respectively. Intercept of the regression equation between CP intake and retained CP indicated that CPm was 3.17 g/BW<sup>0.75</sup>. The estimate of CPm was almost 25% lower than that adapted by NRC (2006); this would need to be verified with more feeding trial data set including protein requirements for elk.

*Keywords: crude protein, elk, CPm, CP balance*

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## Effects of Mao pomace powder supplementation in Cherry Valley duck diets on blood parameters

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### Abstract

The objective of this study was to determine the effects of dietary supplementation with Mao pomace on blood parameters in meat duck. One hundred and twenty 1-d-old Cherry Valley duck were allocated to three treatments with four replicates based on a completely randomized design. Dietary treatments included 0% (Control), 0.5% and 1.0% of Mao pomace powder. All testing diets were formulated in three cycle periods (1-20d, 21-38d and 39-56d). Blood parameters at 54 days old including hematocrit, red blood cell count (RBC), white blood cell count (WBC), heterophil, lymphocytes, cholesterol and triglyceride were determined. The results showed that ducks fed with Mao pomace level 0.5% significant decrease ( $P < 0.05$ ) in WBC, cholesterol and triglyceride concentrations among different group.

*Keywords: Mao pomace, meat duck, blood parameters*

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## Evaluation of mulberry leave as a functional feed additive of laying hens

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### Abstract

Mulberry leaf is a productive and oversupplied crop in Taiwan. The purpose of this study is to evaluate the antioxidant activity ability of Taisung No.3 mulberry leaf (ML) as functional feed additive by a sequence of *in vitro* and *in vivo* experiments. The results presented that the total phenolic compounds were 7.4 mg GAE (gallic acid equivalent)/g dry weight for its aqueous extracts. The chelating capacity of  $\text{Fe}^{2+}$  was 71.6% when the concentration of extracts was 1.0 mg/ml. The scavenging ability of DPPH free radical was 45.9% when added 0.1 mg/mL of extracts. At the concentration of 25 mg/ml, the extracts have approximate 84.0% reducing power compared with ascorbic acid at the concentration of 0.5 mg/ml. In 2.5 mg/mL of ML aqueous extracts have approximate equal equivalent antioxidant capacity (TEAC) compared with 0.05 mg/mL of ascorbic acid. The liposome oxidation inhibiting ability was 43.9% when added 50 mg/ml extracts. *In vivo* experiment, a total of 96 brown laying hens (HENDRIX) were assigned into 4 treatment diets including dry mulberry leaves at 0% (control), 0.5%, 1% or 2%, respectively, for 12 weeks. Each treatment had eight replicates with three hens each. The results indicated that both of 1% and 2% supplemented groups were increased egg mass as well as decreased feed conversion ratio in compared to the control group. The egg weight, yolk weight and white weight were increased among all the groups supplemented with ML powder. The inclusion of 2% ML resulted in overall best performance, as well raised the shell thickness. Serum malondialdehyde content was lower and catalase activity was higher in all the experimental groups compared to the control group. In conclusion, the mulberry leaves could be used as a functional feed additive to enhance performance and oxidant status of laying hens.

*Keywords: mulberry leaf, functional feed additive, antioxidant properties*

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## Effects of performance and intestinal morphology by supplementation with a functional feed additive in poultry diet

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### Abstract

The present study was to produce a functional feed additive by solid-state fermentation of soybean hulls (100%, SBH) and soybean hulls partially replaced of *Pleurotus eryngii* stalk residue (75:25, SBHP) with *Aureobasidium pullulans* SH-218 that owns hemicelluloses secreting activities. The solid-state fermentation enhanced xylanase and mannanase activities as well as antioxidant capacity in terms of total phenolic content and trolox equivalency of both substrates; while the antioxidant properties were more noticeable in SBHP which showed higher levels of xylotriose, mannose and mannobiose as well. A total of 400 broilers were randomly assigned to one of the four dietary treatments including basal diet (control) and basal diet supplemented with 0.5% fermented SBH (0.5% FSBH), 0.5% fermented SBHP (0.5% FSHP) or 1.0% fermented SBHP (1.0% FSHP) until 35 day of age respectively. Body weight gain, body weight along with villus height/crypt depth ratio of jejunum and ileum were much more pronounced in broilers fed with 0.5% FSHP. The highest Lactic acid bacteria/*Clostridium perfringens* ratio in ileum was observed in birds receiving 0.5% FSBH. In conclusion, solid-state fermentation of soybean hulls with *A. pullulans* could efficiently degrade anti-nutritional hemicellulose that subsequently increased oligosaccharides content, which accompanied by improved broiler intestinal microflora. Further supplementation of *Pleurotus eryngii* stalk in diet not only improved intestinal morphology, but had bird optimal growth performance by exerting its bioactive metabolite properties.

**Keywords:** soybean hulls, *Pleurotus eryngii* stalk residue, *Aureobasidium pullulans*, broilers.

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## **Nitrogen balance and carcass quality in broilers given a low-protein diet in the grower period and higher-protein diets in the finisher period**

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### **Abstract**

In the present study, growth performance, nitrogen (N) balance and body composition were measured in broilers given a low-protein diet (LPD, CP 17.6%) during 3-week grower period and then LPD, a standard- (SPD, CP 19.6%) or a high- (HPD, CP 22.0%) protein diets during 1-week finisher period. A total of 24 male broilers (21 d of age) were divided into control and L groups. Control group (6 birds) was given SPD throughout the experimental periods. L group (18 birds) was given LPD during the grower period, and then this group was divided into 3 groups of 6 birds, which were L group given LPD, S group given SPD and H group given HPD during finisher period. During the whole experimental period, there were no significant differences in body weight gain (WG), feed intake (FI) and feed conversion ratio (FCR) among dietary groups, and N excretion decreased and N retention improved significantly in H group, comparing with control group. Body fat deposition increased in L group, but such tendency was not found in H group. In conclusion, it is suggested that feeding LPD during the grower period followed by feeding HPD during the finisher period can decrease N excretion during the whole experimental period and prevent excessive fat deposition in broilers.

*Keywords: body fat deposition, broiler, growth performance, nitrogen retention*

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## **Effect of a heat stress reducing additive on meat production and quality in Hanwoo heifers**

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### **Abstract**

Following the successful development of a feed additive that has the potential of alleviating heat stress in beef cattle, we designed this study to assess the effects of the additive on growth performance and meat quality in Hanwoo (Korean beef breed) cattle finished during the summer season in Korea. The additive contained fat, choline and yeast at 0.05%, 0.05% and 0.025%, respectively. Thirty two heard of Hanwoo fattening heifers were randomly assigned to the control group (no additive) and treatment group (with additive). The additive was added to the animal's diets at 100 g/ d/ head for 120 days. At the end of the study period, the final weights between the two groups did not differ. However, the additive resulted in greater carcass yield of leaner meat than the control group. The treatment group also had better meat color – a major determinant in the choice of beef consumers. We concluded that the additive is beneficial in Hanwoo beef production.

*Keywords: heat stress, body temperature, optimum blend, meat production, Hanwoo*

## Effect of fermented plant extracts on enteric methane production in the rumen

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### Abstract

Methane emissions from ruminants negatively affect the environment and animal productivity. Methane is a more potent greenhouse gas than atmospheric carbon dioxide. Its emission also represents a loss feed energy that could be available to the host animal. The present study was conducted to investigate effect of plant extracts that were fermented by different starter cultures on the reduction of enteric methane production in the rumen. A total of 8 strains, *Pichia anomala*, *Weissella confusa*, *W. cibaria*, *Saccharomyces cerevisiae*, *Lactobacillus brevis*, *L. plantarum*, *L. curvatus* and *L. sakei* were used as starter culture strains. 10 plants, *Eucommia ulmoides* OLIV., *Allium hookeri*, *Dioscorea quinqueloba*, *Asarum sieboldii*, *Hovenia dulcis* Thunb, *Morus alba* L., *Acanthopanax senticosus*, *Leonurus japonicas* Houtt, *Glycyrrhiza uralensis* and *Platycodon grandiflorum* Nakai were fermented. The dried plant powder was included in MRS broth, and starter culture was inoculated. Fermentation was conducted at 30°C for 48 h and then broth was dried at 60°C. Extraction was performed using ethanol, and the extract was prepared after concentration using rotary evaporation. Fermented plant extracts (FPEs) was supplemented in diet at 0.1%. Rumen fermentation parameters were investigated using rumen simulated *in vitro* fermentation. FPEs did not alter ruminal pH. *P. grandiflorum* fermented by *L. curvatus* and *L. plantarum* showed significantly greater ammonia nitrogen concentration than the control ( $P < 0.05$ ). Fermented *A. hookeri* by all starter cultures had greater ammonia nitrogen concentration than the control ( $P < 0.05$ ). *A. hookeri* fermented by *L. curvatus* and *L. plantarum* significantly increased volatile fatty acid production ( $P < 0.05$ ). These treatments also significantly reduced methane production ( $P < 0.05$ ). As a conclusion, the present study suggests that fermentation of *A. hookeri* using *L. curvatus* and *L. plantarum* can improve its biological activity and supplementation of these extracts could improve animal productivity via reduction of enteric methane emissions.

**Keywords:** animal productivity, fermentation, plant extracts, ruminal methane emission, starter culture

## Enhancement of rice straw nutrient value by solid state fermentation with *Trichoderma*

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### Abstract

Rice straw has been a common agricultural waste by rice production. The usage of rice straw to be feed ingredient is limited since its high proportion of cellulose and hemicellulose mainly as xylan, which is difficult to degrade by gastrointestinal enzymes of animals. The present study was to enhance of rice straw nutrient value by solid state fermentation with *Trichoderma*. The results showed that the fermented rice straw for 6 days could produce higher cellulase (24.82 U/g DM) and xylanase (409.67 mg/g DM) than that of unfermented rice straw. Total saccharide as hexose and pentose increased approximately 55.7 mg/g DM and 34.35 mg/g DM, respectively. Transmission electron microscopy observation presented that the lignocellulose structure showed degradation and fragmentation after rice straw fermented by *Trichoderma*. In conclusion, this study found that the fermented rice straw by *Trichoderma* could increase cellulase and xylanase contents as well as cell wall structure was apparently crushed. Hence, the fermented rice straw may potential as feedstuff for ruminants.

*Keywords: rice straw, Trichoderma, cell wall*

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## Supplementation of recombinant lycopene on egg quality and blood characteristics in quail diet

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### Abstract

Lycopene has inhibited *in vivo* low-density lipoprotein (LDL) oxidation and HMG-CoA reductase activity, affect cholesterol biosynthesis and reduce blood triglyceride and cholesterol content, thereby reducing cardiovascular and chronic diseases. This study was to determine the effect of dietary supplementation of bacterial lycopene (BL) produced by *Escherichia coli* on the egg quality and blood characteristics of laying quails. A total of 70 100-day-old quails (*Coturnix coturnix japonica*) were fed with the basal diet supplemented with bacterial lycopene (BL), commercial lycopene (CL) or canthaxanthin for 4 weeks. The results showed that the yolks' triglyceride content was significantly lower for the group with BL and CL supplement. The group with BL supplement also had the lowest level of serum triglyceride. In conclusion, the results indicated that the BL produced by *E. coli* has potential as a feed additive in the diet of laying quails to decrease levels of serum lipid and triglyceride.

**Keywords:** recombinant lycopene, laying quail, feed additive

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## The study of kinetics of yeast growth in fermented milk

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### Abstract

The aim of this study was to study effect of cultivation time on yeast population in fermented milk. Experiments were conducted according to a Completely Randomized Design (CRD) to study growth kinetics of yeast (*Saccharomyces cerevisiae*) in difference cultivation time at 0, 1, 2, 3, 4 and 5 days. The kinetic data of yeast growth were collected at 0 and every day post-cultivation. The results show that pH of fermented milk was the highest ( $P<0.05$ ) at 0 day of cultivation (pH 6.9) and the lowest ( $P<0.05$ ) at 4 days post-cultivation (pH 5.7). For temperature was ranged from 27.0 to 28.4 °C and the highest ( $P<0.05$ ) was at 4 days post-cultivation. Yeast population at 4 days post-cultivation was highest ( $P<0.05$ ) at 9.0 log cell/ml. Moreover, the further research should be investigate the used of fermented milk to improve quality of feed resources especially in Tropical area.

*Keywords: Yeast, fermented milk, cultivation time, Saccharomyces cerevisiae, lactic acid bacteria*

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## **Effect of propolis as a natural antioxidant on the performance, carcass and antioxidant status of V-line rabbits**

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### **Abstract**

The present study was conducted to determine the effect of supplementing propolis as a natural growth promoter and antioxidant on growth performance, carcass traits, lipid peroxide (Malondialdehyde) and the antioxidative status of growing V-line rabbits. A total number of 27 V-line rabbits at 5 weeks old with an average initial live body weight of  $791.6 \pm 21.86$  g. were divided into three groups (n=9 rabbits/group). Each group was subdivided into three replicates with three rabbits each in a completely randomized design. The first group received basal diet free of propolis. The second and third groups were fed diets containing 400 and 800 mg propolis /kg diet, respectively. The results indicated that body weight, weight gain and feed conversion ratio were improved ( $P \leq 0.01$ ) in the group given 400 mg propolis diet as compared to the control and the other experimental group, however, feed intake and carcass traits were not affected by different treatments. Propolis diets lowers the level of serum total lipids, total cholesterol and low density lipoprotein, however, it had insignificant effect on blood serum HDL of rabbits as compared to the control group. Total antioxidant capacity increased in blood serum by propolis supplementation as compared to the control group. It is well demonstrated in the present study that the consumption of propolis had positive effects on rabbits' performance, had a beneficial effect on blood lipid regulation which was demonstrated to be ascribed to their antioxidant activity and the antioxidative status of growing V-line rabbits.

*Keywords: Rabbit, propolis, performance, carcass, blood constituents*

## The effects of phonological stages on forage quality of four rangeland species for the sheep nutrition in Sari plain, Iran

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### Abstract

One of the most important factors that effect on livestock grazing management in rangelands is forage quality that leads managers to proper control of plants production and grazing time. Species at different places and times, different forage quality. For this propose, current study was investigated the changes in forage quality of four rangelands species included *Trifolium repens*, *Onobrychis sativa*, *Medicago scutellata*, and *Medicago sativa* in three stages; vegetative growth, flowering and seeding. After planting species in field conditions of Sari plain, sampling of plants was done in each of the phenological steps. The samples were transported to laboratory for measuring quality factors included crude protein, Acid Detergent Fiber (ADF), digestibility and metabolizable energy. The data was analyzed using ANOVA and means comparison (Tukey's test). The results showed that phonological stage had the sensible effect on forage quality parameters included ADF and dry matter digestibility to other indices specially. Also, the *Trifolium repense* and *Onobrychis sativa* had the lowest digestibility in dry matter in the flowering stage to *Medicago scutellata*, and *Medicago sativa* as their ADF were shown a significant increasing in the late-stage compared to the beginning of growth period.

*Key words: phenology, forage quality, digestibility, crude protein, sheep*

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## Effect of ginger root powder supplementation on growth performances and carcass characteristics of broiler chickens as rearing in hot climate

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### Abstract

This study was conducted to investigate the effect of dietary supplementation with ginger root powder as a natural growth promoter on performances and carcass characteristic of broiler chickens as rearing in hot climates. A total of 250 one-day-old male broiler chicks )Ross 308( were allocated to five treatments with five replicates. The dietary treatments consisted of the basal diet with no supplement as control, basal diet containing 100 mg/kg vitamin E as positive control, basal diet containing 8, 16 and 24 g/kg of ginger root powder as dietary treatment. The curcum in content of the ginger powder was  $1.29 \pm 0.04\%$  by weight. Body weight gain and feed intake of chickens were not influenced by the dietary treatments. Broilers fed ginger root powder supplemented diets exhibited better feed efficiency over the entire experimental periods in comparison with control group ( $P < 0.05$ ). A significant decreased ) $P < 0.05$ ( in abdominal fat pad was observed in chickens fed the supplementation of ginger root powder. The obtained results from this study could be concluded that dietary inclusion of ginger root powder have no significant to improve broiler performance, however, it has significantly improved ( $P < 0.05$ ) feed efficiency. It was also found that supplementation with ginger root powder has significantly improved ( $p < 0.05$ ) carcass characteristic of broilers in term of reduction abdominal fat percentage.

**Keywords:** ginger root powder, broiler performances, carcass characteristic, hot climate

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## Fermentation patterns of alfalfa hay and *Ulva Fasciata* using gas production technique

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### Abstract

The objective of this study was to evaluate fermentation characteristics of alfalfa hay and *Ulva Fasciata*. Samples of particle size of 2 mm were oven dried at 65°C for 48 h., then 200 mg of each were weighed and placed in four replicates into 125-ml capacity serum bottles. The gas production was continuously measured by incubating samples in buffered rumen fluid. Rumen content was obtained from a dairy cow. Incubations were carried out for 96 h. Gas produced was recorded at 2, 4, 6, 8, 12, 24, 48, 72 and 96 h through the incubation periods. Data were analyzed using a non-linear method to predict the gas produced kinetic parameters. Results indicated that gas produced (ml / 200 mg DM) from alfalfa hay was higher than those of *Ulva fasciata* at each measuring time. The fractional rate (c) of gas production were highest (0.08) in alfalfa hay ( $p < 0.01$ ) compared with that of *Ulva fasciata*. Gas production from the insoluble but fermentable fraction (b) of alfalfa hay was also higher than that of *Ulva Fasciata* (60 vs 46 ml/200 mg DM).

**Keywords:** Gas production, Alfalfa hay, *Ulva Fasciata*

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## To compare intestinal available protein of *Ulva Fasciata* with alfalfa hay using a new gas technique

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### Abstract

This study was carried out in to compare the amount of ruminant intestinal available crude protein (uCP) of *Ulva Fasciata* (seaweed) with alfalfa hay. Using a new modified gas technique. The plant samples of particle size of 2 mm were oven dried at 65°C for 48 h. To perform the gas test, rumen fluid was collected before the morning feeding from two rumen fistulated Holstein dairy cows (640 ± 38 kg, body weight). Feed samples (200 mg) and blanks (only 30 ml of buffered rumen fluid) incubated simultaneously in three repeats for 8, 24 and 48 hours. At the end of the each incubation time, the uCP was calculated as non-ammonia N which was calculated by subtracting the amount of ammonia N released in the incubation medium of the total incubated N (sum of N content of feed sample and ammonia N in blanks). Effective uCP (EuCP) was calculated via an exponential equation using the estimated uCPs at 8, 24 and 48 h post incubation. Effective uCP (at the passage rate of 0.06/h) of *Ulva fasciata* (122/91) were significantly ( $P < 0.01$ ) higher than that of alfalfa hay (152/67). The result showed that uCP in 24 and 48 h was higher in *Ulva Fasciata* (149.58, 125/1) than the value obtained from alfalfa hay (105/43, 49/91) respectively ( $P < 0.05$ ).

**Keywords:** *Ulva fasciata*, alfalfa hay, protein

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## Effect of *Curcuma domestica* stock solution on layer performance, egg quality, and antioxidant activity

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### Abstract

The aim of this research was to evaluate the effect of *Curcuma domestica* stock solution on layer performances, egg quality, and antioxidant activity of egg yolk. A total number of 32 *Lohman LSL-lite* white laying hens were divided into 4 treatments; there were 8 replication birds in individual cages. Laying hens were fed with 4 experimental diets, basal diet and diets with 1%, 2%, and 3% of *Curcuma domestica* 10% stock solution. Eggs were collected daily and analyzed of the eggs which were divided into three age stages, namely stage 1 (week 22 - 25), stage 2 (26 - 29), and stage 3 (30 - 33), respectively. The respective layer performances and egg quality were determined every week at every age stage. Antioxidant activity and color stability were determined every week at second age stage. The data was analysed using GLM in a windows-based software package, SAS version 9.1. Data was obtained from different level, age stage, and interaction among level and age stage. The differences were tested by LSM. Significant level used in the group comparisons was set at  $p < 5\%$ . The addition of *Curcuma domestica* 10% stock solution did significantly improve laying performances, egg quality, and antioxidant activity. Addition of 3% *Curcuma domestica* stock solution increased layer performances including water consumption, hen day egg production, and egg weight as well as antioxidant activity including FRAP, iron chelating, and DPPH on egg yolk. Moreover, addition of 2% *Curcuma domestica* 10% stock solution increased egg shell thickness and egg shell strength. In summary, the use of 3% addition of *Curcuma domestica* 10% stock solution had ability to improve layer performances and antioxidant activity of egg yolk on laying hens.

**Keywords:** antioxidant activity, *Curcuma domestica*, egg quality, layinghen, performance

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**Effect of yeast fermented fresh cassava root fed beef cattle on digestibility**

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**Abstract**

The objective of this study was to evaluate effects of level of yeast-fermented fresh cassava root (0, 10, 20 and 30% dry matter) in concentrate diet on dry matter intake (DMI) and nutrient digestibility. Four, non-pregnant female Brahman beef cattle (body weight  $256 \pm 11.5$  kg) were randomly allocated to 4 treatments in 4 x 4 Latin square design with 21-d periods. Fresh cassava root was girded and fermented for 21 days then fermented with yeast as yeast-fermented fresh cassava root. Cattle was fed rice straw as roughage. Dry matter intake was not difference among the treatments. However, ADG was trend to increase when yeast-fermented fresh cassava root was fed at 20 % in concentrate diet. Nutrients digestibilities were not differ among the treatments. However fiber digestibility (NDF and ADF) were trend to increase when yeast-fermented fresh cassava root was fed. It is concluded that yeast-fermented fresh cassava root could be used as protein source in cattle diet up to 30% with trend to enhance the dry matter intake and NDF digestibility.

*Keywords: Cassava root, Beef cattle Feed, Yeast, Yeast-fermented fresh cassava root*

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## Changes in metabolic hydrogen flow on bovine rumen fermentation in response to cashew nut shell liquid

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### Abstract

Analysis of the metabolic hydrogen flow estimated from concentrations of short-chain fatty acids (SCFA) and methane was applied to evaluate effects of cashew nut shell liquid (CNSL), a methane inhibitor, on bovine rumen fermentation. Three cows were fed a concentrate and hay diet without or with a CNSL-containing pellet, which was blended with only silica (trial 1) or with several other ingredients (trial 2). Methane production was measured in a respiration chamber system, and energy balance and nutrient digestibility were monitored. Estimation of metabolic hydrogen demonstrated that a part of metabolic hydrogen was used for hydrogen gas production, and a large amount of it flowed into production of methane and SCFA in both trial 1 and 2, when CNSL was administered to the bovine rumen. The results obtained by regression analyses showed that the effect of CNSL supply on methane reduction was coupled with a significant ( $P < 0.01$ ) decrease of acetate and a significant ( $P < 0.01$ ) increase of propionate and hydrogen gas. These findings reveal that CNSL is able to reduce methane and acetate production, and to increase hydrogen gas and propionate production *in vivo* rumen fermentation.

*Keywords: cashew nut shell liquid, hydrogen gas, metabolic hydrogen, methane, rumen*

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## Utilization of cassava pulp and corncob fermented with *Aspergillus niger* for animal feed: effect on protein levels

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### Abstract

Cassava pulp and corncob can be used as animal feed. However, those contain high fiber, low protein and amino acid deficiency with sulfur compounds. It would be more valuable if the waste product is fermented with microorganisms to increase protein level in animal diets. This study used a solid state fermentation with 2 experiments. In experiment I, the proportion of cassava pulp and corncob fermented with *Aspergillus niger* was determined in the laboratory scales. The sample was divided into 5 groups: cassava pulp: corncob ratio; T100:0 = 1, T0:100 = 2, T = 3 50:50, T70:30 = 4, and T30:70 = 5. Samples were stored at room temperature and mixed 3 times/d. The fermentation of T2, T3 and T5 had the same protein level (4.12, 4.10, and 4.10 g / 100 g, respectively). In experiment II, cassava pulp and corncob in the ratio of 30:70 was fermented in a 200 liter fermenter at 30°C for 7 d. The protein content increased to 4.96 g / 100 g compared to those fermentation in the lab scales. In conclusion, using cassava pulp and corncob fermented with *A. niger* strain would be a good protein source for animal diets.

**Keywords:** cassava pulp, corncob, solid state, protein, *Aspergillus niger*

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## Utilization of fresh cassava with ruzi grass fermented by microbes from Pangkhaomark as diets in swine

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### Abstract

Utilization of fresh cassava with ruzi grass fermented by microbes from Pangkhaomark as diets in swine. The objective of this experiment was conducted on two time interval consisting of growing and finishing pigs. The objective of this experiment was to investigate the supplementation effect of fresh cassava and ruzi grass fermented by Pangkhaomark on performance, production cost, digestion coefficient, carcass quality and blood urea nitrogen level of growing and finishing pigs. There were three diets in this experiments diet 1 normal pig diets diet 2 and 3 were prepared from fresh cassava and ruzi grass fermented by Pangkhaomark mixing with two different herbs )fermented diet 1, fermented 2, respectively(. Eighteen cross - bred pigs were )Large white X Landrace X peatrian( raised from  $24 \pm 1.8$  kg to  $100 \pm 3.8$  kg of body weight were assigned in Completely Randomized Design consisting of three treatments. group 1 , group 2 and group 3 pigs were fed on normal diet, diet 1 and diet 3, respectively. The results showed that growth rate at growing stage for group 1 , group 2 and group 3 were 680, 685 and 678 and while the data of finishing stage were 731, 735 and 726, respectively. There was no significant difference on FCR and feed intakes of all groups from 25 – 100 kg of body weight. Feed intakes of pigs were 1.99, 2.07 and 2.04 kg/day, respectively. Feeding costs per pig were 3,347, 3,204 and 3,153, respectively ( $P < 0.05$ ).

*Keywords: Cassava, Microbes from Pangkhaomark, Pig*

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## Utilization of *Samanea saman* pod meal as protein source in diet on voluntary feed intake and digestibility of goats

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### Abstract

The objective of this study was to investigate the utilization of *Samanea saman* pod meal as protein source in diet on voluntary feed intake and digestibility of goats. The experimental design were randomly assigned according to 4×4 Latin square design )LSD( and the dietary treatments were substitute of SBM by *saman* pod meal at 0% )T1 ,(30% )T2(, 60% )T3(, and 100% )T4(, respectively. The results revealed that voluntary feed intake and apparent digestibility of DM, OM, CP, NDF and ADF were not significantly difference among treatment when replacement soybean meal by *saman* pod meal up to 100%.Based on this study, it could be concluded that *saman* pod meal can use as protein sources in concentrate and can replace soybean meal up to 100% without negative effect on feed intake and digestibility of goat.

**Keywords:** soybean meal, *Samanea saman*, feed intake, digestibility

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**Digestibility and nitrogen balance of growing goats fed different  
*Mimosa pigra* (L.) meal levels**

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**Abstract**

The present study was conducted to evaluate the effects of different levels of *Mimosa pigra* (L.) as replacement protein source of soybean meal (SBM) in growing goat diets on apparent digestibility coefficients and nitrogen balance. Growing goats were randomly assigned to four dietary treatments according to replicate 4x4 Latin square design. Dietary treatments were 4 levels of replacement of SBM to *M. pigra* (L.) at 0, 33.3, 66.7 and 100 % of protein source of SBM. The results showed that digestibility of digestible dry matter (DDM) and digestible organic matter (DOM) of goats fed with *M. pigra* (L.) replacement of SBM were not significant difference ( $P>0.05$ ). Digestible crude protein (DCP) of goats fed with *M. pigra* (L.) replacement of SBM were significant difference ( $P<0.05$ ). Similarly, Nitrogen balance was not significantly varied for treatment. The data suggest that *M. pigra* (L.) replace up to 100% of SBM in goat diets.

*Keywords: Mimosa pigra (L.) meal, replacement, digestibility, Nitrogen balance*

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## Effects of banana stem supplemented on productive performance of finishing pigs

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### Abstract

The study of this experiment was to investigate the effect of supplementation banana stem in diets on average daily gain (ADG), feed conversion ratio (FCR), feed intake, and backfat thickness in growing to finishing pigs. Eighteen pigs cross bred with an average  $63 \pm 3$  kg were fed three experimental diets in a completely randomized design. The animals were randomly assigned to each sequence of feeding on the three dietary treatments. The dietary treatments were  $T_1$  = control diet,  $T_2$  = control diet + fresh banana stem and  $T_3$  = control diet+ fermented banana stem with molasses. The results found that the increased ADG, FCR and body weight gain were significantly difference ( $P < 0.05$ ) when used banana stem supplemented. Average daily feed intake and backfat thickness were not significantly difference ( $P > 0.05$ ) when used banana stem supplemented in diets. The findings reflected that fresh banana stem supplementation can be used as fed for growing to finishing pigs.

*Keywords: banana stem, finishing pigs, supplemented, ADG*

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## Effect of cultivation time on populations of yeast and lactic acid bacteria co-cultures in fermented milk

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### Abstract

The aim of this study was to study effects of cultivation time on populations of yeast and lactic acid bacteria co-cultures in fermented milk. This experiment was conducted according to a Completely Randomized Design (CRD) to study growth kinetics of yeast (*Saccharomyces cerevisiae*) and lactic acid bacteria (*Lactobacillus*) from difference cultivation time at 0, 4, 8, 24, 48, 72 and 96 h post-cultivation times. The results showed that pH of fermented milk was the highest ( $P<0.01$ ) at 0 h of cultivation (pH7.01) and the lowest ( $P<0.01$ ) at 96 h post-cultivation (pH 3.30). For temperature was ranged from 26.0 to 31.0 °C. Yeast populations were highest ( $P<0.05$ ) since 72 h-post (6.90 log cell/mL), while, lactic acid bacteria was highest since 48 h-post-cultivation (9.67 log cell/mL). In conclusion, co-cultures of yeast and lactic acid bacteria in fermented milk at 72 h were the highest of yeast and lactic acid bacteria populations (6.90 log cell/mL and 9.67 log cell/mL, respectively).

*Keyword: yeast, fermented milk, cultivation time, lactic acid bacteria, co-cultures*

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## Effect of dietary supplementation of bioceramic powders on production performance of broiler chickens

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### Abstract

This study was carried out to investigate the influence of bioceramic powders on production performance of broiler chickens. Eight, one day-old chickens with an average body weight of 46.5 g were allocated into two experimental groups (control and treatment) equally and housed individually. The broiler chickens in the control group were offered basal diet while the broiler chickens in the treatment group were offered basal diet supplemented with 0.10% bioceramic powders throughout 5 weeks of the present study. All chickens were offered experimental diets and drinking water *ad libitum* throughout the experimental duration. The body weight of the chickens and refusal feeds were weighed weekly for 5 weeks. Average daily gain (ADG) and Feed:Gain of the studied chickens were then calculated. The results have showed that the ADG of the chickens in the control group ( $42.93 \pm 0.83$  g/day) at period of week 1-3 was higher ( $P \leq 0.01$ ) than that in the treatment group ( $35.73 \pm 1.55$  g/day). However, the Feed:Gain of the chickens in the treatment group ( $1.16 \pm 0.05$ ) at week 1-3 was better ( $P \leq 0.01$ ) than that in the control group ( $1.37 \pm 0.07$ ). For ADG and Feed:Gain of the chickens at period of week 4-5 and overall (week 1-5), there were no significant differences ( $P > 0.05$ ) (between both studied groups). Hence, it could be concluded that supplementation of bioceramic powders in diet at 0.10% would improve feed utilization efficiency, but lower growth rate of broiler chickens at week 1-3 of age.

**Keywords:** bioceramic powders, production performance, dietary supplementation, broiler chickens

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## Effect of cutting Age and ensilage on chemical composition of Pak Chok1 and King Giant Napier grasses

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### Abstract

The current study was conducted to investigate the effect of cutting age and ensilage on chemical composition of Pak Chok1 napier and King giant napier grasses. These grasses were harvested at 30, 45 and 60 days after regrowth. The harvested grasses were made for silage, prepared and allowed to be fermented for 21 days at room temperature with 3 replications for each cutting age. Chemical compositions of each cutting age of fresh grasses and silages were quantified and physical quality (pH and % ammonia nitrogen) of silages was measured. The results have shown that there were no effects ( $P>0.05$ ) of cutting age and grass type on the contents of EE, NDF and ADF. The DM contents in both grasses harvested at 45 and 60 days after regrowth was higher ( $P\leq 0.05$ ) than those harvested at 30 days after regrowth. Both grasses had lowest value of CP contents at the cutting age of 45 days. The contents of OM, ash, EE, CP and NDF of both grass silages were mainly related to the nutrient composition to fresh form of the grasses. There were lowest value of pH and significant lowest of % ammonia nitrogen ( $P\leq 0.05$ ) at the cutting age of 45 days for both grass silages. Thus, there was small difference of nutrient composition between both grasses in fresh form, but the King giant napier silage seems to be better for making silage, and suitable cutting age for making silage of both grasses seem to be at 45 days.

**Keywords:** cutting age, ensilage, chemical composition, Pak Chok1 napier grass, King giant napier grass

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## Effects of levels of dried leucaena (*Leucaena leucocephala*) supplementation on nutritive value of milk in organic dairy cows

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### Abstract

The experiment was conducted to study the effects of dried leucaena (*Leucaena leucocephala*) supplementation at levels of 1.5 and 3.0 kg/h/d in organic dairy cows. The dairy cows receiving either non-urea (organic concentrate) and urea added (non-organic concentrate) based diets. Sixteen multiparous mid-lactating Holstein-Friesian 75% crossbred cows at an initial weight of 405±15 kg were randomly assigned to 4 treatments with 4 replications each in the randomized complete block design (RCBD). Four diets were given as follows: T1) Rice straw and organic concentrate T2) Rice straw + 1.5 kg/h/d leucaena + organic concentrate T3) Rice straw + 3 kg/h/d leucaena + organic concentrate T4) Rice straw and non-organic concentrate. The results revealed that there was significantly difference milk yield among the four treatment group ( $P < 0.05$ ). T2 group provided the highest milk yield at 11.46 kg/hd/d. Dairy cows in T3 group produced the highest milk compositions containing fat (4.52 %) protein (3.51%) SNF (9.60%) Omega3 (0.0065 mg/g) Omega6 (0.081 mg/g) Omega9 (1.272 mg/g). There were no differences in vitamin A (29-30 mg/100ml). In contrast dairy cows in T4 was lower on nutritive value of milk.

*Keyword: leucaena, rice straw, milk, organic concentrate, non- organic concentrate, dairy cow*

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## Metabolic imprinting improves rumen development via modulation of epigenetic gene expression including histone modification

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### Abstract

This study was conducted to investigate the effect of 2 mo. administration of high energy diet on epigenetic gene expression in Hanwoo calves. Twenty Hanwoo calves (7~10 d old) were randomly assigned into 4 different treatments (5 calves per treatment, all male) including control (cow-feeding), milk replacer + concentrate (T1), milk replacer + concentrate + forage (T2) and milk replacer + concentrate + 30% starch (T3). Concentrate diets were fed as pellets in addition to a commercial milk replacer and starch (T3) was added into pellets. Body weight and feed intake were measured and blood was sampled every 2 weeks. After an 10 weeks feeding period, the calves were euthanized and loin muscle tissue from the 10<sup>th</sup> and 11<sup>th</sup> rib junction was sampled for comparative analysis of gene expression using RNA-Seq. Differentially expressed genes (DEGs) for control versus T1, T2 and T3 were 4, 39 and 13, respectively. There were 4 DEGs between T2 and T3. DAVID functional analysis revealed muscle growth and development, glycogen metabolic process and regulation of metal ion transport as the enriched biological processes in T3 compared to control group. Interestingly, expression of ACAT1 was greatest in T2 and BPIFA1 was highest in T3 along treatment groups, suggesting that supplementation of concentrate diet or high energy diets (30% starch) induce epigenetic alterations which may substantially enhance the gene expressions related to energy metabolism and development of epithelial tissue development of rumen. In conclusion, high energy diet during early stage of development may have a positive effect on rumen development in Hanwoo calves.

*Keywords: epigenetic, imprinting, Hanwoo*

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## Potassium iodate supplementation in layer drinking water for iodine enriched egg and laying performance

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### Abstract

This study was aimed to investigate the effects of supplementation potassium iodate in water on layer performance, egg quality, iodine content in egg. Two hundred and sixteen commercial laying hens were divided into 2 groups and subjected to the following treatments: (i) control; (ii) water supplemented with potassium iodate containing 4 ppm of iodine. Each treatment was consisted of 9 replicates with 12 laying hens per replicate. The results have shown that there were no significant difference in layer performance, haugh unit, egg shell thickness, color of egg yolk, and egg specific gravity throughout the period of experiment ( $p>0.05$ ). Iodine content were 80.86  $\mu\text{g}/\text{egg}$  in potassium iodate supplemented in water treatment.

*Keywords: iodine, potassium iodate, layer*

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## **Efficacy of dry powdered *Enterococcus italicus* on immune responses to *Mycoplasma hyopneumoniae* vaccination**

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### **Abstract**

*Enterococcus italicus* is a kind of effective probiotics, which selected to be transformed into an easy dry powdered product. The objective of this study was to evaluate the safety and efficacy of the dry powdered probiotics in enhancing immune responses to *Mycoplasma hyopneumoniae* vaccination. In terms of study methods, firstly the dry powdered probiotics were prepared by mixing the probiotics with methylcellulose and steam broken-milled rice. The mixture was dehydrated at 45°C during 3 days and then mixed with swine commercial feed to get the final concentration of  $10^6$  cfu/g. Subsequently, 12 – twenty-one day old - mixed sex pigs were allocated into 2 groups, with 3 replications for each group and 2 pigs per replication. A completely randomized design (CRD) was used for all experiments. The pigs were fed *ad libitum*. During a month, the pig in the first group received commercial feed, whereas the pigs in the second group were offered commercial feed supplemented with dry powdered *Enterococcus italicus*. Mortality data were collected, and all studied pigs were vaccinated against *Mycoplasma hyopneumoniae* twice at age 45 and 59 day-old. A blood test was done in order to indicate immunity level against the disease. It appeared that no studied pig was found dead and the immunity level of the pigs receiving feed supplemented with probiotics was higher ( $P < 0.001$ ) than those receiving feed without probiotics at seven days after the second vaccination. In conclusion, the pigs receiving feed supplemented with dry powdered *Enterococcus italicus* has the highest immunity level at seven days after the second vaccination.

*Keywords: Enterococcus italicus, immune responses, Mycoplasma hyopneumoniae*

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## Characterization of nitrate-reducing and presumptive-acidogenic bacteria from nitro toxin enriched equine cecal populations

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### Abstract

The nitro toxins 3-nitro-1-propionic acid (NPA) and 3-nitro-1-propanol (NPOH) are produced by a wide variety of leguminous plants, including over 150 different species and varieties of *Astragalus* potentially grazed by livestock. These toxins are known to be detoxified by at least one ruminal bacterium but detoxification by bacteria from other gut habitats is not known. The horse, like other monogastric animals containing pancreatic esterase activity, is recognized to be at risk to nitro-toxin poisoning by plants containing NPA-esters or ether glycosides of NPOH. The latter because the horse contains sufficient fermentative capacity within its cecum able to liberate NPOH from its glycoside where it can yet be absorbed. Results from a previous study provided new evidence that equine cecal populations contained NPA- and NPOH- metabolizing microbes, albeit at low numbers. In the present study, populations of equine cecal microbes enriched for enhanced rates of NPA or nitrate metabolism were diluted and cultured for NPA-metabolizing bacteria on the basal enrichment medium (BEM) or TSA medium supplemented with either 5 mM NPA or nitrate and under H<sub>2</sub>:CO<sub>2</sub> (20:80) as the energy source. After 72 h, separated colonies picked from plates or roll tubes were inoculated to fresh broth medium and again cultured 72 h culture after which their DNA was extracted and subjected to 16S rRNA sequence analysis. Eight strains isolated from the NPA enriched populations were identified as *Streptococcus lutetiensis* (5 strains), *Escherichia coli* (2 strains) and *Sporanaerobacter acetogens* (1 strain) respectively; and four strains isolated from nitrate enriched populations were identified as *Escherichia coli* (1 strain) and *Wolinella succinogenes* (3 strains) respectively. However, none of the above pure strains degraded NPA. The PCR products of total DNA from NPA or nitrate enriched populations of equine cecal microbes and the isolated equine cecal pure strains as well as the strain of *Denitrobacterium. detoxificans*, which is a pure NPA-metablizing microbe from bovine rumen, were examined by using denaturing gradient gel eletrophoresis (DGGE). The DGGE analysis indicated that there was no strain in the equine cecal microbes which was similar to the known strain of *D. detoxificans*. However, we report for the first time the isolation of the anaerobic acetogen, *Sporanaerobacter acetogens*, from the equine cecum.

**Keywords:** equine, nitro-toxin metabolism, DGGE, *Sporanaerobacter acetogens*

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**Feeding standard for Hanwoo cattle: past, present and future**

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**Abstract**

Since 1983, studies on feeding standard for Korean native Hanwoo cattle have been conducted. Initially, feeding standards for Hanwoo heifers and bulls were studied before 2000. Since the early 2000's, studies on feeding standard of Hanwoo steers have been concentrated due to increased demand for Hanwoo steers in Korean beef industry. To estimate energy requirements for maintenance, Hanwoo steers were fed diets with three different levels of energy. Energy requirement for maintenance of Hanwoo steers has been estimated as  $124.3 \text{ kcal/BW}^{0.75}$ . Also, Hanwoo steers were fed diets with three different levels of crude protein to estimate crude protein requirements for maintenance. Crude protein requirement for maintenance of Hanwoo steers has been estimated as  $5.56 \text{ g/BW}^{0.75}$ . Currently, we are conducting studies to update feeding standard for Hanwoo heifers. In future studies, repetitive large-scale experiments would need to be performed to determine more accurate feeding standard for Hanwoo cattle.

*Keywords: energy, feeding standard, Hanwoo cattle, protein*

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**Estimation of the TDN of spent mushroom substrates used as Hanwoo feed**

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**Abstract**

Recently, there has been a growing interest in the use of spent mushroom substrate as Hanwoo feed due to their low cost. Before its use as Hanwoo feed, measurement of TDN is necessary to evaluate the feed value of spent mushroom substrate. An *in vivo* experiment is commonly used to estimate TDN but needs a lot of time and cost. The objective of this study was to find an alternative method to replace a TDN estimation method based on an *in vivo* experiment. As alternative methods, both an *in situ* experiment and the NRC 2001 model were used to estimate TDN of spent mushroom substrate of *Flammulina velutipes* and spent mushroom substrate of *Pleurotus ostreatus*. TDN estimated by these two methods was comparatively assessed against TDN estimated by an *in vivo* experiment. Results indicated that the NRC2001 model may be an alternative method to estimate TDN of spent mushroom substrate instead of an *in vivo* experiment. More studies with other feed ingredients would need to be conducted to revise and verify these alternative methods for TDN estimation.

*Keywords: Hanwoo, in situ, TDN, NRC, spent mushroom substrates*

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**Feed intake, nutrient digestibility and rumen parameters in goats as affected by mao (*Antidesma thwaitesianum* Muell. Arg.) seed meal supplementation**

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**Abstract**

The objective of this experiment was to evaluate the effect of mao (*Antidesma thwaitesianum* Muell. Arg.) seed meal (MSM) on feed intake, digestibility and rumen parameters in goats were fed at 0, 0.8, 1.6 and 2.4% of dry matter intake (DMI). Four female crossbred goats with initial body weight (BW) 20±2 kg were randomly assigned to a 4×4 Latin square design. Animals were fed with a roughage to concentrate ratio (R:C) of 60:40 and pangola grass hay was used as a roughage source. It was found that supplementation of mao seed had no effect on DMI and apparent digestibility when compared with the control (P>0.05). Moreover, ruminal pH and NH<sub>3</sub>-N was not altered among all treatments (P>0.05), whereas BUN were found to be decreased (P<0.05) by MSM supplementation at 2.4% DMI. In conclusion, MSM supplementation at 2.4% DMI exhibited no negative on feed intake, digestibility of nutrients and rumen parameters in goats.

*Keywords: mao seed meal, feed intake, digestibility, rumen parameters, goats*

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## Effects of spineless cactus feeding on milk production, milk quality and antioxidant capacity in dairy goat

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### Abstract

This study evaluated the effects of spineless cactus feeding on milk production, milk quality and antioxidant capacity in dairy goats. Four Japanese Saanen lactating goats (70.9±7.1 kg body weight at the beginning of experiment, 106.5±39.7 days of lactation and 2.3±1.1 parity) were divided by two groups and fed a nutrient required feed with or without a 200 g dry matter (DM) substitution of spineless cactus for barley. One experimental term has fourteen days with ten-day adaptation period and four-day trial period. The experiment was conducted using a cross-over design. Diet was fed at 9:00 hours and 16:00 hours every day. The amount of refused feed was recorded at 9:00 hours during the trial period. Bodyweight of goats was recorded before the morning feeding on the first and the final day of each experimental term. Milk yield was measured at 16:00 hours every day in the trial period. Blood of goats was collected from jugular vein on the final day of each experimental term and plasma was collected. Feed intake, bodyweight and milk yield were not decreased by the substitution of spineless cactus. The contents of protein and antimicrobial substances (lactoferrin and S100A7) in milk, calcium (Ca) and urea nitrogen concentrations in plasma showed higher mean values with the spineless cactus substitution than without the substitution. On the other hand, the cactus feeding showed lower mean values of milk fat, plasma inorganic phosphorus (IP) and plasma total cholesterol (T-CHO) than the control feeding. The degree of oxidative stress and antioxidant capacity did not show the significant differences between the groups. The 200 g DM substitution of spineless cactus for barley did not affect to milk production and antioxidant capacity of dairy goats. However, the feeding of the cactus to goats has possibilities to promote protein metabolism and increase the contents of antibacterial factors in milk.

*Keywords: antioxidant capacity, goat, milk production, milk quality, spineless cactus*

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### **Effect of high choline levels supplementation on phosphatidylcholine concentration in egg yolk of laying hen**

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#### **Abstract**

Eight hundred and forty 44-week-old Isa brown layers were randomly allocated to receive 5 treatment diets with 6 replications each. Treatment diets consisted of choline supplementation at the level of 0, 1000, 1500, 2000 and 2500 mg/kg diet. Birds were raised throughout the 6 weeks of experimental period. Productive performance, egg quality and phosphatidylcholine in yolk, yolk PC, were investigated. There were no significant differences among treatment groups on productive performance and egg quality, except eggshell strength, that was improved at choline level 1000 mg/kg diet group. Yolk PC concentration in choline supplemented groups were higher than control group significantly and the highest was at 1,500 mg/kg diet. In conclusion, the highest level of choline supplementation for synthesizing highest yolk PC concentration was 1,500 mg/kg diet and without any adverse effect on productive performance and egg quality.

*Keywords: choline, performance, egg quality, phosphatidylcholine*

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## Effects of CNCPS fraction-enriched protein feeds on ruminal fermentation in Holstein Steers fed TMR containing low protein as a basal

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### Abstract

Four ruminally cannulated Holstein steers (BW 401.0 ± 2.22 kg) fed TMR containing low protein (CP 11%) as a basal were used to investigate the effects of cornell net carbohydrates and protein system (CNCPS) fraction enriched protein feeds on rumen fermentation. The steers used in a 4 × 4 Latin square design were housed under the condition of temperature humidity index (THI) 71.46 (no stress, 24°C and 60%) during the entire trial. Dietary treatments were control (TMR only), AB1 (TMR + rapeseed meal), B2 (TMR + soybean meal) and B3C (TMR + perilla meal), respectively. Ruminal digesta was sampled through ruminal cannula at 1 h-interval after the afternoon feeding. The digesta was filtered using 8 layers of cheesecloth and measured for ruminal pH, ammonia-N and volatile fatty acids (VFA). Different CNCPS fraction-enriched proteins did not affect ( $P > 0.05$ ) ruminal pH except B3C being numerically low compared with the other groups. It may be derived from relatively high B<sub>3</sub> and C fractionation of perilla meal. Ammonia-N and VFA were not significantly ( $P > 0.05$ ) different among the experimental groups. Numerically low ammonia-N appeared in the steers fed rapeseed meal even though it contained high soluble N composition (A and B<sub>1</sub> fractions). The discrepancy is unclear; however this may be related to low protein level in the diet and/or low DM intake. Further studies on several *in vivo* trials including different dietary protein and investigation of blood metabolites should be required.

**Keywords:** cornell net carbohydrates and protein system, fraction, ruminal fermentation

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**Effects of synbiotic supplemented in broiler diet on carcass and meat quality**

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**Abstract**

This study was conducted to investigate the effect of synbiotic supplementation in broiler diets on carcass and meat quality. Jerusalem artichoke and BACTOSAC-P<sup>®</sup> were used as the source of prebiotic and probiotic, respectively. Three hundred and twenty Ross-308 chickens with 10 days old of age were randomly allocated to four dietary treatments (T); control diet (T1), synbiotic supplemented at 0.025% of DM (T2), 0.050% of DM (T3) and 0.075% of DM (T4) in broiler diet according to a completely randomized design (CRD) with 4 replicates (20 chickens per replicate). Carcass and meat qualities were determined at the day 32 of experimental period. The results were showed that supplementation of all three supplements did not effected on carcass and meat quality. The results indicated that supplementation with synbiotic in broiler diet did not result in changes in performance of birds. However, synbiotic might provide a more beneficial immune modulation status as we are observed in the laboratory.

*Keywords: Broiler, Synbiotic, Carcass quality and Meat quality.*

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**Effect of nitrate addition to cassava chip on *in vitro* gas production**

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**Abstract**

The objective of this study was to determine the effect of nitrate addition to cassava meal and cassava chip on total gas production and mitigation of methane (CH<sub>4</sub>) using a gas production technique. The experimental design was completely randomized design (CRD) with seven replication per treatment. The six dietary treatments consisted cassava meal (T1), cassava chip (T2), cassava meal + nitrate (1:1 vol/vol) (T3), cassava chip + nitrate (1:1 vol/vol) (T4), cassava meal + nitrate (extrusion, T5) and cassava chip + nitrate (extrusion, T6). The total gas produced were recorded at 1, 2, 3, 4, 6, 8, 12 and 24 h of incubation time and the CH<sub>4</sub> was collected at 24 h of incubation time. It was found that cumulative volume of gas production increased with increasing time of incubation gas produced after 24 h incubation ranged between 0.7 and 44.73 ml per 200mg of dry matter. In addition, the CH<sub>4</sub> was increased by T1 and T2 compared with other treatments which nitrate addition. Additional research is necessary to evaluate more effective means of reducing methane with a slow release nitrate (extrusion) in goat diets.

*Keywords: nitrate, methane, slow release*

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## Effects of TDN value in TMR on ruminal fermentation characteristics and effective dry matter degradability by rumen microbes

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### Abstract

An *in vitro* trial was conducted to examine the effects of total mixed rations (TMR) on fermentation characteristics and effective degradability (ED) by rumen microbes. Three TMR diets were growing period TMR (GR-TMR, 67% TDN), early fattening period TMR (EF-TMR, 75.4% TDN) and late fattening TMR (LF-TMR, 80% TDN). Three TMR diets (3g of TMRs in each incubation bottles) was added to the mixed culture solution of stained rumen fluid with artificial saliva (1:1, v/v) and incubated anaerobically for 48 hours at 39°C. The pH in all incubation solutions tended to decrease up to 48h, but the opposite results were found in concentration of total gas production, ammonia-N and total VFA in all incubations. The total gas production ( $P < 0.05$ ) in LF-TMR was highest compared with those of other diets. Also, concentration of total VFA was tended to increase in LF-TMR compared with other TMR diets in all incubations. The EDDM in both EF-TMR and LF-TMR was tended to high compared with GR-TMR ( $P = 0.100$ ). In this *in vitro* trials, concentration of propionate in all incubation solution was not affected by increased concentration of TDN. The results of the present *in vitro* study indicate that TMR may provide more favorable condition for nutrient digestion both in the rumen.

**Keywords:** TMR, rumen fermentation, ruminal degradation



### Performance of Lohi sheep and Beetal goats fed various fodders

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#### Abstract

A study was conducted to compare the performance of Lohi sheep and Beetal goats fed [Maize (*Zea mays*), Sorghum (*Sorghum bicolor*) and Millet (*Pennisetum americanum*)] fodders. A total of 90 animals [female Lohi sheep (n=45) and Beetal goats (n=45)] were randomly selected and divided equally in six groups (n= 15) animals per groups having three replicates under 2×3 factorial arrangement. Three fodders (maize, millet and sorghum) were randomly fed to the respective replicates in both species. Dry matter (DM), crude protein (CP), NDF and ADF intake was similar (P>0.05) among both species. Results Demonstrate that average daily weight gain feed efficiency and cost of production were similar (P>0.05) among both species.

*Keywords: summer fodders, sheep, goats and growth performance.*

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**Feed intake and nutrient digestibility in goats of silages prepared from Stylo legume (*Stylosanthes guianensis* CIAT184) treated with dried mao pomaces (DMP) and lactic acid bacteria**

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**Abstract**

The aim of this study was to investigate the effect of applying dried mao pomaces (DMP) alone and combined with LAB on the fermentative quality and nutritive value of Thapra Stylo legume silages. Silages were untreated (control) or prepared with DMP, or DMP plus FJLB (DMP+FJLB), or DMP plus *Lactobacillus plantarum* ST1 (DMP+Lp). DMP was applied at 100 g/kg of fresh matter (FM). FJLB and Lp were applied at log 6.03 and 5.58 cfu/g FM, respectively. Four male ruminally fistulated crossbred Boer x Saanen goats (~ 16 kg body weight) were randomly assigned to one of the four dietary treatment silages in a 4 x 4 Latin square design. The 28-d experimental period consisted of a 21-d feed intake and 7 d of sampling. All goats were received concentrate at 1.5% of body weight (BW) and *ad libitum* silage.

Dry matter content of silage was increased with addition of DMP portion. Without any additives, the silage showed the highest pH value. The NH<sub>3</sub>-N contents of DMP silages was lower ( $P < 0.01$ ) compared with the control silages, but did not appear to be significantly different from the combined silages. Silage intake tended to be higher in goats fed with DMP silages. However, no significant differences ( $P > 0.05$ ) of nutrient digestibility were observed in goats fed silages.

*Keywords: dried mao pomaces, ThapraStylo, silage, goat*

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## Study on rumen ecology of swamp buffaloes as affected by urea as protein source in concentrate mixture fed on rice straw based

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### Abstract

This study was investigated on rumen ecology adaptation of urea uptake of swamp buffaloes fed rice straw based. Four, Thai – rumen fistulated swamp buffaloes male (*Bubalus bubalis*), about 5 years old with 390±18 kg liveweight, were randomly selected and fed with rice straw *ad libitum* plus concentrate mixture containing 0% urea at 0.5% BW supplemented for a period of two weeks. Following adaptation to diet, all buffaloes were shifted to a step-up diet regimen by supplementation of concentrate mixture containing 2% and 4% urea at 0.5% BW for a period of four weeks each. The result shows that ruminal pH and temperature were not affected by urea uptake. However, feed intake were increased dramatically. Data from real-time PCR showed that total bacteria and three dominant cellulolytic bacteria (*R. albus*, *F. succinogenes*, *R. flavefaciens*) were increased with urea uptake. However, within four weeks of urea uptake, buffaloes could adapt well and utilized urea as N source and result showed clearly in the buffaloes consumed urea at 4%. Based on this study, we could concluded that swamp buffaloes could adapt well with urea after two weeks uptake period with increasing feed intake without affecting rumen ecology. Moreover, urea supplement at 4% could increase microbial growth in swamp buffaloes at 4 weeks uptake adaptation period.

*Keywords: swamp buffaloes, urea, rice straw, rumen ecology*

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## Effect of rice straw treat menton feed intake and nutrient digestibility in swamp buffaloes

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### Abstract

The objective of this experiment was to evaluate the effect of rice straw treatment (RST) on feed intake and nutrient digestibility in swamp buffaloes. Four rumen fistulated male swamp buffaloes with  $330 \pm 20$  kg live weight were randomly assigned according to a  $4 \times 4$  Latin square design to receive four dietary treatments and were as follows; T1=untreated rice straw, T2=1%urea treated rice straw, T3= 1%urea+1%cassava chip powder treated rice straw, and T4= 1%urea +1%cassava chip powder +0.1%yeast treated rice straw. All animals were fed concentrate mixtures at 0.2% of body weight and rice straw was fed *ad libitum* for 21 days with the first 14 days were for feed adaptation and voluntary feed intake measurement, while the last 7 days were for samples collection. The results revealed that nutritive values of rice straw were increased by urea and yeast treatment. Moreover, feed intake and nutrient digestibility of swamp buffaloes were increased in buffaloes consuming treated rice straw especially with 1%urea + 1% cassava chip powder +0.1%yeast treatment (T4). Based on this study, it could be concluded that rice straw treatment with urea plus cassava chip powder and yeast could improve nutritive value and enhanced feed intake and nutrient digestibility of swamp buffaloes.

*Keywords: rice straw, intake, digestibility, swamp buffaloes*

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## Effect of Nitrate Slow Release on Rumen Fermentation in Goats

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### Abstract

This experiment studied on the effect of different level of nitrate binding cassava flour (NBC) on feed intake, nutrient digestibility and rumen fermentation. Sixteen male crossbred Anglonubian x Native goats were used in 4x4 Latin square design with 21-d period and there were four treatments of NBC at 0, 1, 2 and 3% in concentrate. The results revealed that feed intake was 846.00, 913.23, 887.07 and 879.28gDM/d ( $p>0.05$ ) and %BW was 2.96, 2.81, 4.83 and 3.24 respectively and differently among treatment. Organic matter and crude protein digestibility, metabolizable energy and microbial crude protein were no significantly ( $p>0.05$ ). Rumen fermentation parameters were measured at 0, 3 and 6 h-post feeding for pH and  $\text{NH}_3\text{-N}$ . Ruminant pH was significantly difference among treatments at 3 and 6 hr post morning feeding but no effect to ammonia nitrogen in the rumen. The present results indicate that NSR can substitute imported feedstuff concentrate (e.g. soybean meal) as protein supplement for goat production.

*Keywords: Nitrate, Slow release and Rumen fermentation*

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## Effects of condensed tannins of some tropical plants on ruminal gas production *in vitro*

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### Abstract

The objectives of this study was to investigate the effect of condensed tannins (CTs) in some tropical plants species on *in vitro* ruminal gas production. Three plant species, include leucaena (*Leucaena leucocephala*) (LN), cassava (*Manihot esculenta*, Cranzt) (CV), and Siam neem (*Azadirachta indica* A. Juss. var. *siamensis* Valetton) (SN) (CTs contained at 2.9, 1.2 and 5.0 % of DM, respectively) were selected to use in this study. Plant species had effect on *in vitro* gas kinetic parameters and gas productions ( $P<0.01$ ). However, only high concentration of CTs in SN (5.0% of DM) showed the inhibitory effect on the insoluble fractions and methane production at 48 h of incubation. The results suggested that various plant species contained different concentration of CTs had different effect on *in vitro* gas and methane production, however, others factors affected on biological properties of CTs, such as molecular weight and structure should be further investigated.

**Keywords:** *phenolic compound, secondary metabolites, rumen, polyethylene glycol.*

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## **Dietary fat sources on growth performance and body composition in broiler chickens**

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### **Abstract**

This study was aimed dietary beef tallow, soybean oil and krabok oil on growth performance and chemical carcass composition. Growth performance was significantly improved ( $P < 0.05$ ) by krabok oil (final body weight, average daily gain and feed conversion ratio). The diets containing soybean oil showed a significantly higher ( $P < 0.01$ ) protein and ash content in the whole body. In contrast, fat content in whole carcass was reduced ( $P < 0.01$ ). The results can indicated that krabok oil can be used as energy source of broiler chickens without a negative effect on growth performance.

*Keywords: beef tallow, soybean oil, krabok oil, growth performance, body composition*

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## Comparison of aquaporin-1 (AQP1) expression between yak (*Bos grunniens*) and cattle (*Bos taurus*) in the Qinghai-Tibetan Plateau

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### Abstract

Aquaporins (AQPs) are a large family of integral membrane proteins that facilitate the transport of water through the biomembranes. AQP1, one of the thirteen AQPs identified in mammals, is distributed in various tissues and organs, and plays an important role in body water homeostasis. The objectives of this study were to identify the expression of aquaporins-1 (AQP1) in the kidney, rumen and parotid gland of yaks, and to quantify whether the protein abundance of AQP1 were species specific between yak (*Bos grunniens*) and indigenous cattle (*Bos taurus*). Three 3-year-old castrated males of each of three genotypes were used: yak, indigenous cattle and their crossbred (*Bos taurus*♂×*Bos grunniens*♀), which were grazed in the same autumn pasture of the Qinghai-Tibetan Plateau, China. Western blot results showed that (i) 28 kDa unglycosylated AQP1 were all detected in the kidney, rumen and parotid gland in three species; 40~55 and 40~70 kDa glycosylated AQP1 were found in renal cortex and medulla, respectively. (ii) Compared with cattle, yak expressed less 28 kDa AQP1 in the renal cortex ( $P<0.01$ ) and slightly more in the ventral rumen ( $P=0.088$ ). No difference was observed in the renal medulla, dorsal rumen and parotid gland ( $P>0.10$ ). In conclusion, we first confirmed the presence of AQP1 in bovine rumen and parotid gland and identified the expression of AQP1 in yaks. The different abundance of AQP1 in the renal cortex and ventral rumen between yaks and cattle indicated that yak might have a relatively low water metabolism rate and high urine concentrating capacity as an adaptation to the harsh environment in the Qinghai-Tibetan Plateau.

**Keywords:** aquaporin-1 (AQP-1), yak, bovine kidney, rumen, bovine parotid gland

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## **Productive performance and production cost of different cross bred meat goats fed high levels of OPL fermented TMR**

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### **Abstract**

The objectives of this experiment was to determine the utilisation of oil palm leaflets (OPL) as roughage sources in total mixed ration (TMR) on feed intake, digestibility and rumen parameters productive performance of three crossbred meat goats. Eighteen of crossbred goats (T1= native, T2= native x Anglo Nubian, and T3= native x Beor) males with a mean age of 8-9 months and average weight of  $20 \pm 3.8$  kg were used. Six goats per treatment were allocated to the individual cages in completely randomized design. As main roughages, 70% OPL was prepared for TMR in 120 L plastic container and later used for three animal treatments. Each animal was kept individual crate, fed dietary treatment as *ad libitum*, and clean water were offered throughout the experiment. The result in this experiment showed that DM intake and CP intake were significantly higher in T3 animal group than those for T1 and T2. The tested animals had similar increasingly growing pattern. And average daily gain was in the range 63.6 to 86.1 g/h/d. Production cost had showed not profitable especially in the native group (T1). Based on this study, it can be concluded that fermented TMR containing chopped OPL is compromising roughage source for alternative meat goat production. Crossbred of native and Boer goats are perform better to the diets for growing and production cost effectively

*Keywords: Oil plam leaflets Total mixed ratio, Productive performance, Meat goat*

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## Effect of different Chinese herbs on antioxidant capacity and immune function in Sansui laying duck

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### Abstract

The aim of the experiment was to study the effect of different Chinese herbal additives on immune function, antioxidant capacity and serum biochemical indexes in Sansui laying duck. Two kinds of Chinese medicine Herbal powders Herb I and Herb II were applied in this study. 300 Sansui laying ducks at 1 day of age were randomly divided into five groups, each group consisted of three replicates and each replicate had 20 ducks. The control group of ducks were received a basal diet (BD) without any feed additive, the experimental group I was fed BD added 1% of Herb I, the experimental group II was fed BD added 1.5% of Herb I, the experimental group III was fed BD added 1% of Herb II, and the experimental group IV was fed BD with 1.5% of Herb II.

The experimental duration was 120 days and rearing environment for all groups were completely the same. The results showed that the contents of serum GsH-Px of group I, group II were significantly higher than control group ( $P < 0.05$ ), group III, and group IV increased slightly, but the no significance ( $P > 0.05$ ). The serum SOD levels for all groups were significantly higher than control group ( $P < 0.05$ ). It could significantly reduce concentration of malondialdehyde (MDA) in blood while adding Chinese medicine herbs ( $P < 0.05$ ). Compared to the control group, the serum IgA levels of group II, III, IV had significantly increased by 10.41%, 8.75%, 9.71% ( $P < 0.05$ ), respectively. No significance was detected in group I ( $P < 0.05$ ). The serum IgG contents for group I, II, III, IV were greater than control ( $P < 0.05$ ), The serum IgM contents of the group II, III were significantly increased ( $P < 0.05$ ). The serum total protein (TP) contents for group IV and group II were higher than control ( $P < 0.05$ ). ALB levels of all groups were higher than the control group ( $P < 0.05$ ). Group II was the highest. Suggesting that Chinese medicine herbs can improve the antioxidant capacity and immune function in Sansui laying duck.

**Keywords:** Chinese herbal medicine, Sansui duck, Antioxidant index, Immune parameters

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### **Evaluation of nutrient digestibility of mixed cassava pulp and Napier Pakchong grass for use as an alternative feedstuff in laying hens**

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#### **Abstract**

This study was conducted to investigate the effects of using mixed cassava pulp and Napier Pakchong grass as feed substitution in laying hen diets on nutrient digestibility and retention. A total of 40 laying hens (Isa brown), 34 weeks of age, were randomly distributed to 5 dietary treatments: one control and 4 mixed cassava pulp and Napier Pakchong grass as 80:20 ratio at levels of 5, 10, 15 and 20% through 10 days. The excreta were total collection at the last 4 days of experimental period, sprayed with 5% HCl and dried at 60 °C for 2 days. The results showed that all mixed cassava pulp and Napier Pakchong substitution levels had no negative effects on dry matter and organic matter digestibilities and nitrogen retention. In conclusion, it indicates that the mixed cassava pulp and Napier Pakchong can be used in laying hen diets up to 20% without showing negative effects on nutrient digestibility and retention.

*Keywords: cassava pulp, laying hen, Napier Pakchong, nutrient digestibility*

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## Effects of microorganism and ambient temperature on the quality of fermented soybean meal

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### Abstract

Two *in vitro* experiments were designed to obtain the appropriate conditions for fermentation of soybean meal. Experiment 1 consisted of 8 treatments from combinations of two levels each of three microorganisms (*Bacillus subtilis*, *Saccharomyces cerevisiae* and *Bacillus lactis*) with 3 replicates in each treatment. Fermentation broth was mixed soybean meal in 18 L bucket incubated under normal room temperature for 10 days. Results of Experiment 1 showed that weight loss of the fermented soybean meal occurred mainly during day 3 to day 8 which ranged from 3.70 to 5.47 %. The protease inhibitor activity in treatment with 20 g *B. subtilis* was significantly lower than those of 10 g *B. subtilis* treatments ( $P < 0.05$ ). Based on the results of Experiment 1, the higher level of the three microorganisms (treatment number 8) was selected as it had the highest content of small peptides, and incubated with soybean meal in 3 L beaker at 25, 30 and 35°C for 7 days in Experiment 2. In Experiment 2, total weight loss was 7.66, 9.12 and 10.20% and crude protein content increased by 3.35, 3.70 and 4.29%, respectively, for the 25, 30 and 35°C, while the protease inhibitor activity of the fermented soybean meal declined by 93.30, 94.46 and 94.40% from day 0 to day 5. The quantity of *Filamentous fungi* increased rapidly after day 5 in the 25 and 30°C, treatments but the increase only after day 6 for the 35°C treatment. In addition, the population of *Filamentous fungi* was lowest for the 35°C treatment. Results of our study suggested that treatment at 35°C was most beneficial to improve the quality of fermented soybean meal.

**Keywords:** fermented soybean meal, *Bacillus subtilis*, *Saccharomyces cerevisiae*, *Bacillus lactis*, fermentation duration and temperature

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## Effect of extraction methods for krabok oil on milk production, compositions and fatty acids in milk of dairy cows

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### Abstract

The objective of this experiment was to study the effect of method of oil extraction of krabok seed on nutrient digestibility, milk production and milk composition of dairy cows. Fifteen lactating Holstein-Friesian x Thai native crossbred dairy cows, with an initial milk production ranging from 10 to 15 kg/day, were used. The experiment had a randomized block design that lasted for 90 days. Cows were blocked by bloodline (HF>75% and HF<75%) and within each block cows were randomly assigned to three dietary treatments; i.e. a total mixed ration (TMR) supplemented with fresh krabok seed meal (KSM) or TMR supplemented with krabok oil (4%) obtained by means of either a cold (C-KO) or hot (H-KO) extraction method. All cows were fed *ad libitum* and the animals had free access to water.

Dry matter intake (DMI) was significantly affected by dietary treatment and was found to be 12.3, 16.2 and 9.6 kg/day after the feeding of KSM, C-KO and H-KO, respectively. The digestibility was significantly different on either extract 85, 86 and 76 percentages of KSM, H-KO and C-KO respectively. Statistically significant differences in milk production (kg FCM/day) were not found, but the difference in milk production between C-KO and H-KO tended to be significant ( $P=0.090$ ). Likewise, feed efficiency (kg FCM/kg DMI) tended ( $P=0.081$ ) to be influenced by dietary treatment and was found to be 0.96, 1.00 and 0.65 after the feeding of KSM, C-KO and H-KO, respectively. Milk composition was not affected by dietary treatments and for the three dietary treatments combined values were 4.48, 2.11, 7.49 and 12.0 for the percentages of fat, protein, solids-non fat and total solids, respectively.

It is concluded there were no differences on method of oil extraction of krabok seed. So suggestion of this study for the farmer that they can use krabok seed meal supplement diet fat to the cows.

*Keywords: Dairy cows, krabok oil, fat extraction, milk production*

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## Effect of substitution of soybean meal by dried tomato pomace on feed intake and productive performance in beef cattle fed urea treated rice straw as main roughage source

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### Abstract

Twenty four crossbred Brahman steers were used in a Randomized Complete Block Design (RCBD). Treatments were level of substitution of soybean meal (SBM) by dried tomato pomace (DTP) at 0, 25, 50 and 100% in concentrate diets. All animals were received concentrate diet at 2.0%BW and urea treated rice straw (UTRS) was fully supplied. The experiment lasted for 150 days. At the end of experiment, UTRS intake was 1.33, 1.40, 1.50 and 1.61%BW in substitution of SBM by DTP at 0, 25, 50 and 100% in concentrate diets, respectively ( $P<0.05$ ). Concentration of blood urea nitrogen (BUN) in day 0 of experiment was 10.22, 13.18, 13.34 and 13.46 mg% BW in substitution of SBM by DTP at 0, 25, 50 and 100% in concentrate diets, respectively ( $P<0.05$ ), but in day 30, 60, 90, 120 and 150 of experiment were significantly differ ( $P<0.05$ ). Based of experimental data, it found that dried tomato pomace can replace soybean meal without any influence on feed intake, growth rate and feed conversion ratio in beef cattle fed urea treated rice straw as main roughage source.

*Keywords: Dried tomato pomace, Soybean meal, Beef steers, Feed intake, Growth rate, Urea treated rice straw*

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## Effect of Kaentawan supplementation on feed intake and growth performance in dairy calves

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### Abstract

This study was aimed to study the use of Kaentawan antibiotic substance in cattle diet. Twenty-one female crossbred Brahman cows were used in randomly completed block design. There were three treatments (CON = control; MOS = control + 240mg MOS/3kg and KAN = Kaentawan 1.5g/3kg of concentrate). The experiment was lasted for 90 days. At the end of experiment, it was found that feed intake of cows was not significantly difference ( $P>0.05$ ) among treatments. Productive performances of beef cows were not altered. For calf data, feed intake were not significantly differ ( $P>0.05$ ) among treatments. Concentration of IgA, IgG and IgM of calves received KANI were higher than calves received CON, but there was not significant different from calves fed MOS. Based on experimental data, supplementation of Kaentawan in beef cow diet and continuing to calf diet show increase the concentration of immunoglobulin (IgG, IgA, IgM).

*Key words: Beef Cow, Calf, Kaentawan, Immunoglobulin*

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***In vitro* rumen fermentation characteristics of goat and sheep supplemented with polyunsaturated fatty acids**

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**Abstract**

An *in vitro* gas production study was conducted to compare differences in rumen fermentation characteristics and the effect of supplementation of 4% linseed oil as source of polyunsaturated fatty acids on the rumen fermentation profile in rumen fluid collected from goats and sheep. Rumen fluid for each species was obtained from two male goats of about 1.5 years old and two sheep of similar sex and age fed the similar diet containing 30% alfalfa hay and 70% concentrates. The substrate used was alfalfa hay and concentrate mixture (30:70) without (control) and with addition of linseed oil. The experiment was a two (inoculums) x two (oil levels) factorial experiment with five replicates per treatment and repeated in two independent runs. Rumen fermentation characteristics, including pH, fermentation kinetics, *in vitro* organic matter digestibility (IVOMD), volatile fatty acids (VFA) production and microbial population were determined. Results of the study showed that gas production rate (c), IVOMD, VFA and population of total bacteria and two cellulolytic bacteria (*Ruminococcus albus* and *Butyrivibrio fibrisolvens*) from rumen fluid of goat were significantly higher ( $P < 0.05$ ) than those of sheep. Irrespective of sources of inoculums, addition of oil did not affect fermentation capacity, IVOMD and total VFA production. Higher *B. fibrisolvens* population (associated with bio-hydrogenation) in rumen fluid of goat seems to suggest that polyunsaturated fatty acids are more prone to bio-hydrogenation in rumen of goat as compared to that of sheep. This assumption deserves further investigation

**Keywords:** goat, *in vitro* gas production, rumen fermentation, sheep

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## Effects of animal feed ensilage on meat goat production in farmer scale

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### Abstract

The objectives of this study to developed silage technology of combination between Napier grass and leucaena and supplemented by cassava root in different ratios to increase the efficiency of silage sources in meat goat production performance. The experiments were investigated to evaluate the chemical compositions of ensilage ratios to fermentation end products. This experiment was study at on station scale and on farm research. There were 3 treatments in the study. Treatment, Napier grass (N): Leucaena (L) : cassava root (C) at 70:30:0, 70:30:5 and 70:30:10, respectively. All treatments were fermented for 21 days. The results shown that, silage pH were 4.9, 4.6 and 4.4 in T1, T2 and T3, respectively. Dry matter (DM) were 73.1, 74.3 and 71.7%; crude protein (CP) were 8.95, 11.84 and 13.32 %DM ( $P<0.05$ ); Organic matter (OM) were 90.25, 84.32 and 88.48%DM in T1, T2 and T3, respective.

Moreover, experiments were study in weaning goat were assigned into Complete Randomized Design (CRD) with 3 treatments, each treatment contain 5 replications. Data were collected as dry matter intake, rumen fermentation end products, all animal were receive all feed as *ad libitum* for 21 days per period. The results show that, total feed intake were 1.2, 1.2 and 1.3 kg/h/d ( $P>0.05$ ), respectively. Rumen pH were 6.4, 6.4 and 6.6 ( $P>0.05$ ) in T1, T2 and T3, in order of ammonia nitrogen (NH<sub>3</sub>-N) concentration were 6.12, 6.09 and 5.19 mg% in T1, T2 and T3, respectively. Similar work were established on farm research at MaMae Farm, where located at Dankhunthod district, there were 3 treatments with 5 replicated were done and all feeds were fed to animals as *ad libitum* for 30 days. Feed cost were 1.60 baht/kg (as fed), 1.70 baht/kg (as fed) and 1.80 baht/kg (as fed) in T1, T2 and T3, respectively. The results shown that average dairy gain (ADG)/d were 16.25, 26.25 and 13.33 g/h/d ( $P<0.05$ ), respectively.

Base on this study, it was concluded that ratio to produce silage depend on local feed that available on farm, such as Napier grass, leucaena and cassava root. The optimal ratio were found in N:L:C as 70:30:5 was gave best results in term of ADG (g/h/d), follows by 70:30:10 and 70:30:0, respectively.

**Keywords:** ensilage, Napier grass, leucaena, cassava root, goat, technology transfer

## Effects of lycopene on hepatic metabolic and immune-related gene expressions in chickens

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### Abstract

Lycopene has been known for many years for its antioxidant properties but some studies now focus on its anti-inflammatory (protective immunity) and the modulator of lipid metabolism in mammals. There is a lack of information related the action of lycopene beyond antioxidant in chickens. The present study aimed to investigate the possible interaction of lycopene on hepatic metabolic and immune-related gene expression in laying hens. A total of 48 twenty five-week-old White Leghorn hens were randomly allocated into 4 groups consisting of 4 replicates of 3 birds. Chickens were subjected to one of following treatments: Control (BD, basal diet), T1 (BD + tomato powder-containing lycopene 10 mg/kg diet), T2 (BD + micellar of tomato powder-containing lycopene 10 mg/kg diet), T3 (BD + purified lycopene 10 mg/kg diet). Chickens were fed with a basal diet or the basal diet supplemented with lycopene *ad libitum* for 5 weeks. Total RNA was extracted from the liver for quantitative RT-PCR. PPAR $\gamma$  was decreased in the liver with lycopene intake ( $P<0.05$ ). Lycopene intake decreased a PPAR $\gamma$  target genes, fatty acid binding protein (FABP) 4 and fatty acids synthase (FASN) in T2 group ( $P<0.05$ ). Sterol regulatory element-binding protein (SREBP) 2 and CCAAT/enhancer binding protein (C/EBP)  $\alpha$  also down regulated in hens fed with micellar of tomato powder-containing lycopene ( $P<0.05$ ). However, the gene expression of carnitinepalmitoyltransferase 1(CPT-1) was not changed by lycopene treatment. The pro-inflammatory cytokines such as tumor necrosis factor (TNF)  $\alpha$  and interleukin (IL) 6 were inhibited by supplement with lycopene ( $P<0.05$ ). These data suggest that lycopene may play an important role in the modulation of lipid metabolism and immune response of chickens.

*Keywords: lycopene, gene expressions, metabolism, immune, chickens*

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## **Morphological studies of thyroid gland of Saidi rams fed mannan oligosaccharide supplemented diet**

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### **Abstract**

Eighteen Saidi rams were used in this trial to study the impact of additive mannan oligosaccharide (MOS; activeMOS<sup>®</sup>) on morphological studies of thyroid gland. MOS are commercially available as BioMos<sup>®</sup>, which is a nutritional supplement manufactured by MOS<sup>®</sup> Matrix nutrition, LLC, USA was used in this experiment. Animals were randomly divided into three equal groups. The initial average live body weight values were 24.00, 24.08 and 24.17 kg for groups 1, 2, and 3 respectively with 8 months age. The first group did not receive MOS and served as a control group, while the second and third groups were supplemented with 2 and 4 g/kg diet MOS and served as a MOS<sup>1</sup> and MOS<sup>2</sup> groups, respectively. At the end of the experimental period, lasted for 6 months, final average body weight values were 44.17, 48.50 and 45.83, respectively. Five animals from experimental groups were slaughtered. Thyroid glands were removed after slaughtering, cleaned carefully of extraneous tissues and prepared for histological studies. The data revealed that the overall mean of follicular diameter increased in dietary MOS<sup>1</sup> rams compared with MOS<sup>2</sup> and the control. Supplementation of MOS<sup>1</sup> increased the number and size of follicular cells (height, length and width) than MOS<sup>2</sup> and control groups. Consequently, it appears from the present study that the dietary of MOS improved the activity of thyroid gland. Moreover, MOS inclusion at 0.2% was the most effective, suggesting that MOS might be a potential type of food additive useful for the growing sheep in Upper Egypt conditions.

*Keywords: Morphology of thyroid gland, mannan oligosaccharides, Saidi rams*

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## Efficiency of difference doses of pregnant mare's serum gonadotropin on superovulations in meat goats

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### Abstract

The objective of this study was to compare the efficiency of two doses (700 IU and 1,000 IU) of pregnant mare's serum gonadotropin (PMSG) on superovulatory responses in crossbred meat goats. Twelve crossbred meat does were assigned for estrus synchronization using the intravaginal progesterone controlled internal drug release (CIDR) devices for 10 days and 125 µg prostaglandin F<sub>2α</sub> injections at day 10 immediately after CIDR device removal. These twelve does were divided into two equal groups. Group 1 and Group 2 were injected with 700 IU and 1,000 IU of PMSG at 48 h before CIDR removals, respectively. After CIDR withdrawals, estrus responses were detected. In addition, on day 7 after CIDR removal, each estrus doe in both groups were examined the ovaries for superovulatory calculation. The ovulatory follicle was evaluated from the number of active corpus luteum (CL) which founded on both ovaries. The results showed 100 % of does with estrus responses in both groups. The mean estrus onsets and estrus durations of Group 1 and Group 2 were not significantly different (1.16±18.92 h and 3.06±35.42 h vs. 2.24±19.50 h and 1.46±36.08 h, respectively). The mean numbers of active CL per doe in Groups 1 and Group 2 were not significantly difference (5.46±7.17 and 3.37±9.17, respectively). On other hand, Group 1 had %50.00 superovulation rate while in Group 2 had %83.33 superovulation rate. Moreover, the does in Group 2 revealed the tendency of higher percentages of active CLs plus dominant anovulatory follicles when compared with Group 1 (7.65±75.54)% vs. %19.34±55.55, respectively. (In conclusion, the efficiency of 700 IU or 1,000 IU of PMSG on superovulatory responses obtained similar stimulations to produce number of ovulatory follicles. In contrast, the treatment with 1,000 IU of PMSG had trends of higher incidences of superovulation rate and percentage of dominant follicles than the treatment with 700 IU of PMSG in crossbred meat goats.

**Keywords:** CIDR, crossbred meat goat, estrus synchronization, PMSG, superovulation

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## **Supplementation of vascular endothelial growth factor (VEGF) increases the maturation of porcine COCs derived from small follicles**

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### **Abstract**

It is known that oocytes derived from small follicles (SF) less than 3 mm in diameter have lower competence to successfully mature *in vitro*. The aim of this study was to investigate, in prepubertal pig, whether vascular endothelial growth factor (VEGF) can stimulate the meiotic competence of oocytes derived from SF. The amount of VEGF secreted to the maturation medium was higher in cumulus-oocyte complexes (COCs) derived from middle follicles (MF) than those from SF ( $P<0.05$ ). Different concentrations of VEGF (0, 10, 25, 50 or 100 ng/mL) were supplemented during the first 20 h of *in vitro* maturation (IVM). Higher maturation rates were recorded ( $P<0.01$ ) in the presence of VEGF at 50 and 100 ng/mL (62.2% and 72.9%, respectively), while there were no significant differences among the other samples in the presence of 0, 10 and 25 ng/mL VEGF (53.8%; 55.2% and 50.7%, respectively). Our results indicate that VEGF improves the meiotic competence of oocytes derived from SF, especially at a 100 ng/ml concentration when added during the first 20 h of IVM.

*Keywords: IVM, small follicle, porcine, VEGF*

## Effects of age and body weight at the first mating on subsequent reproductive performance and economic return in Thai native gilts

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### Abstract

The objective of this study was to evaluate the effects of age and body weight at the first mating management of Thai native gilts on reproductive performance, piglet production and economic return throughout their first three litters. The Experiment was a 2x3 factorial arrangement of treatments in a completely randomized design (CRD) with 4 replicates per treatment. The treatments studied consisted of three age groups (younger: 4.11 months, middle-aged: 5.19 months and old: 6.18 months) with two body weight levels (low-BW: 18.58 kg and high-BW: 25.25 kg). The results showed that there was no interaction between the age factor and the body weight factor on all parameters ( $p>0.05$ ). Under the age factor, it was found that younger gilt group was more likely to increase the number of mating service ( $p=0.08$ ) and days open ( $p<0.05$ ), especially in the litter 2, that affected to increase the age at pregnancy and the age at farrowing in both litter 2 and 3 ( $p<0.05$ ). Besides, when compared with the upper age groups, it gave the negative value of the number of newborn piglets ( $p<0.05$ ), piglet loss ( $p<0.05$ ), and the number of weaning piglets ( $p<0.05$ ). However, even though the total cost of production was lower but also the total income was lower. At the end of the experiment showed that the profit of the younger group was in the negative value (-742 baht/litter), while the profit of the middle-aged group and the old group were in the positive value (1,743 and 1,615 baht/litter, respectively). Under the body weight factor, it hardly affected the reproductive performance. For the low-BW group, it was found only that days open in the litter 3 was significantly higher ( $p<0.05$ ) as well as the average number of mating service from all litters was likely higher ( $p=0.06$ ) when compared with the high-BW group. Besides, in the low-BW group, it was revealed that the piglet loss was higher and the number of weaning piglet was less ( $p<0.05$ ); however, the economic return was not different with another group ( $p>0.05$ ). In conclusion, if farmers need the high production and profit, they should set the native gilts that have age about 5.19 months and body weight about 25.25 kg for the first mating attainment.

*Keywords: age, body weight, reproductive performance, piglet production, Thai native pigs*

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## Characterization of prepubertal gilt ovaries with different patterns in the follicular morphology on the surface and the meiotic competence of the oocytes

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### Abstract

The ovary is an important follicular resource. Oocytes from middle-size follicles have been utilized in domestic animals for *in vitro* production of embryos following *in vitro* maturation and fertilization. In this study we evaluated if ovaries from slaughtered prepubertal gilts presented any differences in their follicular populations based on their morphological traits. For this, ovaries were classified into three categories; ovaries with smooth (SSO), bubbled (BSO) or mixed (uneven) surface (MSO), individually weighted, and we counted the number of small (SF) (< 3 mm), medium (MF) (3-6 mm) and large (> 6 mm) follicles present on the surface of each ovary. Cumulus-oocyte complexes from SF and MF of SSO or MSO were cultured *in vitro* to assess their meiotic competence. Statistical analyses were performed with ANOVA and Bonferroni or Tukey post-hoc tests. The more abundant morphologies were SSO and MSO as compared with BSO (45.6% and 48.0% vs. 6.8%, respectively). Based on the follicular populations, a significantly higher percentage of MF was observed in ovaries with BSO than MSO and SSO (24.7% vs. 11.1% and 12.0%, respectively), whereas the number of MF per ovary was significantly higher in BSO and MSO than SSO (18.44 and 14.18 vs. 11.04, respectively). When the meiotic competence of oocytes was assessed, oocytes arrested at the GV stage were significantly higher in those from SSO than MSO in both, SF (16.4% vs. 7.7%) and MF oocytes (4.1% vs. 2.1%). MSO also showed a significant higher percentage of M-II stage oocytes than SSO in SF (55.6% vs. 50.0%) and MF (80.2% vs. 75.6%). Regardless of the type of ovarian morphologies, oocytes from MF had always a significantly higher maturation rate than those from SF. In conclusion, we propose that MSO can serve as a good source of oocytes for their use in reproductive technologies.

*Keywords: prepubertal ovary, porcine, morphology*

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### **Antibacterial activity of wood vinegar against *Salmonella Enteritidis* and *Salmonella Typhimurium***

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#### **Abstract**

The *in vitro* antibacterial activities of wood vinegar were investigated against *Salmonella* Enteritidis and *Salmonella* Typhimurium. The antibacterial effect was tested by minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) methods. Wood vinegar's pH was also evaluated. The broth-determined MIC was found at 10% (v/v). The agar-determined MBC was noticed at 1% (v/v) in both those bacteria strains. Results indicated that wood vinegar showed antibacterial activities against *Salmonella* Enteritidis and *Salmonella* Typhimurium. Moreover, we found that wood vinegar at corresponded concentration had pH at 4.15-4.59. These suggested that the efficacy of wood vinegar may be associated with their pH and its constituents. The current study might be applied wood vinegar for an alternative antibacterial agent towards the *Salmonella* Enteritidis and *Salmonella* Typhimurium treatment.

**Keywords:** wood vinegar, antibacterial activity, *Salmonella* Enteritidis, *Salmonella* Typhimurium

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### Virucidal efficacy of *Clinacanthus nutans* and *Houttuynia cordata* extract against virulent Newcastle Disease Virus

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#### Abstract

Determining the virucidal efficacy of *Clinacanthus nutans* (*C. nutans*) and *Houttuynia cordata* (*H. cordata*) extract against virulent Newcastle disease viruses (vNDV) was the aim of this study. Both candidate agents were extracted using 50% and 70% ethanol and then were stock at 200 mg/ml of concentration until test. Concentration as 12.5, 50, 100 and 200 mg/ml of both candidate agents were tested for virucidal efficacy by inoculating vNDV into the cell culture of chicken embryo fibroblasts (CEFs). The neutralizing index (NI) to vNDV was determined to evaluate virucidal efficacy for the present study. The results have illustrated that minimal concentration of *H. cordata* using 50% and 70% ethanol extracted, could inactivate vNDV at concentration of 12.5 and 100 mg/ml, respectively. In the meantime, *C. nutans* extracted by 50% ethanol could inactivate vNDV at only concentration of 200 mg/ml. Therefore, the present study could be concluded that the ethanol extracts of *C. nutans* and *H. cordata* have a virucidal property against vNDV at different concentrations and they might be used as an alternative disinfectant for bio-security purpose, particularly in poultry farms.

**Keywords:** Virucidal efficacy, *Clinacanthus nutans*, *Houttuynia cordata*, Newcastle disease virus

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## Antimicrobial efficiency of selected essential oils against four common Animal pathogenic bacteria

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### Abstract

The objective of this study was to investigate the antimicrobial efficiency of essential oils from local Thai plants. Eight essential oils from *Cymbopogon citratus* Stapf. (Lemon grass), *Cymbopogon nardus* Rendle (Citronella grass), *Citrus hystrix* DC. (Leech lime), *Citrus medica* Linn (Citron), *Ocimum basilicum* L. (Sweet basil), *Piper nigrum* L. (Black pepper), *Ocimum sanctum* L. (Holy basil) and *Ocimum basilicum* L.f. var *triatum* Back (Hairy basil) were evaluated for their antimicrobial properties by agar-disc diffusion technique, against four common pathogenic bacteria in animals (*Escherichia coli*, *Staphylococcus aureus*, *Salmonella Typhimurium* and *Pseudomonas aeruginosa*). The results showed that each essential oil possessed different degree of antibacterial activity. The essential oil from lemon grass showed higher tendency to inhibit tested pathogens, but the inhibitory effects of essential oils from holy basil and hairy basil were not observed. Minimum Bactericidal Concentration (MBC) of lemon grass essential oil by microbroth dilution test ranged between 125-500 ppm for tested pathogenic bacteria. The results indicated the promising antibacterial property of the essential oil from lemon grass which could benefit in animal treatments

*Keywords: essential oil; Thai plant; antimicrobial efficiency*

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## **Ciliary activity and life span of swine precision-cut lung slices: Comparison between changed and unchanged medium**

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### **Abstract**

Precision-cut lung slices (PCLS) offer the possibility of investigating thin tissue culture material under various changing conditions. In PCLS, ciliary function is pertained, and the interactions of cilia with infectious agents and its functional aspects can be investigated. PCLS is possible to evaluate morphologic changes over a longer period of time using only a small group of animals. To investigate the life span of cilia in changed and unchanged medium groups, PCLS were prepared from lungs of three months old crossbred pigs and shown fully retained of the epithelial cells viability. One of the groups was changed medium daily and another was not changed until the end of the experiment. The result revealed that the changed medium group retained full ciliary activity for 10 days, longer than the unchanged medium group for 4 days. This information could help for design the experiment for this culture system in the future.

*Keywords: precision-cut lung slices, ciliary activity, tissue culture*

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**Effect of rice husk bedding on *Eimeria tenella* transmission in broiler chickens**

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**Abstracts**

The aim of the current study was to investigate the influence of rice husk bedding on *Eimeria tenella* transmission in broiler chickens. Forty-eight, one day-old chickens were allocated into two experimental groups (No litter and Litter) equally and housed in group of 6 chicks per cage. The broiler chickens in the No litter group were reared in cage without any bedding while the broiler chickens in the Litter group were reared in cage with rice husk bedding throughout this experiment, lasting for 6 weeks. All chicks were fed *ad libitum* by commercial diet and allowed free access for drinking water. At the chicken age of 14 days, a suspension of 30,000 sporulated oocysts/ml of *E. tenella* was experimentally infected to all chicks. Four chicks from each group were randomly selected to be slaughtered for weekly measuring lesion score and oocysts in ceca. The results have showed that the log (oocysts/g + 1) of the chicks in the No litter group at week 0, 1, 2, 3 and 4 post infection were 0.00±0.00, 5.80±0.49, 3.16±2.16, 2.38±2.60 and 1.27±1.58, respectively whereas the chicks in the Litter group had 0.00±0.00, 3.68±2.60, 5.82±0.70, 5.19±1.66 and 1.69±2.06 log (oocysts/g+1) at week 0, 1, 2, 3 and 4 post infection. The cecal lesion scores of the chicks in the No litter group at week 0, 1, 2, 3 and 4 post infection were 0.00±0.00, 2.00±0.00, 1.00±0.00, 1.00±0.00 and 0.67±0.49, respectively, while there were 0.00±0.00, 1.25±0.50, 1.25±0.50, 2.00±1.16 and 0.75±0.50 for the lesion scores of the chicks in the Litter group at week 0, 1, 2, 3 and 4 post infection, respectively. The differences ( $P \leq 0.05$ ) between the studied groups were detected at week 2 and 3 post infection for log (oocysts/g + 1) and at week 1 and 3 post infection for lesion score. The rice husk bedding would prolong oocysts found in ceca and increase cecal lesion score from re-infection of *E. tenella*. Thus, rice husk bedding for rearing broiler chickens increased transmission of *E. tenella*.

**Keywords:** rice husk bedding, *Eimeria tenella*, transmission, broiler chickens

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## Process development of cooking wine from whey of buffalo milk

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### Abstract

Development of process in the production of cooking wine from whey of buffalo milk was undertaken. Whey from buffalo milk was treated with different inocula, sugar concentrations and fermented in different types of container. Data gathered on the physico-chemical analysis and sensory qualities of wine were tabulated and statistically analyzed using the split-split plot design in Completely Randomized Design. The relationships of the physico-chemical data to sensory evaluation scores were also studied. Results of the study revealed that *Kluyveromyces marxianus* is a better source of inoculum for wine fermentation of whey because it has high percent Total Titratable Acidity (TTA), alcohol taste, good clarity, sourness, sweetness, and general acceptability but low on off-odor, off-flavor, aroma, after-taste and saltiness. Wine developed from 24°Brix has high Total Soluble Solids (TSS), percent alcohol, alcohol taste and clarity than 20°Brix. On the other hand, 20°Brix has also higher percent TTA, sourness, sweetness and general acceptability than 24°Brix. Both have low values on off-odor, off-flavor, aroma and saltiness. Thus, 20 and 24°Brix are the best sugar concentrations that could be used for whey fermentation. On the other hand, the use of earthen jar converted and produced more alcohol than the other containers use. It also has the highest percent TTA, TSS, clarity, aroma, alcohol taste, sourness, and general acceptability. Furthermore, it has low sensory scores on saltiness, off-odor and off-flavor. Earthen jar is the best type of container that could be used for the fermentation of whey for wine production.

**Keywords:** buffalo milk, Cooking wine, process development

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## Crude triterpenoid, phenolic compounds and enzyme activities of fermented soybean hull by *Antrodia cinnamomea*

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### Abstract

One of brown-rot fungus, *Antrodia cinnamomea*, also known as Niu-Chang-Chih, was a unique species which only parasitizes in decayed heart woods of stout camphor (*Cinnamomum kanehirae*) in Taiwan. The study was demonstrated that using solid-fermented soybean hulls by *A. cinnamomea* and evaluated its functional components and enzyme activities to evaluate as a functional fermented feed. The results showed that soybean hulls inoculum contained 60% of fungal mass after 21 days fermented contained 16.80 mg/g DW and 4.50 mg gallic acid equivalent (GAE)/g DW of crude triterpenoid and total phenolic contents, respectively. Hence, the carbohydrates enzymes were produced such as mannanase (5.40 U/g DW), xylanase (21.30 U/g DW) and cellulases (3.0 U/g DW), respectively. In conclusion, solid-fermented soybean hulls by *A. cinnamomea* could increase functional metabolites and carbohydrates enzymes activity; therefore, the fermented feed by *A. cinnamomea* could be potential as a functional feed.

**Keywords:** *Aureobasidium pullulans*, solid-state fermentation, functional compounds

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## Effect of performance and intestinal characteristics on supplemented with protease in the broiler diet

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### Abstract

This study was demonstrated that supplementation of protease in the diets to evaluate the effect on performance and intestinal characteristics of broilers. One thousand four hundred 0-day old broilers were divided to two batches. There were four replications in every batch, two males and females respectively. Broilers were randomly allocated into following treatments: T1 (maize-soybean meal diet); T2 (T1 diet decreasing 5% CP); T3 (non-conventional diet including DDGS, meat bone meal and feather meal); T4 (T3 diet decreasing 5% CP), and 0.05% protease was added in the T2, T3 and T4 to be the enzyme supplement groups. The results showed that based on different protein sources, T1 and T2 had the better weight gain and FCR than T3 and T4 in starter (0-10d) and grower (11-20d) period ( $P < 0.05$ ), but not occurred in finisher (21-35d) period. There was a significantly better FCR in normal protein diet than that of the low-protein diet ( $P < 0.05$ ) in finisher period. Both decreasing the protein level and protease inclusion significantly reduced concentration of ammonia in excreta ( $P < 0.05$ ). Supplementation of protease significantly decreased the total VFA concentration in ceca ( $P < 0.05$ ). The availability of protein was improved in low-protein diet treatments by adding protease ( $P < 0.001$ ). In conclusion, protease inclusion could improve the utilization of protein in low-protein diet, and reduce ammonia emission in broilers.

*Keywords: protease, broilers, performance*

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## The levels of TBARs in pellet fish feed mixed with different astaxanthin levels and packaging methods

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### Abstract

The objective of this experiment was to study the levels of TBARs in pellet fish feed mixed with different astaxanthin and packaging methods. This study was conducted using a 3x4 factorial experiments in completely randomized design with 3 replications, treatment contained 2 factors, factor A levels of astaxanthin were 0, 250 and 500 mg/kg of feed, factor B type of packaging were polyethylene bag, polyethylene vacuum packing bag, aluminium foil bag and aluminium foil vacuum packing bag, 100 g/bag samples were collected and storage at amphibian temperature. TBARs were measure after 3 months, the results showed that the level of TBARs was lowest at  $0.0660 \pm 0.0006$  mgMDA/kg of feed ( $P < 0.05$ ) when applying astaxanthin at 500 mg/kg of feed with aluminium foil vacuum packing bag. And the highest ( $P < 0.05$ ) when using astaxanthin at 0 mg/kg of feed with polyethylene vacuum bag ( $0.0713 \pm 0.0019$  mgMDA/kg of feed). Therefore, based on this study, it could be concluded that supplementation of astaxanthin in pellet fish feed at 500 mg/kg of feed with aluminium foil vacuum packing bag could preserve the quality of ornamental pellet fish feed.

*Keywords: Oxidation, astaxanthin, packaging, fish feed, storage*

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## Standardized total tract digestibility of phosphorus of various meal diets as protein source in growing-finishing pigs

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### Abstract

This study was conducted to estimate apparent total tract digestibility (ATTD), standardized total tract digestibility (STTD) of phosphorus (P), ATTD of crude protein (CP) and dry matter (DM) in various meals fed to growing-finishing pigs. Twelve barrows (initial BW, 71.7±17.0 kg) were allocated in metabolism cages. The experimental design was a 12×8 Latin square with 12 dietary treatments and 8 replication periods. The diets were based on sesame meal (SM), dehulled soybean meal from Korea (KD-SBM), dehulled soybean meal from India (ID-SBM), soybean meal from Korea (K-SBM), corn high protein distillers dried grains (HPDDG), perilla meal (PEM), canola meal (CAM), copra meal (COM), corn germ meal (CGM), palm kernel meal (PKM), cassava root distillers dried grains (CRDDG), respectively, and P-free diet for measuring basal endogenous losses of P. ATTD of DM was higher ( $P<0.001$ ) in the K-, KD- and ID-SBM compared with SM, PEM, PKM and CRDDG. ATTD of CP in the K-, KD- and ID-SBM was greater ( $P<0.001$ ) than that in SM, PEM, COM and CRDDG. Nitrogen retention was increased ( $P<0.001$ ) in the K-, KD- and ID-SBM than the SM, PEM and HPDDG. ATTD of P was higher ( $P<0.001$ ) in the CGM than the SM, PEM, CRDDG and KD-SBM. STTD of P was greater ( $P<0.001$ ) in the HPDDG and CGM compared with the SM, KD-SBM, PEM and CAM. In conclusion, data from our current study can be utilized as a platform for formulating the diets with precise P utilization in various meals for pigs.

*Key words: various meals, standardized total tract digestibility, phosphorus, crude protein, pigs*

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## Effects of storage on pathogenic bacteria content of layer manure extract

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### Abstract

The effects of storage of layer manure extract (LME) produced from 1) newly dried manure and 2) and 3) dried layer manure stored for 1 and 2 month, respectively, on the content of pathogenic bacteria including coliform bacteria, *E.coli* and *Salmonella* spp. were studied. LME was produced by steeping of dried layer manure in water at a ratio 1:10 w/v for 24 hr. and then remove out the solid. The LME produced were stored in 200 liter plastic drum covered with plastic lid. Samples of the LME were taken at Day 0, 7, 14, 21, 28, 35, 42, 49 and 56 of storage and analyzed for population of coliform bacteria, *E. coli*, *Salmonella* spp., pH and total N content. Results of the study showed that storage of dried layer manure could reduced ( $P<0.05$ ) the initial loads of the pathogenic bacteria in LME produced from the layer manure. The storage of LME significantly reduced ( $P<0.05$ ) population of coliform bacteria, *E. coli* and *Salmonella* spp. to nil at Day 35, 28 and 21, respectively. LME produced from stored dried layer manure has more rapidly decreasing of the pathogenic bacteria content than those produced from the newly dried manure. There were apparently no change in total N content, but there was a significantly increase ( $P<0.001$ ) of pH in LME during the storage. The research data has indicated the safe use of LME for food crop production after the storage of LME for 21 to 35 days. In additional, the uses of stored layer manure for 1 month will reduce the risk of pathogenic bacteria contamination in the LME.

*Keywords: layer manure extract, pathogenic bacteria, coliform bacteria, E.coli, Salmonella*

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### Effect of heat stress environment on the blood parameters and behavior pattern in Korean native calves

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#### Abstract

Heat stress in hot climates is a major factor that strongly affects Korean beef industry in negative ways, leading to immeasurable economic loss. For this reason, we investigated the effects of a heat stress environment on the blood parameters and behavior in Korean native calves (6~7 months, male). The temperature-humidity index (THI) is commonly used to indicate the degree of heat stress on cattle. The study used 6~7 month-old Korean native calves ( $204.5 \pm 6.79$  kg) and was conducted in two designated THI periods: low THI (LTHI;  $\text{THI} = 70.01 \pm 0.81$ ) and high THI (HTHI;  $\text{THI} = 87.73 \pm 0.92$ ). According to the temperature and humidity change (THI 70-87), the blood metabolites and hormone as stress-related indicators were analyzed by biochemical analyzer-TBA-40FR, and CBC (Complete blood Count) test was conducted to determine the change in blood cells. Through a video monitoring system, we also analyzed the behavior pattern, feed intake, water intake, heart rate and rectal temperature. The results showed that there was a decrease in NEFA and an increase in GOT and GPT in the serum of calves under hot conditions (HTHI) ( $P < 0.05$ ), and that these calves have lowered WBC and platelet counts, but an enhanced rectal temperature and heart rate ( $P < 0.05$ ). The level of serum cortisol as indicator of stress steroid hormone was significantly increased in the HTHI period compared with the LTHI period ( $P < 0.05$ ). In addition, calves in the HTHI period had an increased water intake but a decreased feed intake compared with calves in the LTHI period. This means that higher THI is related to high stress in Korean native calves. In conclusion, the data indicate that determining the basis for altered blood parameter and behavioral pattern during heat stress will lead to opportunities for improved animal performance via altered nutritional management in Korean native cattle.

*Keywords: heat stress, THI, behavior pattern, blood parameter, Korean native calves*

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## Development of local cattle with sustainable in North Sulawesi

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### Abstract

Local cattle is a source of income for people in North Sulawesi. The problem is local cattle was developed traditionally. Cattle in certain areas, developed under the coconut trees, where the cattle consume grass that grows wild. Cattle, in other areas of grazing farms, and cattle consuming agricultural wastes, such as corn waste. Development in other areas, cattle are given rice straw as feed to meet the needs of cattle. The purpose of this study was to determine the pattern of development of local cattle with sustainable. Sample location is South Minahasa and Bolaang Mongondow, which has been determined by purposive sampling, because it has the largest cattle population. The results showed that farmers' income is affected by several factors. Earned income of farmers is higher when cattle were developed with an integrated pattern of cattle-coconut and cattle-food crops. In conclusion, the development model of local cattle in North Sulawesi should be integrated and sustainable. Introductions feed technology can be done to improve the productivity of local cattle. Development of local cattle with sustainable, will be maximal with the intervention of the government.

*Keywords: development, local cattle, sustainable*

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## Farmers' knowledge, beliefs and barriers to prevent Newcastle disease in village chickens in central dry zone of Myanmar

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### Abstract

Cross-sectional studies were conducted in November; 2014 and June; 2015 to describe in a Health Belief Model framework farmers' knowledge, beliefs and barriers to prevent Newcastle Disease (ND) in village chickens. Using a questionnaire village chicken farmers in the two villages from Mahlaing, one village from Taungthar, one village from Myingyan and one village from Meikhtila Townships in the Central Dry Zone of Myanmar were surveyed (N=327). A total of 95.4 % (312/327) of village chicken farmers were aware of the occurrence of ND in their villages, while 4.6 % (15/327) were not aware of this disease. A total of 79.8% of respondents (261/327) reported that ND can spread between households. In regards to the perceived severity of ND, the majority of farmers indicated that birds that are infected with ND will most likely die (N for strongly agree and agree = 281/327, 85.9%). A majority large proportion of farmers were unsure if infected birds can be treated (N=109/327, 33.3%) or indicated incorrectly that birds infected with ND can actually be treated (N for strongly agree and agree =75/327, 22.9%). Also, 34.6% (N=113/327) of farmers were unsure if birds infected with ND will recover. This highlights knowledge gaps in the village chickens community in regards to ND. A majority of farmers indicated an increased risk of ND spreading through a flock, when newly introduced birds are not separated (N combined agreed and strongly agree=219/327, 67%). In contrast a majority of farmers believed that ND cannot spread between roosters during cock fights (combined disagree and strongly disagree= 109/327, 33.3%). None of the village chicken farmers interviewed used ND vaccination in the past. The major barriers to ND prevention were that farmers indicated not to have time to make birds available for ND vaccinations or that they are unable to catch birds to be vaccinated (249/327, 76.1% and 231/327, 70.7%, respectively). A total of 95.1%, (N=311/327) farmers highlighted that the ND vaccine is actually not available in their villages, but a majority of farmers would pay for ND vaccinations to protect their birds if it would be available (63%, N=206/327). An overwhelming majority of farmers highlighted that they would read information about improving village chickens health if it would be provided to them (95.7%, N=313/327). Overall, we were able to show in this study that there is great need in interest of farmers to increase their knowledge about ND. Farmers would also contribute to ND vaccinations of their birds, if the vaccine would be more readily available. This highlights the need for further extension work on ND prevention and for establishing a ND vaccine supply chain to village chicken farmers in the Central Dry Zone of Myanmar.

**Keywords:** village chickens, Newcastle disease, Myanmar

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## Understanding of village chicken production and health care management at the central dry zone of Myanmar

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### Abstract

The objectives of this study were to describe the importance, the management and the health status of village chickens and to identify the major constraints to village chicken production in the Central Dry Zone (CDZ) of Myanmar. A cross-sectional study was conducted in June 2015 in one village of the Taungthar Township and in two villages of the Mahlaing Township in the CDZ of Myanmar. A total of 167 village chicken farmers were interviewed with a questionnaire. Village chicken production was considered the major source of income (classified as important or very important) for chicken farmers (N=136, 81.4%) followed by crop production (N=97, 58.1%), sheep/goat production (N=36, 21.6%), pig production (N=30, 18%), employment (N=28, 16.8%), cattle production (N=15, 9.0%) and receiving donations from relatives (N=7, 4.2%). The most important purpose of chicken raising was cash income from the sale of chickens with (N=137, 91.9%), followed by consumption of chicken meat (N=52, 34.9%) and consumption of eggs (N=4, 2.7%). Constraints to village chicken production included the occurrence of Newcastle disease (ND) outbreaks (N=86, 51.5%), mortalities due to extreme weather conditions (N=2, 1.2%) and deaths from predators (N=144, 98.6%). A total of 86 out of 147 farmers that answered this question (58.5%) reported to have ND observed in their flocks, while 27.9% (N=41) reported not to have had ND in their flocks and 13.6% (N=20) were unsure if ND was present. The average mortality rate during ND outbreaks was 92%. Vaccination against ND was not conducted in any households. A total of 38.9% (N=65) of farmers reported intestinal problems in their flocks, with the most frequent sign reported being inappetence in chicks (N=34, 20.4%), growers (N=40, 24%) and in adults (N=29, 17.4%). Nervous symptoms in village chickens were indicated by 27.5% (N=46) and respiratory problems by 4.8% (N=8) of farmers. Ruffled feathers were the most frequently observed general sign in all age groups of village chickens. All farmers reported to provide supplementary feed to village chickens. No shelters for village chickens were provided on any farm. This is the first detailed report on the health and management of village chickens in the CDZ of Myanmar.

*Keywords: village chickens, Newcastle disease, Myanmar*

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## **The complexity of animal husbandry in crop-livestock farming systems in the New Reclaimed Lands (NRL), Egypt**

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### **Abstract**

The New Reclaimed Lands (NRL, Egypt) are the desert lands surrounding the Nile delta and managed during the past half century for irrigated agriculture development. They are inhabited by migrants from various origins, including graduate students and landless peasants from the highly populated areas of Nile delta and valley. There are few references that describe the farming systems of these small holders in the NRL, especially animal husbandry practices, crop-livestock integration, animal performances and their diversity. The CLIMED Project aims to produce reliable data about these topics in order to describe and understand these crop-livestock farming systems, assess their performances as well as the rural trends. It also aims to define the priorities in terms of research and development policies. The authors describe the farming systems based on the data collected through monthly monitoring of thirteen farms in three zones. These farms have been selected as a result of a large survey applied to 160 farms in four zones. To date, the main result is the high complexity of these farming systems due to four main factors: multi-functionality of animal production, livestock which is strongly dependent on feed produced by cropping system, and human dimension in terms of skill, education and work organization. As a result of this highly complex system, the farm monitoring shows the huge challenge of extension services in terms of technical assistance given the uncertainty of local market, the weak land access, the future constraints in water management and the appeal of agriculture to young people.

*Keywords: Multi-functionality of livestock, Crop-livestock integration, Complexity, Efficiency, Nile Delta, Egypt*

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**Behavioral characteristics of laying hens under different heat condition**

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**Abstract**

This experiment aimed to prepare the basic data that is able to evaluate the level of animal welfare in specification of laying hens, by analyzing the changes of behavioral characteristics according to the environmental temperature. Thirtyhy-line brown aged 22 weeks were posted per treatment group. Cages (stocking density 420cm<sup>2</sup>/bird) were placed in the laboratory, and 3 birds were accommodated in each cage. The environmental temperature of the control group was set as 22±2°C(Proper Fixed Temperature/PFT) that of the low treatment group 10±4°C (Low Fixed Temperature/LFT) that of the high treatment group 30±2°C(High Fixed Temperature/HFT). Laying hens' behaviors were recorded for 16 hours (05:00~21:00) continuously, and were observed individually under the focal sampling rule. The total eating time was longest in PFT (256.5min), significantly higher than HFT (219.1min)(p<0.05). Drinking time was recorded 115.7min in HFT, significantly higher than PFT (78.8min) and LFT (21.1min)(p<0.05). The exploring time was longest in HFT (471.9min), but not different from other treatment groups. The resting time was 230.4min in LFT, which recorded significantly higher than two groups (p<0.05). The total frequency of preening was 1468.2 in PFT, significantly higher than LFT (679.4) and HFT (497.6) (p<0.05). Pecking and feather pecking were recorded most frequently in PFT (927.4); wings fluttering in HFT (3.2); but significance of the other groups could not be found. Frequency of other treading and orienting response were significantly higher than two groups in PFT (6.4, 10.8) (p<0.05). In LFT, revelation of drinking, preening, other treading and orienting response reduced than PFT, but resting increased. In HFT, eating, preening, other treading and orienting response reduced, but drinking increased. Consequently, laying hens' behaviors sensitively reflected the changes according to the heat environment, and therefore it is considered that significant changes in behaviors will be the foundation for measuring the state of animal welfare.

*Keywords: laying hen, behavior, heat condition, environmental temperature, animal welfare*



## **Conventional and deep - litter pig production system: income over feed cost of three breed cross fattening pigs**

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### **Abstract**

A previous study to investigate the effects of conventional and deep - litter pig production systems on growth performance showed no significant difference between these 2 systems, although a conventional group received 100% commercial diet while a deep - litter pig group received only 50% commercial diet and 50% grasses/native vegetables. The objective of this study was to calculate income over feed cost of finishing pigs from the conventional and the deep - litter pig production systems. A total of 16 crossbred (Largewhite-Landrace x Duroc), mixed sex (8 gilts and 8 barrows) pigs at 15.75 kg live weight were randomly allocated into 2 treatments (8 pigs/treatment): a traditional concrete - based house (TCBH) received only commercial diet. The deep - litter house (DLH) treatment group received the commercial diet and grasses/ native vegetables (50/50), bedding materials with 10 parts of rice hulls and 1 part of soil, then topping by salts about 500 g and addition of a mixed culture as 30 cm height layer and repeated 2 times to completed 90 cm. height. Results indicated that the average feed cost was higher in the TCBH group due to 100% commercial diet consumption (54.08 versus 29.24 Baht/head/day) as compared to the DLH group, leading to a greater feed conversion ratio (2.11 versus 1.72); followed by slightly higher average weight gain (1 versus 0.96 kg/day) in the TCBH group. The TCBH group only received 4,990.20 Baht/head income from pig sold while the DLH group received 5,297 Baht/head income from pig and litter sold (a live weight pig sold price at farm was 60Baht/kg), so the income per day of the TCBH group was less (57.36 Baht/head/day) than DLH group (60.19 Baht/head/day). Income over feed cost (IOFC) in the DLH group was higher than TCBH group (30.95 versus 3.28 Baht/head/day) according to the existing feed cost and income data. Therefore, the deep - litter pig production system could be more beneficial for fattening three breed cross pigs when focusing on Income over feed cost.

*Keywords: deep – litter pig production, income over feed cost, three breed cross pig*

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## Development of local cattle with sustainable in North Sulawesi

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### Abstract

Local cattle is a source of income for people in North Sulawesi. The problem is local cattle was developed traditionally. Cattle in certain areas, developed under the coconut trees, where the cattle consume grass that grows wild. Cattle, in other areas of grazing farms, and cattle consuming agricultural wastes, such as corn waste. Development in other areas, cattle are given rice straw as feed to meet the needs of cattle. The purpose of this study was to determine the pattern of development of local cattle with sustainable. Sample location is South Minahasa and Bolaang Mongondow, which has been determined by purposive sampling, because it has the largest cattle population. The results showed that farmers' income is affected by several factors. Earned income of farmers is higher when cattle were developed with an integrated pattern of cattle-coconut and cattle-food crops. In conclusion, the development model of local cattle in North Sulawesi should be integrated and sustainable. Introductions feed technology can be done to improve the productivity of local cattle. Development of local cattle with sustainable, will be maximal with the intervention of the government.

*Keywords: development, local cattle, sustainable*

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## Why poultry welfare in Kuwait is an obstacle to trade?

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### Abstract

The poultry industry is one of the most important animal production industries and contributes to approximately 10% of all meat and eggs produced in the world each year. Poultry is highly susceptible to disease outbreaks that may cause irreversible economical losses to the poultry industry. Biosecurity is a modern practice introduced out of a need to protect the poultry from an intentional or unintentional threat of a biological agent. In everyday management, biosecurity is an endless endeavor to keep viral disease agents or the spread of such disease agents at bay. Biosecurity is even more important today because of the avian flu disease, type A influenza, which has been in the global news lately. Wild water birds are the natural carriers of this virus from where it can spread to domestic poultry and become fatal. Type A influenza can occur in many forms. Humans and some other animals are susceptible to some of these forms, but poultry are susceptible to all of them. Any time there is an outbreak, health officials are concerned because influenza viruses continuously change and officials have to determine how it happened and if it can become epidemic. Therefore, biosecurity of poultry farms is an important and vital practice to reduce the burden of any disease producing agent in any commercial operation. Biological hazards or biological agents, infectious/noninfectious, are such things as viruses, bacteria, fungi, and protozoa are responsible for disease outbreak in poultry. Most of the poultry industries in the world have developed biosecurity measures as a part of animal welfare to maintain the safety of poultry from biological hazards and be used for protection and disease control of the poultry. However, in many cases, these program measures including vaccination are not applied or followed properly because a comprehensive program usually is not in effect. The purpose of this study is to provide the poultry industries with a brief account of the most important aspects of poultry biosecurity program so that they may have a better understanding of the farm animal's operations. It is extremely important that poultry industry in Kuwait implement a comprehensive biosecurity program (regulations and recommendations) in their farms to ensure better quality production.

*Keywords: welfare, biosecurity program, education, chicken and laying hens*

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## **The comparative study on chemical compositions and antioxidant activities with different cuts in Hanwoo (*Bos taurus coreanae*) beef**

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### **Abstract**

The present study determined the chemical compositions and antioxidant activities with different cuts in Hanwoo (*Bos taurus coreanae*) beef. The comparative studies were targeted to high-preference cuts (HPC: loin, tenderloin and rib) and low-preference cuts (LPC: brisket, top-side and shank). Beef samples collected from ten heads of fattening cow were used to investigate chemical compositions, fatty acids, amino acids, total antioxidant capacities using direct QUENCHER method and superoxide dismutase activity. Dry matter content was the highest in the tenderloin and the lowest in shank ( $P < 0.05$ ). Crude protein content was the highest in top-side and followed by shank, brisket, loin, rib and tenderloin ( $P < 0.05$ ). The content of crude fat was almost contrasted with that of crude protein ( $P < 0.05$ ). The content of crude ash was significantly higher ( $P < 0.05$ ) in LPC than in HPC. Total saturated fatty acid was the highest in loin and the lowest in rib ( $P < 0.05$ ). Total monounsaturated fatty acid was the highest in rib and total polyunsaturated fatty acid was higher in LPC than in HPC ( $P < 0.05$ ). Total amino acid and free amino acid contents were higher in LPC compared with HPC. The 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2'-azino-bis-3-ethylbenzothiazoline-6-sulfonic-acid (ABTS) and N,N-dimethyl-p-phenylenediamine (DMPD) radical scavenging activities of LPC were significantly higher ( $P < 0.05$ ) those of HPC. The ferric reducing antioxidant power (FRAP) values were higher in LPC than in HPC, and lowest in tenderloin ( $P < 0.05$ ). Superoxide dismutase activity was significantly higher ( $P < 0.05$ ) in LPC than in HPC. Consequentially, it can provide alternative choices to consumers with the positive effects of LPC beefs such as brisket, top-side and shank compared to HPC beefs such as loin, tenderloin and rib.

*Keyword: Hanwoo, Beef, Low-preference, Chemical composition, Antioxidant activity*

## Meat quality of crossbred fattening pigs sired by Pakchong 5 boars and commercial boars

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### Abstract

This study evaluated the meat quality of crossbred fattening pigs sired by Pakchong 5 boar and 2 commercial breeding boars. Forty-eight weaning pigs (20 kg body weight) were distributed into 3 treatments with 8 gilts and 8 barrows in each. The experimental treatments consisted of crossbred pigs sired by Pakchong 5 boar (CP5), crossbred pigs sired by commercial boar 1 (CB1), and crossbred pigs sired by commercial boar 2 (CB2). All sires in this study were bred to hybrid sows (Large White x Landrace). The animals were fed with commercial diet and drinking water *ad libitum*. At slaughtering weight ( $103.54 \pm 6.89$  kg), all pigs were slaughtered and *Longissimus dorsi* (LD) muscle were collected to compare the physical characteristics of meat. Results showed that breeds had no effect ( $P > 0.05$ ) on pH<sub>45min</sub>, drip loss, thawing loss and Warner-Bratzler shear force. Crossbred pigs sired by Pakchong 5 boar had a higher value of pH<sub>24h</sub> ( $P < 0.05$ ) and lower percentage of cooking loss ( $P < 0.05$ ) than crossbred pigs sired by commercial boars. CP5 and CB1 had significantly higher L\* values (lighter,  $P < 0.05$ ) than CB2, whereas CP5 and CB2 had significantly lower ( $P < 0.05$ ) a\* and b\* (less red and less yellow) than CB1. However, the effect of sex and interaction between breed and sex had no significant influence on meat quality attributes ( $P > 0.05$ ). LD from crossbred fattening pigs sired by Pakchong 5 boars was as tender as LD from those sired by commercial boars. But it could be much juicy due to its high ultimate pH and less cooking loss.

**Keywords:** Pakchong 5 boar, commercial boar, crossbred fattening pig, meat quality

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## Comparison muscle fiber size, sarcomere length and tenderness between chicken and duck meat

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### Abstract

The objective of this study was to investigate the effect animal types (chicken and duck) and cutting parts (breast and thigh) on muscle fiber size, sarcomere length and tenderness. Breast and thigh from 10 Cherry valley ducks and 10 Arbor acres broiler were used in this study. The results showed that muscle fiber diameter (MFD) of chicken meat was statistically longer than duck meat ( $P<0.01$ ). MFD of thigh meat was statistically longer than breast meat ( $P<0.05$ ). There was a statistically interaction between animal type and cutting part, which duck breast had longer MFD than chicken breast meat. Duck thigh had the same MFD as chicken thigh. Sarcomere length (SL) was not significant difference between chicken and duck. Thigh meat had longer SL the breast meat ( $P<0.05$ ). Chicken thigh and duck breast had the longest SL, followed by duck thigh and chicken breast ( $P<0.01$ ). Duck meat had higher shear force value (SF) than chicken meat ( $P<0.01$ ). There was a statistically interaction ( $P<0.01$ ) between animal type and cutting part. Which duck thigh had a higher SF than chicken thigh. Duck breast had the same SF as chicken breast. While chicken thigh showed the lowest SF.

**Keyword:** chicken, duck, muscle fiber size, sarcomere length, tenderness

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**Effect of immunocastration on myosin heavy chain isoform expression**

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Institute of Technology Ladkrabang, Bangkok 10520, Thailand*

**Abstract**

The aims of this study were to examine and compare the myosin heavy chain (MyHC) isoform expression in 3 crossbred pigs [Duroc x (Large white x Land race)]. The animals used were from 2 groups of surgical castration and immunocastration pigs, 15 pigs in each group. They were slaughtered at the age of 24 weeks (110-110 kg live weight). The *Longissimus dorsi* (LD) muscle was taken to process for RNA and cDNA synthesis for measuring the myosin heavy chain isoform expression. The results revealed that the expression of MyHC IIx from immunocastration pigs was significantly higher than from surgical castration pigs ( $P < 0.05$ ). While other three MyHC isoforms, MyHC I, MyHC IIa and MyHC IIb were not significantly different between two treatment groups.

*Keywords: Surgical castration, Immunocastration, Myosin Heavy Chain isoform*

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## Effect of dried fermented juice of epiphytic lactic acid bacteria on broiler meat quality

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### Abstract

The influence of powdered fermented juice of epiphytic lactic acid bacteria on processing yields, and meat quality of broiler chickens was assessed at 42 d of age. A total of 200 (1-d old) mixed-sex broilers were assigned to 4 dietary treatments: T1) Control diet (basal diet); T2) Control + 0.05% of Oxytetracycline; T3) Control + 0.2% of dried lactic acid bacteria; and T4) Control + 1.0% of dried fermented juice of epiphytic lactic acid bacteria. The birds were arranged in a Completely Randomized Design (CRD; 5 reps/trt and 10 birds/pen). Each treatment was provided in a 2-stage feeding program. Results indicate no differences ( $P>0.05$ ) in body weight, carcass and component yields (wings, leg quarters, drumsticks, thighs, breast fillets and tenders) because of dietary treatments. The incidence and severity of footpad dermatitis did not show any differences ( $P>0.05$ ) due to dietary treatments. Meat quality attributes (pH, drip loss, shear force, and lipid oxidation) were not significantly influenced ( $P>0.05$ ) by treatment regimen. The redness value ( $a^*$ ) of breast fillets was higher ( $P<0.05$ ) in birds fed 0.2% DLAB compared to those fed control diet. However, dietary treatments had no significant effect ( $P>0.05$ ) on  $L^*$  and  $b^*$  values. Probiotics can be replaceable to antibiotics in broiler feed in order to enhance meat color.

*Keywords: probiotic, lactic acid bacteria, meat quality, broiler*

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**Prediction of meat and carcass quality traits by real-time Ultrasound in swine**

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**Abstract**

The carcass characteristics of 296 crossbreed (large white x landrace x duroc) were evaluated the meat and carcass quality with real-time ultrasound. The body weight pigs were assigned to slaughter between 78 -134 kg. The means of hot carcass weight (CW) was 78.78 kg, chilling carcass weight (CCW) was 76.71 kg and loin eye area (LEA) 40.20 cm<sup>2</sup>. The regressions linear model of ultrasound back fat thickness and ultrasound loin eye area on swine were also developed. LEA was dependent variable and the independent variables were ultrasound of loin eye area (U\_LEA), ultrasound back fat thickness positions 3 (U\_BF3), measurement of 10<sup>th</sup>-11<sup>th</sup> rib (BF10R) and fillet weight (FW), the R<sup>2</sup> model was high (0.828). The ultrasound measurements are accurate.

*Keywords: carcass quality, real-time ultrasound, swine*

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## **Body growth of Thai wild boar (*Sus scrofa jubatus*) within a yearling age in a deep litter pig production system**

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### **Abstract**

The objective of this study was to investigate development of body growth of Thai wild boar (*Sus scrofa jubatus*) within a yearling age in a deep - litter pig production systems. A total of 10 piglets, at 151 days of age (5 months), at 11.51 kg of average body weight were placed into a deep - litter house, received commercial diet and mixed local roughage; used grated coconut, Napier grass banana stalk and palm kernel (20/80 as fed) and fill bedding materials with 5 parts of coconut coir, 5 parts of coffee hulls and 1 part of soil and topping by salts about 500 g and addition of a bacterial mixture as 30 cm height layer and repeated 2 times to completed 90 cm. height. At the end of the first phase of the experiment at 365 days of age (Yearling). The study reveal that the body weight of Thai wild boar in a deep - litter pig production systems were very low in all age categories. Mean body weight was 17.6 kg. While the maximum and the minimum body weights were 13.4 kg and 25.3 kg. The age categories of deep - litter pig wild boar, as similar to a confined wild boar study, could be defined as piglets (4 - 6 months old with 12.23 kg average body weight), young (7 – 11 months old with 16.64 kg average body weight), and the beginning of subadults (12 months old with 17.6 kg average body weight). The average final weight was 17.6 kg as presented as subadults. The average daily gain was 29 g during 214 days of the study.

*Keywords: wild boar, body growth, deep – litter pig production, Sus scrofa jubatus*

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## Consumer attitude toward meat consumption in Ghana

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### Abstract

**MATERIALS:** The data used in this report were taken from the survey for meat consumption among staff and students of Ghana University. Questionnaire surveys were undertaken September in 2013 by placement method. Data was obtained from 28 respondents in University of Ghana (Male 21, Female 6, NA 1).

**RESULTS:** 1) Preference for meat and fish; The extent of preference for meat and fish was classified using a five-point semantic differential (SD) scale. The average preference rating of respondents was highest for fish, following by goat, bush meat, chicken, beef, pork, and sheep, which was not so high evaluation. 2) Purchasing and using behavior; Among the average estimated consuming frequency per week of meat and fish; fish was 2.02 times a week, most frequently, following by chicken, beef, goat, sheep, pork and bush meat. And the consuming amount eating on each occasion was also fish was most consumed following by chicken. From the result of frequency and amount eating on each occasion for meat and fish, average consumption of fish was most, 320gram per week per person, followed by chicken, sheep, pork, goat, beef, and bush meat. 39.3 percent of respondents did not eat bush meat at all (whereas proportion of respondents did not eat; pork and sheep-28.6%; fish-14.3%; goat-10. 7%; chicken-7.3%; beef-3.6%). Rate of respondent level of concern when they purchase each meat and fish were classified using a five-point SD scale. The average important point index was highest for taste ( $4.82 \pm 0.08$ ), following by expiration date, appearance, safety, freshness, and so on. 3) Safety consciousness; The level of risk perceived by respondents associated with eating domestic and imported meat were classified using a five-point SD scale. The average level of uneasiness for eating all of domestic and imported meat and fish indicated under 3, which means respondents worried about safety of all of meat and fish sold. Domestic pork indicated by respondent was  $1.84 \pm 0.24$ , which was lowest. There were no difference between each domestic meat and imported meat significantly. 4) Attitudes toward future consumption of meat and other food; A five-point SD scale was used to rate respondents on their plans for future consumption of meat and other food. Average ratings on plans for future food consumption was highest for vegetable, following fruits, fish, and yoghurt, whereas other meat and food was rated below 3, which indicated low possibility on increasing meat and other animal products.

*Keywords: meat consumption, consumer behavior, ghana*

## Role of operator equations in biological sciences

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### Abstract

Most of the natural and biological many processes or phenomena in the universe are not straight forward and involve jumps or discontinuous. Again, almost all such natural and biological phenomena involve the decay or growth, that is, the change in the state with respect to the time period. Hence present investigation was carried out to study the role of operator equations in biological sciences. Therefore in the present investigation these problems formulated as nonlinear equations involving discontinuous terms and modelled on the systems of nonlinear equations have been used. So for this investigation fixed point method which is powerful tool for existence of the solution of nonlinear functional integral and differential equations has been used. From the present investigation it is concluded that the solution for a fractional order nonlinear functional differential equation in Banach algebra via a hybrid fixed point theorem can be used in biological sciences.

*Keywords: Banach algebra, fractional order, nonlinear functional differential equation, existence result.*

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## Prevalence study of gastrointestinal parasites in goats from small farms in and around Bangkok, Thailand

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### Abstract

The objectives of this study were to assess the prevalence of gastrointestinal parasites in goats from 16 small farms around Bangkok and nearby provinces, and in addition to provide classification based on egg's morphology in this central region of Thailand. 185 goats (dairy and meat) aged between six to 30 months were used in this study. Fresh fecal samples were collected directly from goats' rectum during the sampling period from September 2014 to October 2014. Fecal samples were examined for eggs and cysts of internal parasites by floatation method with saturated salt solution and counted by Modified McMaster technique. Total herd prevalence for this sampling area was 100% with 68.65% individual prevalence of infection. Among the infected goats, 43.31% were involved in mixed infection and 41.73 and 14.96% were infected with single type of parasites which is helminth and protozoa, respectively. From 127 infected goats, the prevalence according to the species based on egg's morphology were; nematodes including Strongyles group (76.38%) and *Strongyloides papillosus* (24.41%), cestodes including *Moniezia expansa* (7.87%) and protozoa including *Giardia* spp. cyst (8.66%) and unsporulated coccidian oocyst, *Eimeria* spp. (59.84%). The present study has confirmed the infection of gastrointestinal parasites in Bangkok and nearby areas with Strongyle group is the common species.

**Keywords:** prevalence, gastrointestinal parasites, small farms, Bangkok and nearby

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## Antimicrobial susceptibility profiles of potential lactic acid bacteria isolated from grazing ducks and geese in Thailand

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### Abstract

The disc diffusion method was performed to determine antimicrobial susceptibility profiles of twenty-eight lactic acid bacteria isolated from ducks and geese in Thailand, as it currently suggested by Food and Agriculture Organization/World Health Organization. The isolates were tested with ampicillin, ciprofloxacin, erythromycin, gentamycin, tetracycline and vancomycin. The results showed that 17.86% of isolates were resistant to all of antimicrobial used in this study, 17.86% were resistant to 10 µg ampicillin, 92.86% were resistant to 5 µg ciprofloxacin, 17.86% were resistant to 15 µg erythromycin, 17.86% were resistant to 120 µg gentamycin, 17.86% were resistant to 30 µg tetracycline and 92.86% were resistant to 30 µg vancomycin.

*Keywords: antimicrobial susceptibility, ducks, geese, lactic acid bacteria, probiotic*

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