PROCEEDINGS

VOLUME II

The 2nd International Conference
on Animal Nutrition and Environment
(ANI-NUE2017)

"Towards the Betterment of Animal Productivity, Conserving Resources and Environment"

November 1-4, 2017

Pullman Raja Orchid Hotel,
Khon Kaen, Thailand

EDITORS: Cherdthong, A., Foiklang, S., Mapato, C., Pilajun, R., Kang, SC. and Wanapat, M.

ISBN: 978-616-438-084-4

Organized by

Tropical Feed Resources Research and Development Center (TROFREC), Department of Animal Science,
Faculty of Agriculture, Khon Kaen University

In Recognition for

Professor Dr. Metha Wanapat

"The Khon Kaen University Distinguished Research Professor"

for

His 37 years of continuous serving in teaching, research, education, technology development, and transfer in Animal Science nationally and internationally.

The 2nd International Conference on Animal Nutrition and Environment (ANI-NUE2017) Organizing Committee,

November 1, 2017

PROCEEDINGS

of

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Pullman Raja Orchid Hotel, Khon Kaen, Thailand

Welcome Remarks

by

Professor Dr. Metha Wanapat

Dear Distinguished Scientists, Friends, Ladies and Gentlemen, Sawaddee Krub!

It is my great pleasure and honor to warmly welcome and to express my most appreciation and sincerity to all participants and supporters of The 2nd ANI-NUE2017 International Conference at Pullman Raja Orchid Hotel, Khon Kaen, Thailand, Nov 1-4, 2017, with the theme of "Towards the betterment of animal productivity, conserving resources and environment".

To refresh the memories, the 1st ANI-NUE2012 was organized here with full participation and great achievements. It is the prime time now for the 2nd ANI-NUE to be organized with great interest, enthusiasm and participation of both senior and young animal scientists from around the world.

With the rapid growth of global population and climate changes, it is highly inevitable that animal agriculture and the development of highly-qualified animal scientists would be in great demand, consequently.

I am confident that the gathering of all participants at the 2nd ANI-NUE would be prosperous, knowledge-enriching, collaborative-connecting and interactive-entertaining. The great successful of the conference in all dimensions is from the hard grit and determination of all organizing committee members under the chairman, Assist. Prof. Dr. Anusorn Cherdthong. The efforts of mutual implementations will certainly prosper their future undertakings and to promote the animal agriculture. The mindful attention and generous support of universities, institutions, organization, companies and all personal are gratefully acknowledged.

I wish to express my personal gratitude and willingness to all participants both nationally and internationally for the deep understanding and well-cooperation, as well as their contributions making the 2nd ANI-NUE successfully-unique conference. Beyond the 2nd ANI-NUE, I would encourage all participants to continue their keen deliberations through the future ANI-NUE to support the research and development of animal agriculture.

Ladies and gentlemen, may I alert you that the success and achievement of the 2nd ANI-NUE is from two pillars – one is from gaining knowledge and experience-sharing and another one is the happiness, socially-interactive exchanges among all ages of animal scientists, which are now already initiating and shining throughout the conference.

Ladies and gentlemen, friends of all ages, I truly believe that "Youth has no age", as it has been inspired and brightened by our Professor Dr. Charan Chanthalakhana, who has been showing and reiterating the importance of the interactions and continuation of hard work. This confidence is one of the kinds that connect all generations together to help promote and develop the "Animal Agriculture". Please enjoy yourself and be enriched with happiness, wealthiest, prosperity and the continuation beyond!

Finally, as the President of the 2nd. ANI-NUE Int. Conf. I wish to express my heart-felt gratitude to Khon Kaen University, and all the Co-host Institutions as well as supporters, donors and friends. Special thanks are extended to the Organizing Committee Members, led by Assistant Professor Dr. Anusorn Cherdthong including all current and former students who have been putting enormous efforts for the success of the conference.

With my warm greetings, hospitality and best wishes for all your deliberations.

Thank you very much! Sawaddee Krub!

Professor Dr. Metha Wanapat

President, the 2nd ANI-NUE2017 International Conference

Message from the Chairman of ANI-NUE2017

Dear Participants,

On behalf of the Organizing Committee, it is my great pleasure to present to you the organization of the 2nd International Conference on Animal Nutrition and Environment (ANI-NUE2017) held at Khon Kaen, Thailand, during November 1- 4, 2017.

The 2nd ANI-NUE Int. Conf. 2017 brought together leading experts specializing in animal nutrition and environment to discuss the current frontier issues in this area, and to promote awareness of ongoing research achievements. With a wide range of topics covering multiple aspects of animal nutrition and environment, this conference offered participants the most up-to-date information on advances of the researches of animal nutrition and environment to promote and develop animal agriculture.

May I report that this week, there are about 150 participants represented from more than 20 countries are here to attend the 2nd ANI-NUE2017 and present their research findings and ideas for promotion of "Towards the Betterment of Animal Productivity, Conserving Resources and Environment". There are 99 oral presentations at this conference including invited speakers (Key-note, Plenary, Lead speakers). In addition, a special forum for young scientists on "How to improve writing papers to submit to International Journal with high Impact factor" and exhibition booths are organized. I would like to thank all of the researchers for submitting their works and all members of the Organizing Committee for their co-operation and hence making in the conference a great success.

I am grateful to Prof. Dr. Metha Wanapat, ANI-NUE2017 President, and all the members of the International Advisory Committee for the valuable advices and support during the preparation of this conference. My sincere thanks are due to all the co-host institutions, and sponsors without the support of whom a Conference of this scale would not have been possible.

In addition, this is a remarkable occasion in recognition for Professor Dr. Metha Wanapat "The Khon Kaen University Distinguished Research Professor" for his Outstanding Long-Term Contribution and Dedication in Education, Research and Development in Animal Science especially in Ruminant Nutrition, both nationally and internationally. Despite his reaching 65 years of age, he is still strong, physiology and mentally in serving the academic arena in the future to come. We all wish to congratulate him for the high dedication and inspiration to develop human researchers especially the young scientists.

On behalf of the Organizing Committee members and the Advisory Board, we wish you all the best, great health and prosperity. Please enjoy your stay in Khon Kaen and have a successful Conference. Again, thank you for your kind cooperation.

With my best wishes!

A. Cherdthong

Assistant Professor Dr. Anusorn Cherdthong

Chairman, the 2nd ANI-NUE2017 International Conference

Message from the editorial board

Dear Participants,

On behalf of the Chair, Academic Committee, we would like to welcome you to The 2nd International Conference on ANI-NUE2017, 1-4 Nov 2017, Pullman Raja Orchid Hotel, Khon Kaen, Thailand. Your participation is important to make the event become meaningful and successful. This conference provides not only an opportunity to discuss and exchange experience and information with people who have the same interests from the different regions of the world but also a good environment to meet people and build up friendship among nations. The primary objective of ANI-NUE2017 is to provide a venue for animal nutritionists, agriculturists or environmentalists (academicians, researchers, administrators and livestock producers), to share their experiences and develop collaborations and to enhance development of animal nutrition, environmental friendly concerns in their respective countries. We also welcome our colleagues from the related fields to contribute to the above objectives.

This week, there are about 150 participants from more 20 countries are here to attend the 2nd ANI-NUE2017 and present their research findings and ideas for promotion of "Towards the Betterment of Animal Productivity, Conserving Resources and Environment". There are 100 oral presentations at this conference including invited speakers (Key-note, Plenary, Lead speakers). In addition, a special forum for young scientists on "How to improve writing papers to submit to International Journal with high Impact factor" and exhibition booths are organized.

The overall conference, it includes Key-note, Plenary, invited papers, scientific abstract papers, full papers in CD- ROM, field trip, exhibition booths and a full social program.

We wish to thank the members of local organizing committee, the international advisory committee (IAC), international scientific committee, reviewers, all co-hosts, KKU graduate students, all ANI-NUE2017 committees and all individuals who have contributed in so many ways to make this conference a great success and enjoyable.

With best wishes!

On behalf of editorial board, the 2nd ANI-NUE2017 International Conference

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Organizing Committee: ANI-NUE2017

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Chairman: Assistant Professor Dr. Anusorn Cherdthong

Scientific: Assistant Professor Dr. Anusorn Cherdthong

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Others

ANI-NUE2017 Proceedings of the 2nd International Conference on Animal Nutrition and Environment, "Towards the betterment of animal productivity, conserving resources and environment": November 1-4, 2017, Pullman Raja Orchid Hotel, Khon Kaen, Thailand.

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Conference Program

The 2nd International Conference on Animal Nutrition and Environment (ANI-NUE2017)
"Towards the Betterment of Animal Productivity, Conserving Resources and Environment"

November 1-4, 2017, Pullman Raja Orchid Hotel, Khon Kaen, Thailand

October 31, 2017	
04:00 pm-20:00 pm	Arrival of participants / Pre-Registration at Orchid ballroom I
November 1, 2017	
	Orchid ballroom I
08:00 am-09:00 am	**Registration**
09:00 am-10:15 am	**Opening Ceremony**
10:15 am-10:30 am	***Coffee/ tea break***
10:30 am-11:15 am	**Chairperson:** Prof. Dr. Metha Wanapat-Thailand **Key-note speaker:** Prof. Dr. Charan Chanthalakhana-Thailand **"Sufficiency Economy Philosophy as a Framework for the Promotion of Sustainable Agriculture and Better Life Quality"**
11:15 am-12:00 am	**Key-note speaker:** Prof. Dr. Junichi Takahashi-Japan **"Prospect on Mitigation of GHG and Renewable Energy Towards Sustainable Animal Agriculture"**
12:00 am-01:00 pm	***Lunch***

	Session 1-Orchid ballroom I	*Session 2-Arawan I*
01:00 pm-01.30 pm	**Chairperson:** Prof. Dr. Federico Infascelli-Italy	**Chairperson:** Prof. Dr. Junichi Takahashi-Japan
	Co-Chairperson: Assist. Prof. Dr. Sineenart Polyorach-Thailand	**Co-Chairperson:** Assist. Prof. Dr. Nirawan Gunun-Thailand
	Invited speaker: Assoc. Prof. Dr. Suneerat Aiumlamai-Thailand **"Thai Dairy Productivity: Milk Quality and Days Open"**	**Invited speaker:** Prof. Dr. Vu Dinh Ton-Vietnam **"Current Non-ruminant Production and Future Prospects in Vietnam"**
01:30 pm-01:42 pm	**ANN-01-0006: "Metabolizable Protein Requirements of Lactating Buffaloes (*Bubalus bubalis*) Fed on Silage Based Diet"** *Umesh Balaji Sontakke , Shivlal Singh Kundu , Sonali prusty, Gautam Mondal, Vijay Kumar Sharma and Muneendra Kumar-India*	**ANN-01-0052: "Feeding POAB at Different Level of Amino Acids in The Diet of Broiler Chickens"** *C.H. Goh, T.C. Loh, H.L. Foo, and N. Frisco-Malaysia*
01:42 pm-01:54 pm	**ANN-01-0093: "Supplementation of mangosteen peel and banana flower pellet (MABAP) to improve ruminal fermentation and milk production in dairy cows"** *Thiwakorn Ampapon and Metha Wanapat-Thailand*	**ANN-01-0089: "Effects of purple glutinous rice residue meal in concentrate diets on growth performance in growing pigs"** *Walailuck Kaewwongsa and Attapong Piladang-Thailand*
02:54 pm-02:06 pm	**ANN-01-0015: "Energy Utilization, VFA, and A/P Ratio of Kacang Goat Fed Total Mixed Ration Containing Different Treatments of Soybean Meal"** *Kustantinah, I Gede Suparta Budisatria, Rusman and Retno Adiwinarti-Indonesia*	**ANN-01-0010: "Effect of Diet Containing Dragon Fruit Peel Meal Fermentation for Productivity of Kampung Chickens"** *Gusti A.M.Kristina Dewi, I M. Nuriyasa, and I Wayan Wijana-Indonesia*
02:06 pm-02:18 pm	**ANN-01-0063: "Feed intake and digestibility of dairy cows affected by mao (*Antidesma thwaitesianum* Muell. Arg.) pomace meal supplementation"** *Pongsatorn Gunun, Nirawan Gunun, Thanaporn Ouppamong, Srisuda Sirilaophaisan, Anusorn Cherdthong, Kessara Ampaporn, Paiwan Punyakaew, Metha Wanapat and Sineenart Polyorach-Thailand*	**ANN-01-0103: "Effect of rice wine by-product as alternative protein source on growth performance of broiler chickens"** *Benya Saenmahayak, Smerjai Bureenok, Chalermpon Yuangklang, Sasiphan Wongsuthavas, and Kraisit Vasupen-Thailand*
02:18 pm-02:30 pm	**ANN-01-0030: "Performance and Physiological Status of Kids Milking by Milk Replacer Containing Cricket Meal"** *Dewi Apri Astuti, Lilis Khotijah and Rika Damanik-Indonesia*	**ANN-01-0035: "A Comparison of Fat-Soluble Antioxidants in Wild and Farm-Reared Chukar Partridges (*Alectoris Chukar*)"** *Filiz Karadasa, Anders Pape Møllerb , and Mehmet Reşit Karageçili-Turkey*
02:30 pm-02:42 pm	**ANN-01-0080: "Variations in milk composition between morning and afternoon milking in dairy cow"** *Chamnanwit Promkot, Pitukpol Porn-anek, and Lerdchai Phu-oob-Thailand*	**ANN-01-0101: "Used dried cassava leaves with enzymes from fermented tomato pomace with *Aspergillus niger* in laying duck diet on nutrient digestibility"** *Kraisit Vasupen, Savang Saykhammy, Sasiphan Wongsuthavas, Chalermpon Yuangklang, Smerjai Bureenok, Benya Saenmahayak-Thailand*
02:42 pm-03.00 pm	***Coffee/ tea break***	

	Session 3-Orchid ballroom I	*Session 4-Arawan I*
	Chairperson: Prof. Dr. Effendi Abustam-Indonesia	**Chairperson:** Prof. Dr. Agung Purnomoadi- Indonesia
	Co-Chairperson: Dr. Thitima Norrapoke -Thailand	**Co-Chairperson:** Dr. Ratchataporn Lunsin -Thailand
03:00 pm-03:12 pm	**ANN-01-0001: "Effect of Increasing Energy and Protein Ration on Nutrient Digestibility and Performance of Bali Heifer Calves"** *Ni Nyoman Suryani, I Wayan Suarna, I Gede Mahardika and Ni Putu Sarini-Indonesia*	**ANN-01-0012: "Use of *Bacillus subtilis* to Produce Feather Meal for Animal Feeds and Organic Fertilizers"** *Chi-Chu Lo, Liang-Yi Lin, and Shu-Chuan Chen-Taiwan*
03:12 pm-03:24 pm	**ANN-01-0003: "Metabolizable Energy of Cassava Pulp for Thai Native Beef Cattle"** *Ornvimol Keaokliang, Tomoyuki Kawashima, Wanna Angthong, Tomoyuki Suzuki, and Ramphrai Narmseelee-Japan*	**ANN-01-0032: "Assessment of Metabolizable Energy, Nutrients Digestibility and Fatty Acids Composition of Fat Crystals Derived from Crude Palm Oil in Chickens"** *Sarawut Treetan, Sonthaya Numthuam, Rangsun Charoensook, Wandee Tartrakoon, Papichaya Incharoen, and Tossaporn Incharoen-Thailand*
03:24 pm-03:36 pm	**ANN-01-0008: "Application of Pressurized Heating in Production Process of Bali Cattle Fur Meal to Its Nutrient"** *Muhammad Irfan Said, Farida Nur Yuliati, Muhammad Zain Mide, Wempie Pakiding and Hamri-Indonesia*	**ANN-01-0034: "Effect of Dietary Supplementation of Cinnamon and Curcumin on Performance, Humoral immune Responses, and Blood lipid Profile in Rabbits"** *Hassan Zeweil, Soliman Zahran, Mohamed Ahmed, Yasmin El-Gindy and Nagat Khoshera-Egypt*
03:36 pm-03:48 pm	**ANN-01-0073: "Effect of ß-glucan supplementation on feed intake, digestibility and rumen fermentation in Thai native beef cattle"** *Anusorn Cherdthong and Anuthida Seankamsorn-Thailand*	**ANN-01-0033: "Study on The Growth Performance, Meat Quality and Bone Breaking Strength of Broilers fed Dietary Rice Hull Silicon"** *Sarawoot Nakhon, Sonthaya Numthuam, Rangsun Charoensook, Wandee Tartrakoon, Papichaya Incharoen, and Tossaporn Incharoen-Thailand*
03:48 pm-04:00 pm	**ANN-01-0040: "Ruminal Nitrogen Release from Limestone-Urea Mixture"** *M. Ainsyar Harahap, Limbang K. Nuswantara, Eko Pangestu, Fajar Wahyono and Joelal Achmadi-Indonesia*	**ANN-01-0064: "The effects of organic corn level decreasing in organic laying hen diets on egg production and egg quality"** *KANN-01ikar Hamprakorn, Buaream Maneewan, Tonglian Buwjoom and Sukit Khantaprab-Thailand*
04:00 pm-04:12 pm	**ANN-01-0074: "Effect of sulfur levels supplementation in fermented total mixed ration containing fresh cassava root using F gas production technique"** *Chanadol Supapong and Anusorn Cherdthong -Thailand*	**ANN-01-0067: "Factors Effecting on Rabies Immunity Titer in Canine"** *Suraphong Wongsutthawart, Bundit Nuansrichay, Ratchaneekorn Vitoonpong, Kongkul Kaskosol, Lamul Molee and Sasiphan Wongsuthavas-Thailand*
04:12 pm-04:24 pm	**ANN-01-0042: "The Performance of Extension Agent in Improving Adoption The Technology Beef Cattle Feed"** *Agustina Abdullah, Jamila, and A. Amrullah-Indonesia*	**ANN-01-0011: "Antibacterial activity of *Phaleria macrocarpa* fruit extracts: an *In vitro* study"** *Niati Ningsih, Bambang Ariyadi, and Zuprizal-Indonesia*
07:00 pm-10:30 pm	**Welcome party-Orchid ballroom I**	

November 2, 2017		
	Orchid ballroom I	
08:00 am-09:00 am	**Registration**	
09:00 am-09:40 am	**Chairperson:** Prof. Dr. Ermias Kebreab-U.S.A.	
	Plenary speaker: Prof. Dr. Metha Wanapat-Thailand **"Diversity of Feed Resources and their Potential to Improve Ruminant Production and Mitigate Enteric Methane"**	
09:40 am-10:20 am	**Plenary speaker:** Prof. Dr. Peter Rowlinson-U.K. **"Strategies to Increase The Efficiency of Nutrient Utilization"**	
10:20 am - 10.30 am	***Coffee/ tea break***	
10:30 am-11:00 am	***Session 5-Orchid ballroom I***	***Session 6-Arawan I***
	Chairperson: Assist. Prof. Dr. Chalermpon Yuangklang-Thailand	**Chairperson:** Prof. Dr. Vu Dinh Ton -Vietnam
	Co-Chairperson: Dr. Umesh Balaji Sontakke-India	**Co-Chairperson:** Assist. Prof. Dr. Sasiphan Wongsuthavas-Thailand
	Invited speaker: Dr. Pattaya Napasirth and Dr. Viengsakoun Napasirth-Lao, PDR. **"Ruminant Production in Lao, PDR."**	**Invited speaker:** Assoc. Prof. Dr. Monchai Duangjinda-Thailand **"Tropical Animal Genetic and Environment Impact"**
11:00 am - 11:12 am	**ANN-01-0050: "Development strategies for dairy cattle production system and milk products in northeast of Thailand: Policy framework and challenges"** *Theerachai Haitook, Samruay Ninking, Phruetthinun Chukasem, Wuttikorn Srakaew and Naritsara Suayroop-Thailand*	**ANN-01-0005: "Genetic Polymorphisms of Alphas1-Casein (CSN1S1) Gene In Indonesian Local Goat Population Reared In South Sulawesi Province"** *Muhammad Ihsan Andi Dagong, Lellah Rahim, RR Sri Rachma Aprilita Bugiwati, Magfirah Nur, and Nurul Purnomo-Indonesia*
11:12 am - 11:24 am	**ANN-01-0058: "Beef Cattle Feeding Management of Smallholder Farmers in Kon Tum City, Vietnam"** *Ratchataporn Lunsin, Thai Thi Bich Van, Truong Thi Tu Trinh and Somporn Daunyai-Thailand*	**ANN-01-0079: "Induction of follicular growth and atresia: Expression of aromatase mRNA in the ovary of *Bos Indicus*"** *Nattawut Kogram, Vilaivan Khanthusaeng, Surapong Tongrueng, Thunya Bunma and Chainarong Navanukraw-Thailand*
11:24 am - 11:36 am	**ANN-01-0016: "Formaldehyde Protected Soybean Meal in Total Mixed Ration for Kacang Goat to Increase the Production"** *Retno Adiwinarti, I Gede Suparta Budisatria, Kustantinah, and Rusman, and Edwin Indarto-Indonesia*	**ANN-01-0037: "The effect of bull (*Bos indicus*) and extender medium to additional antioxidant α-tocopherol of cryopreservation sperm post-thawing to minimize of repeat breeding"** *ANN-01a Farhana, Ismaya, and Nono Ngadiyono-Indonesia*

11:36 am - 11:48 am	**ANN-01-0056: "Effects of different tropical grasses on feed intake and blood metabolite of goats"** *Pin Chanjula, Rawee Chiarawipa and Phantip Panklang-Thailand*	**ANN-01-0083: "Early embryonic development, corpus luteum and metabolite of PGF in lactating dairy cows supplemented with palm or sunflower oil"** *Aree Kraisoon, Jaruwan Kaokejon, Wiroon Inthamonee, and Chainarong Navanukraw-Thailand*
11:48 am - 12:00 am	**ANN-01-0004: "Application of Tunnel-Ventilated Barn in Tropical Dairy Industry: A review"** *Aan Andri Yano, Adiarto, and Diah Tri Widayati-Indonesia*	**ANN-01-0086: "Development of corpus luteum in goats: interaction between progesterone concentration and luteal cell proliferation"** *Thanya Bunma, Chainarong Navanukraw, Vilaivan Khanthusaeng, Aree Kraisoon and Nattawut Kogram-Thailand*
12:00 am-01:00 pm	***Lunch***	
01:00 pm-01.30 pm	***Session 7-Orchid ballroom I***	***Session 8-Arawan I***
	Chairperson: Assoc. Prof. Dr. Pramote Paengkoum-Thailand	**Chairperson:** Prof. Dr. Gusti Ayu Mayani Kristina Dewi-Indonesia
	Co-Chairperson: Dr. Onanong Poungchompu-Thailand	**Co-Chairperson:** Dr. Viengsakoun Napasirth-Lao, PDR.
	Invited speaker: Assist. Prof. Dr. Anusorn Cherdthong-Thailand **"Potential use of Alternative Source of Protein in Ruminant Feeding"**	**Invited speaker:** Dr. Kalaya Boonyanuwat-Thailand **"The Influence of Climate Change and the Strategy for Producing Tropical Animals"**
01:30 pm-01:42 pm	**ANN-01-0018: "Optimation Total Digestible Nutrients - Protein Ratio To Achieve Good Feed Conversion Ratio In Indonesian Native Beef Cattle"** *Nadlirotun Luthfi, Edy Rianto and Agung Purnomoadi-Indonesia*	**ANN-01-0017: "The Effect of Liquid Smoke on Methane Emission from Faces"** *Vita Restitrisnani, Khanza Syahira Dhia, Tegar Wicaksono, Edy Rianto, and Agung Purnomoadi-Indonesia*
01:42 pm-01:54 pm	**ANN-01-0049: "Dietary Protein Requirement for Maintenance and Growth of Southern Thai Indigenous Cattle"** *O. Pimpa, B. Khamseekhiew, B. Pimpa and S. Ruengsuwan-Thailand*	**ANN-01-0057: "Effects of sunflower oil and nitrate supplementation on methane production and rumen fermentation by using in vitro gas production technique"** *Jiravan Khotsakdee, Chalermpon Yuangklang, Siwaporn Paengkoum and Pramote Paengkoum-Thailand*
02:54 pm-02:06 pm	**ANN-01-0019: "The effect of dietary protein intake on body protein growth in Thin Tailed Lambs"** *Ari Prima, Nadlirotun Luthfi, Edy Rianto, Endang Purbowati and Agung Purnomoadi-Indonesia*	**ANN-01-0043: "In Vitro Rumen Microbial Population and Fermentation with The Addition of *Sapindus rarak* Extract and Sesame/Canola Oils Microencapsulation"** *Sri Suharti, Isma Firliani,and Komang Gede Wiryawan-Indonesia*
02:06 pm-02:18 pm	**ANN-01-0092: "Effect of yeast fermented cassava pulp (YFCP) supplementation on feed intake, digestibility and rumen fermentation in beef cattle"** *Sukruthai Sommai, Metha Wanapat, Chaowarit Mapato and Pajaree Totakul-Thailand*	**ANN-01-0097: "Effect of Dragon fruit (*Hylocercus undatus*) peel powder and roughage to concentration ratio on gas production kinetics, digestibility, and fermentation using in vitro gas production technique"** *Maharach Matra , Metha Wanapat , Suban Foiklang , Chaowarit Mapato , Thiwakorn Ampapong , Bounnaxay Viennasay and Ahkarapon Nunoia-Thailand*

02:18 pm-02:30 pm	**ANN-01-0095: "Influences of Yeast fermented potato peel and cassava peel on gas kinetics and digestibility using in vitro gas technique"** *Suban Foiklang, Risa Japanya, Phanuphong Ounpon, Metha Wanapat, Anusorn Cherdthong, Thitima Norrapoke, and Kampanat Phesatcha-Thailand*	**ANN-01-0066: "Hematology and physiological responses as indicator of heat tolerance"** *Pitukpol Porn-anek, Chamnanwit Promkot, and Thaweechai Phuard-Thailand*
02:30 pm-02:42 pm	**ANN-01-0098: "Effect of yeast fermented dehulled rice (YEFEDER) levels with different kind of roughage on gas production and in vitro degradability using in vitro gas production technique"** *Pajaree Totakul ,Metha Wanapat, Suban Foiklang, Chaowarit Mapato, and Sukruthai Sommai-Thailand*	**ANN-01-0071: "Effects of supplementation of Piper sarmentosum leaves powder in concentrates on feed efficiency, rumen fermentation and protozoa in Thai native beef cattle"** *Anusorn Cherdthong and Benjamad Khonkhaeng-Thailand*
02:42 pm-03.00 pm	***Coffee/ tea break***	
	Session 9-Orchid ballroom I	***Session 10-Arawan I***
	Chairperson: Assoc. Prof. Dr. Filiz Karadas-Turkey	**Chairperson:** Dr. Kalaya Boonyanuwat-Thailand
	Co-Chairperson: Dr. Siwaporn Paengkoum-Thailand	**Co-Chairperson:** Dr. Muhammad Ihsan Andi Dagong- Indonesia
03:00 pm-03:12 pm	**ANN-01-0061: "Determination of level protein intake to control fat and protein in carcass of fattened lambs"** *Rizky Choirunnisa, Mukh Arifin, Robert Kussetyawan, Febrian Rhamadya, Ari Prima, Vita Restitrisnani, Nadlirotun Luthfi, Sutaryo and Agung Purnomoadi-Indonesia*	**ANN-01-0013: "Use of Body Measurements to Predict Intermuscular Fat in Thin-tailed Lambs"** *Ulia Renfelia Baysi, Ari Prima, Farah Nabila, Pradhipta Hersandika, Endang Purbowati, Christina Maria Sri Lestari, and Agung Purnomoadi-Indonesia*
03:12 pm-03:24 pm	**ANN-01-0044: "Effect of yeast-fermented cassava pulp levels on growth performance of growing goats fed Napier Pakchong 1 grass"** *Saran Parisuthikul, Tichakorn Thumtong, Theerasant Phothee, Panuwat Teebklang, Wunchai Inthiseang, Wichan Kaewluan and Ruangyote Pilajun-Thailand*	**ANN-01-0099: "Effect of inclusion of enzyme from fermented tomato pomace with *Aspergillus niger* (FETPAN) in total mixed ration on feed intake and growth performance in beef cattle"** *Chalermpon Yuangklang, Jiravan Khotsakdee, and Krisit Vasupen-Thailand*
03:24 pm-03:36 pm	**ANN-01-0102: "Effect of mangosteen peel liquid protected soybean meal on methonogen and microbial population using in in vitro gas fermentation technique"** *Kampanat Phesatcha, Burarat Phesatcha, Suban Foiklang, Metha Wanapat-Thailand*	**ANN-01-0100: " Influence of Tropical Roughages Combined with Urea and Bamboo Grass (*Tiliacora Triandra*, Diels) Supplementation on Gas Production and *In Vitro* Degradability"** *Chaichana Suriyapha, Metha Wanapat and Chinda Wann-Thailand*
03:36 pm-03:48 pm	**ANN-01-0082: "Fermentation quality and *in vitro* digestibility of fermented total mix ration with difference roughage and fermentation period"** *Pichad Khejornsart, Teerayoot Jantanam and Metha Wanapat-Thailand*	**ANN-01-0087: "Effect of Bamboo grass (*Tiliacora Triandra*) pellet supplementation on feed intake, nutrient digestibility and rumen microbial population in Thai native beef"** *Chinda Wann, Metha Wanapat, Choawarit Mapato and Chaichana Suriyapha-Thailand*

03:48 pm-04:00 pm	**ANN-01-0076: "Effect of replacement soybean meal by yeast waste on feed intake and rumen ecology in Thai native beef cattle"** *Anusorn Cherdthong, Phussorn Sumadong, Suban Foiklang, and Nipa Milintawisamai-Thailand*	**ANN-01-0105: "*In Vitro* Fermentation and Methane Production Influenced by Leucaena Silage and Mangosteen Peel Powder"** *Sungchhang Kang, Metha Wanapat, Ratana Khun, Laiheang Chhen, Piseth Try, Kimsan Sok, Ratha Long and Vannak Un-Cambodia*
04:00 pm-04:12 pm	**ANN-01-0077: "Chemical composition and In vitro gas production of the local Thai and India Moringa (*Moringa oleifera* Lam.) for ruminant"** *Chaiyawan Wattanachant, Nattha Rattanakosol, Chaermpon Yuangklang, and Apichat Loopachr-Thailand*	**ANN-01-0106: "Influence of Bamboo Leaf Meal Supplementation on *In Vitro* Gas Production and Digestibility"** *Sungchhang Kang and Metha Wanapat-Cambodia*
04:12 pm-05:30 pm	**Orchid ballroom I**	
	Chairperson: Prof. Dr. Metha Wanapat-Thailand	
	Invited speaker: Prof. Dr. Peter Rowlinson-U.K.	
	"Young Scientist Forum-How to Prepare Well for Publication in the International Journals with High Impact Factor "	
November 3, 2017		
	Orchid ballroom I	
08:00 am-09:00 am	**Registration**	
09:00 am-09:40 am	**Chairperson:** Prof. Dr. Peter Rowlinson-U.K.	
	Plenary speaker: Prof. Dr. Ermias Kebreab-U.S.A. **"Sustainable Intensification of Animal Systems in Emerging Economies"**	
09:40 am-10:20 am	**Plenary speaker:** Prof. Dr. K. Sarjan Reddy-India	
	"Climate Smart Livestock Production Systems (CSLPS)- A Novel Approach to Balance the Changing Climate"	
10:20 am - 10.30 am	***Coffee/ tea break***	
	Session 11-Orchid ballroom I	***Session 12-Arawan I***
	Chairperson: Assist. Prof. Dr. Anusorn Cherdthong-Thailand	**Chairperson:** Dr. Pakapun Skunmun-Thailand
	Co-Chairperson: Dr. Ni Nyoman Suryani- Indonesia	**Co-Chairperson:** Dr. Goh Chong Hau-Malaysia
10:30 am-10:42 am	**ANN-01-0075: "Effect of Banana flower powder contained in high quality feed block and roughage to concentrate ratio on in vitro gas production kinetics, digestibility and fermentation"** *Suban Foiklang, Metha Wanapat, Bounnaxay Viennasay, and Thitima Norrapoke-Thailand*	**ANN-01-0072: "Inclusion of yeast waste as protein source to replace soybean meal in concentrate diet on ruminal fermentation and kinetics of gas using a gas production technique"** *Anusorn Cherdthong, Rittikeard Prachumchai, Chanadol Supapong, Metha Wanapat, Suban Foiklang, and Nipa Milintawisamai-Thailand*

10:42 am-10:54 am	**ANN-01-0047: "Feed intake and blood metabolite of goats fed urea-calcium hydroxide treated oil palm frond"** *Pin Chanjula, Suradech phetarwut, and Anusorn Cherdthong-Thailand*	**ANN-01-0055: "Using of Urea and Molasses Fermented Cassava Pulp on Rumen Fermentation and Methane Production"** *Thitima Norrapoke and Tanitpan Phongchongmit-Thailand*
10:54 am-11:06 am	**ANN-01-0070: "Blood chemistries of dairy cow during pre-calving, at calving and post-calving period"** *Chamnanwit Promkot , Pitukpol Porn-aneke, and Teerawat Srinukool -Thailand*	**ANN-01-0046: "The Meat Quality of Bali Beef fed with Supplement Blocks with Different Liquid Smoke Levels as Antioxidant and Binder"** *Effendi Abustam, Muhammad Irfan Said, and Muhammad Yusuf-Indonesia*
11: 06 am - 11:18 am	**ANN-01-0060: "The study on determination of feed digestibility using frequency of defecation on Thin Tailed lamb"** *Febrianto Dwi Nugroho, Ari Prima, Edy Rianto, Agung Purnomoadi-Indonesia*	**ANN-01-0094: "Effect of Flemingia (*Flemingia macrophylla*) as a protein replacement of soybean meal on feed intake, digestibility of nutrients and microbial population in Thai native beef cattle"** *Burarat Phesatcha and Metha Wanapat-Thailand*
11:18 am - 11:30 am	**ANN-01-0062: "Effect of *Terminalia Chebula* RETZ. meal on nutrient intake, digestibility and microbial population of goats"** *Nirawan Gunun, Pongsatorn Gunun, Anusorn Cherdthong, Sineenart Polyorach and Metha Wanapat-Thailand*	**ANN-01-0068: "Nutrient utilization and rumen ecology of Thai indigenous cattle given hay and sago palm pith with different levels of soybean meal"** *Bunseelarp Wiyada and Ngampongsai Wanwisa-Thailand*
11: 30 am - 11:42 am	**ANN-01-0090: "Effect of bamboo grass pellet (Bamboo-cass) levels on gas production kinetics and in vitro degradability"** *Bounnaxay Viennasay and Metha Wanapat-Thailand*	**ANN-01-0085: "Comparison between Hay and Silage of *Pennisetum purpurium* cv. Mahasarakham feeding on feed intake, nutrient digestibility, and rumen fermentation in Thai native beef bulls"** *Chaowarit Mapato and Metha Wanapat-Thailand*
11: 43 am - 11:54 am	**ANN-01-0084: "Effect of fresh cassava root with feed block containing high sulfur on gas kinetics and rumen fermentation using *in vitro* gas production technique"** *Gamonmas Dageaw and Anusorn Cherdthong-Thailand*	**ANN-01-0078: "Increasing Productive Performance of Native Chickens by Herbs in Rural Community"** *Narumon Somkuna, Eakkasit Somkuna, Jarous Sawangtap and Phinithi Ratchwicha-Thailand*
11:55 am-01:00 pm	***Lunch***	

	Orchid ballroom I	
01:00 pm-01.40 pm	**Chairperson:** Prof. Dr. K. Sarjan Reddy	
	Plenary speaker: Prof. Dr. Luigi Zicarelli-Italy **"The Role of Ruminants on Environmental Pollution"**	
01:40 pm-02.20 pm	**Plenary speaker:** Prof. Dr. Federico Infascelli-Italy **"Milk fatty acid profile: influence of feeding model"**	
02:20 pm-3:00 pm	**Plenary speaker:** Prof. Dr. Huang Bizhi-P.R. China **"Development of MBY in Yunnan and Diverse of Grass Resources in P.R. China"**	
03:00 pm-03:40 pm	**Plenary speaker:** Mr. John W. Long-JARVIS China, President **"Advances in Meat Processing Technology, Slaughtering House Facility and Development: JARVIS"**	
03:40 pm-04:00 pm	*Coffee/ tea break*	
	Session 13-Orchid ballroom I	***Session 14-Arawan I***
	Chairperson: Assoc. Prof. Dr. Pin Chanjula-Thailand	**Chairperson:** Assist. Prof. Dr. Ruangyot Pilajun-Thailand
	Co-Chairperson: Dr. Agustina Abdullah-Indonesia	**Co-Chairperson:** Dr. Sri Suharti- Indonesia
04:00 pm-04:12 pm	**ANN-01-0059**: **"Regression Models for Estimating Fat Carcass Percentage Using Chest Measurement in Thin Tailed Lambs"** *Farah Nabila, Pradhipta Hersandika, Ari Prima, Vita Restitrisnani, Nadlirotun Luthfi, Endang Purbowati, Sutaryo and Agung Purnomoadi-Indonesia*	**ANN-01-0088: "Effects of Microflora-treated rice straw on rumen fermentation and digestibility using In vitro gas production technique"** *S. Polyorach, M. Wanapat, C. Promkot, P. Gunun, S. Kang, A. Cherdthong, N. Gunun, and C. Mapato-Thailand*
04:12 pm-04:24 pm	**ANN-01-0065: "Development of Near Infrared Spectroscopy for nondestructive and rapid measurement of chemical compositions and somatic cell counts in raw milk"** *Onanong Poungchompu, Metha Wanapat, Chaluntorn Vichasilp,Yaungyote Jindatajak and Pongsagorn Poungchompu-Thailand*	**ANN-01-0091: "Effects of Fresh Purple Napier Grass (*Pennisetum Purpureum* 'Prince') and silage on Ruminal Gas Production In Vitro Study"** *Narawich Onjai-uea, Anan Petlum and Pramote. Paengkoum-Thailand*

04:24 pm-04:36 pm	**ANN-01-0014: "Effect of Hydroponic Maize Fodder Supplementation on Production Performance in Graded Murrah Buffaloes of Scarce Rainfall Zone"** *Atturi Krishna Murthy, Dhanalakshmi Guduru, Y.G.Prasad, and Sarjan Reddy Kapa-India*	**ANN-01-0096: "Effect of Thapra Stylo silage treated with dried Mao pomace and lactic acid bacteria on feed intake and digestibility of goats"** *Smerjai Bureenok, Chalermpon Yuangklang, Kraisit Vasupen, Benya Saenmahayak, Nittaya Pitiwittayakul-Thailand*
04:36 pm-04:48 pm	**ANN-01-0081: "Effect of fermented total mixed ration with microbial culture on fermentation quality and *in vitro* digestibility"** *Pichad Khejornsart and Metha Wanapat-Thailand*	**ANN-01-0036: "In Vitro and In Vivo Evaluation of Malic Acid on Methane Mitigation in Paddy Straw Based Complete Diet for Sustainable Animal Production in Dairy Cattle"** *A. Bharathidhasan and R. Karunakaran-India*
04:48 pm-05:00 pm	**ANN-01-0104- "Effect of Addition of Siamese Neem Foliage on pH and Number of Lactic Acid Bacteria in Napier Grass Silage"** *Anan Petlum, Sukanya Kamphayae, Pramote Paengkoum, Walailuck Kaewwongsa, Smerjai Bureenok, Tanaporn Plong-uan, and Thanyalak Theppaw-Thailand*	**ANN-01-0039: "In Vitro Gas Production Technique (IVGPT) on Evolving Methane Reduction by Malic Acid Supplementation in Forage Based Diet for Ruminants"** *A. Bharathidhasan-India*
05:00 pm-06:00 pm	**Orchid ballroom I**	
	Presentation award & Closing Ceremony: - Prof. Dr. Metha Wanapat - Assist. Prof. Dr. Anusorn Cherdthong - Prof. Dr. Peter Rowlinson	
07:00 pm-10:30 pm	**Sarathai room I**	
	Farewell Party with Loy Kra-Tong Festival	
November 4, 2017		
07:30 am-08:00 am	**Registration**	
08:00 am-04:00 pm	**Field trips**	
	Dairy farming, DPO, temples	

Contents

Contents (Continued)

Contents (Continued)

Contents (Continued)

Contents (Continued)

Contents (Continued)

Contents (Continued)

Contents (Continued)

Contents (Continued)

ANN-01-0019

The Effect of Dietary Protein Intake on Body Protein Growth in Thin Tailed Lambs

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Abstract

A study was carried out to examine the effect of dietary protein intake on the growth of body protein on thin tailed lambs fed diet with different protein level. The study used 12 lambs of 3-4 months old with 15.02 ± 2.01 kg (CV = 0.86%) of body weight. The lambs were reared intensively in individual pen and fed a complete feed containing 14, 16 and 18% crude protein (CP), 60% total digestible nutrients (TDN), for 9 weeks. Protein content of the lambs' body was measured by urea space methods. The results showed that the body protein growth rate increased with dietary protein intake, up to 162 g/d protein intake. However, when the dietary protein intake was higher than that point, the body protein growth rate decreased. It is concluded that best diet to obtain the highest body protein growth rate should contain 15.4% protein.

Keywords: body protein, crude protein, lambs

Introduction

Fattening lambs could give many advantages, such as shortening time of raising , reducing feed cost and reducing the total waste from livestock (Purnomoadi et al., 2016). The success of fattening could be evaluated from the increase of body weight which was caused by the changes in body composition including fat, water and protein (Restitrisnani et al., 2013). The body component that is expected to change largely is the body protein. Body protein can reflect the muscle tissue that is formed; the greater body protein content the greater muscle tissue is formed and the more meat can be produced.

The growth rate of the body protein is dominantly influenced by intake of dietary protein. The dietary protein has an important role in the metabolism process in the cell and for the formation of body tissues especially muscle tissue (Costa et al., 2013). If dietary protein intake is less than the requirement of lambs, then the process of formation of body tissue will not be reached maximally. On the other hand, if dietary protein intake is very high, the feed cost may increase; while the excessive protein cannot be utilized by livestock and wasted through feces and urine, which potentially cause of environmental pollution (Lohakare et al., 2006). Therefore, it becomes very important to pay attention to the amount of dietary protein that should be given to lambs, so that lambs growth ate can be achieved optimally and efficiently, in an environmentally friendly way.

Materials and Methods

This study used 12 lambs of 3-4 months of age with 15.02 ± 2.01 kg (CV = 0.86%) body weight. The lambs were raised in individual cages equipped with feed and drinking bunk. They were given complete feed in form of pellet containing 14, 16, 18% crude protein (CP) and 60% total digestible nutrient (TDN). Lambs were reared intensively in individual pen for 9 weeks. The parameters observed were dietary protein intake, and changes of body composition. Body composition was measured by urea space method in accordance with Restitrisnani et al. (2013). Measurement of body composition was done in weeks 0 and week 9. Data were analyzed using regression correlation. Value of correlation based on r value, which consists of no relationship (r = 0.00), weak (r ≥ 0.00-0.25), moderate (r ≥ 0.25-0.50), strong (r ≥ 0.50-0, 75), very strong (r ≥ 0.75-0.99), perfect (r = 1.00).

Results and Discussion

The dry matter intake, protein intake, body protein gain, daily body protein and protein conversion gain of lambs are presented in Table 1. The 9 week fattening lambs showed that dietary protein intake was ranged at 136.49 - 168.43 g/day and averaged gave 168.43 g/day. During the fattening time, the body protein gained around 860.60-1319.49 g (1063.91 g in average). Daily body protein gain was 13.66 – 18.42 g/day (16.34 g/day in average). Protein conversion was ranged at 8.39 – 13.58 (10.4 in average).

Table 1. Dry matter intake, protein intake, body protein gain, daily body protein and protein conversion gain of lambs.

Parameter	Range	Average	Standard Deviation
Dry Matter Intake (g)	793.8 – 1206.2	1053	103.1
Protein Intake (g)	136.49 – 196.2	168.4	18.5
Body Protein 0 weeks (g)	932.1 – 1544.8	1207.5	189
Body Protein 9 weeks (g)	2660.3 – 1997.1	2255.7	201.8
BPG (g)	860.6 – 1319.4	1063.9	122.1
DBPG (g/d)	13.6 – 18.4	16.3	1.4
Protein Conversion	8.3 -13.5	10.4	1.7

BPG = Body Protein Gain, DBPG = Daily Body Protein Gain

The body protein gain and protein conversion to body protein gain in lambs was higher than the sheep as reported by Wati et al. (2015) who found that sheep consumed 133.8 g/d protein had body protein increase of 10.16 g/day with protein conversion of 12.2. Higher body protein growth of lambs in this study was attributed to the fact that the lambs were in the fast muscle growth phase (Owens et al., 1993). The correlation between body protein content and dietary protein intake is presented in Figure 1.

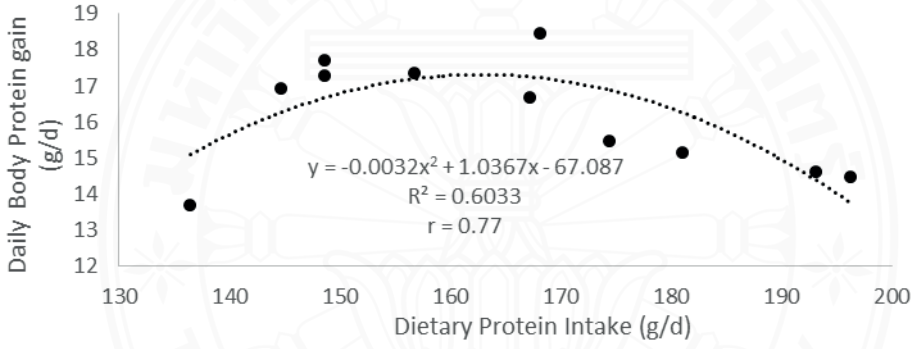

Figure 1. Correlation between body protein content and dietary protein intake

Based on Figured 1, dietary protein intake was highly correlated with body protein gain (r = 0.77). From the equation presented in Figure 1, it is predicted that the optimal daily body protein gain of 16.87 g/day can be achieved when dietary protein intake is 162 g/d or the feed should contained 15.4% of CP. It is shown in Figure 1 that beyond such level of dietary protein intake, the body protein gain would decrease. This might be caused by the capacity of muscle to enlarge is limited, so that when the dietary protein intake was excessive, it cannot be used by the muscle to grow more than the capacity. Hood and Allen (1973) stated the muscle tissue in lambs grows with cell enlargement process (hypertrophy), the enlargement of cells have limitations to grow optimal and affected by breed, sex and age. The results of this study was lower than the results of Haddad (2001) who reported the optimal protein content in feed was 16% for fattening Awassi lambs. This difference might be caused by the breed used. This study used thin tailed lambs which a small breed, while Awassi breed is a medium breed. Bello et al. (2016) stated that the small breed needed lower protein requirement.

Conclusion

From the current study, it can be concluded that the best dietary protein content for highest body protein growth rate was 16.87 g/d, which can be obtained by a diet containing 15,4% protein.

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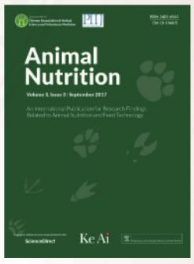

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