

The 17th Asian-Australasian Association of Animal Production Societies Animal Science Congress

Proceedings

22-25 AUGUST 2016

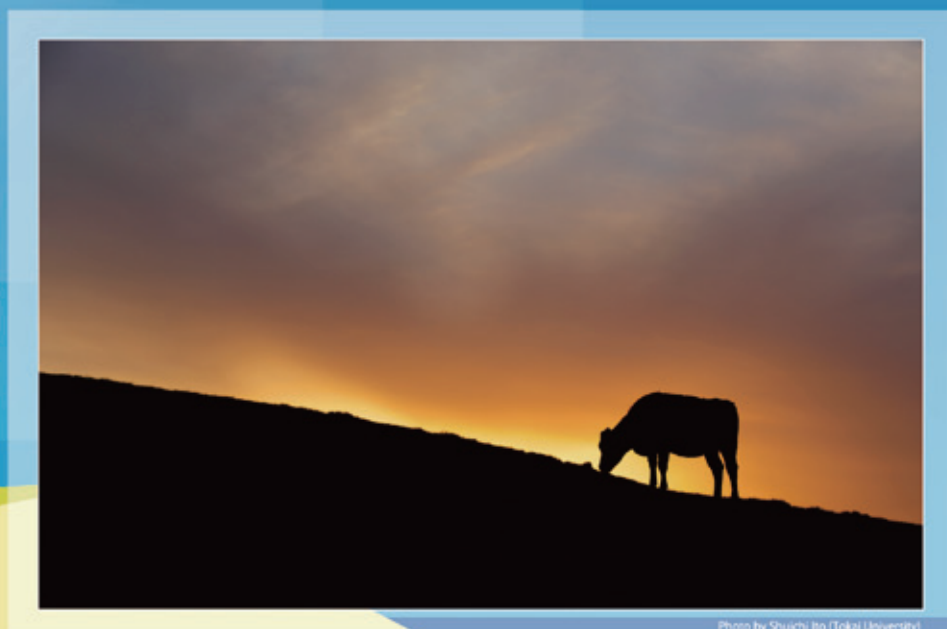
CONGRESS VENUE: FUKUOKA JAPAN

FUKUOKA

Osaka

Nagoya

Tokyo



Welcome Message

The 17th Animal Science Congress of AAAP will be held at Kyushu Sangyo University, Fukuoka, Kyusyu Area in Japan, from 22 to 25 August 2016. The aim of this congress is to provide a forum for the exchange of new information on animal sciences and technology, with a focus on successful strategies for the sustainable promotion of livestock considering the environment and welfare of livestock and human beings. At the same time, the congress will provide a venue for people from both inside and outside of the Asian Australasian region to make new contacts and renew friendships. Japanese Society of Animal Science is organizing the 17th AAAP Congress and is pleased to welcome everyone in this congress who is interested in animal science and production.

The venue of the congress, Fukuoka City, where tradition meets modernity, with delicious dishes and an excellent geographic location close to the Asian countries.



Prof. Mitsuhiro FURUSE
President of 17th AAAP

Committee Members

Mitsuhiro FURUSE	President
Seiichi KOIZUMI	Chair of Committee and Finance
Kei HANZAWA	Chair of Fund Raising, Public Relations, and Registration
Naomi KASHIWAZAKI	Chair of Accommodations & Tour
Masahiro SATOH	Chair of Program, Scientific Section and Publications
Koichi ANDO	Chair of Venue, Social Culture & Protocol, and Exhibition
Keitaro YAMANOUCHI	Secretary General

Naoshige ABE	Takashi NAGAI
Yoshikazu ADACHI	Kunihiko NAITO
Ryozo AKUZAWA	Yoshitaka NAKANISHI
Narito ASANUMA	Sueo NIIMURA
Hisashi ASO	Takahiro NIKKI
Takashi BUNGO	Shotaro NISHIMURA
Hiroshi DOHI	Takeyuki OZAWA
Osamu DOI	Hiroshi SASADA
Takafumi GOTOH	Eimei SATO
Tsutomu HASHIZUME	Kazuhiro SHIMADA
Satoshi HIDAKA	Shigeru SHIOYA
Kohzy HIRAMATSU	Kunio SUGAHARA
Hiroyuki HIROOKA	Koji SUGIURA
Toshiyoshi ICHINOHE	Madoka SUTOH
Masakazu IRIE	Kenichi TAKEDA
Yasuhiro KAWAMOTO	Kumiko TAKEDA
Tomoyuki KAWASHIMA	Ryuichi TATSUMI
Kazuhiro KIKUCHI	Yoshinori TERAWAKI
Shinichi KOBAYASHI	Atsushi TOYODA
Yasuo KOBAYASHI	Hiroko TSUKAMURA
Tetsuo KUNIEDA	Hitoshi USHIJIMA
Hiroki MATSUI	Akira WATANABE
Takashi MIYANO	Nobuhiko YAMAUCHI
Tetsuo MORITA	Tatsuyuki YOSHIDA

Outline of the congress

Congress Name

The 17th Asian-Australasian Association of Animal Production Societies Animal Science Congress

Theme

Strive toward Progress on Sustainable Animal Production Contribute to Environment and Welfare for Human and Livestock

President

Mitsuhiro FURUSE (Professor, Animal & Marine Bioresource Sciences, Kyushu University)

Date

22-25 August, 2016

Venue

Kyushu Sangyo University
hotel nikko fukuoka

Official Website

<http://www.aaap2016.jp/>

JAPANESE SOCIETY OF ANIMAL SCIENCE (JSAS)

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Secretariat for AAAP2016

c/o Convention Linkage, Inc.
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TEL: +81-(0)3-3263-8695 / E-mail: aaap2016@c-linkage.co.jp

Acknowledgements

Supporting Organizations

Association of Japanese Agricultural Scientific Societies
Fukuoka City
Fukuoka Prefecture
Fukuoka Veterinary Medical Association
Hokkaido Society of Livestock and Grassland Science
Hokushinetsu Society of Animal Science
Japan Embryo Transfer Society
Japan Ethological Society
Japan Poultry Science Association
Japan Society for Immunology of Reproduction
Japan Society of Reproductive Endocrinology
Japan Veterinary Medical Association
The Japanese Society of Animal Breeding and Genetics
Japanese Society for Applied Animal Behaviour
Japanese Society of livestock management
The Japanese Society of Swine Science
The Japanese Society of Veterinary Science
Kansai Animal Science Society
Kanto Society of Animal Science
Kyushu Sangyo University
Kyushu University
SCIENCE COUNCIL OF JAPAN
Society of Beef Cattle Science
The Society for Reproduction and Development
Tohoku Animal Science and Technology Society
TOKAI SOCIETY OF ANIMAL PRODUCTION
Warm Regional Society of Animal Science, Japan

Foundations

Fukuoka Prefecture
Fukuoka City
The Ito Foundation
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Awardee of the 11th AAAP Animal Science Award

Sponsored by Japanese Society of Animal Science, Japan

Presented at the Opening Ceremony of 17th AAAP Animal Science Congress
on August 22, 2016 at Hotel Nikko, Fukuoka, Japan

Dr. In Kyu Han

Professor Emeritus

College of Agriculture and Life Sciences, Seoul National University, Korea

Prof. In K. Han graduated in Animal Science from Seoul National University in 1956, with M.Sc degree from the same institute in 1958 and was awarded Ph. D. in mono-gastric animal nutrition from Cornell University in 1965.

He has spent most of his working career at the Seoul National University of Korea (1965-2000). As is well known not only in Asia but also throughout the world, Prof. Han has been a dedicated teacher, researcher and administrator for more than 60 years in the area of animal agriculture. He trained more than 170 graduate students, many of whom took key positions and contributed to the development of animal science and industry in Korea and AAAP countries. As a scientist, Prof. Han published 670 papers in refereed journals, notably in the area of development and utilization of non-conventional animal feeds, amino acids, and other ingredients and supplements. Also he put tremendous effort to the develop Korean feed composition tables and feeding standards for major domestic animal species in Korea, which provided the key information and technologies necessary for the modernization of animal agriculture in Korea.

Prof. Han is the type of person with the vision and the ability to play key roles in engineering many master plans. Creation and establishment of AAAP in 1980 and AJAS in 1988 are two best examples. Prof. Han together with 8 pioneers including Y. Yamada from Japan and S. Jalaludin from Malaysia master-minded the establishment of AAAP and he played the key role in development of the organization until today. He invited the 3rd AAAP Congress to Seoul and organized the congress in 1985 as one of the most successful meetings in AAAP history. In addition Prof. Han tried very hard to establish the official journal of AAAP ever since its creation and successfully launched the first issue of AJAS in March, 1988. He nourished the journal, both in quantity and in quality, from its outset until 2001, when he stepped down as editor-in-chief to take another important position: President of the Korean Academy of Science and Technology. His international interest was extended to WAAP, for which he served vice-presidency for 5 years and for another 5 years as the president. The 8th WCAP which was organized under his leadership in Seoul in 1998 was, and still is, the most successful conference in WAAP history.

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Within the context of science in Korea, he engineered the establishment of many local scientific societies and their journals: some of examples are Korean Society of Animal Science & Technology, Korean Society of Animal Nutrition & Feed and Korean Nutrition Society. Prof. Han took a number of important positions in Korea and is well-known for his achievement in these positions. He was elected as the president of Korean Academy of Science & Technology for 3 years term (2001-2004) and as the dean of Agricultural University of Seoul National University for 2 years (1989-1991) with tremendous achievement for those organizations and for the development of sciences including agricultural science. His affection and interest in fostering human resources for the development of animal science and industry in AAAP region continued even after his retirement. He established Hans Animal Life Science Foundation with the personal donation of almost one million dollar in 2000. The foundation has provided scholarship to not only Korean students, but also many other foreign students. Moreover, his foundation sponsored award programs such as AAAP Animal Science Award and WAAP International Animal Agriculture Award, and international meetings (AAAP and WAAP).

In view of his contributions aforementioned, it should be considered that Professor In K. Han is eminently suitable for receiving the 11th AAAP Animal Science Award, since he is recognized and respected across AAAP region as a leading scientist and mentor.



Awardee of 4th Woogene B&G Award

Sponsored by Woogene B&G Co., Korea

Presented at the Opening Ceremony of 17th AAAP Animal Science Congress
on August 22, 2016 at Hotel Nikko, Fukuoka, Japan

Dr. Takashi Nagai

Head, International Relations Office
Department of Research Planning and Coordination Headquarters,
National Agriculture and Food Research Organization, Japan

In 1984 Dr. Takashi Nagai succeeded in the *in vitro* fertilization in pigs for the first time in the world, and got Ph.D from Kyoto University. Since then, he has published about 200 papers in international journals and presented papers at many international congresses; he has been invited as a keynote speaker at many congresses and become one of the leaders in the field of animal biotechnologies such as *in vitro* fertilization, embryo transfer and production of cloned and transgenic animals in the world. Beside successful *in vitro* fertilization in pigs, it should be emphasized that he produced the clone bulls from frozen cloned embryos reconstructed using somatic cells for the first time in the world in 1999 and that he hypothesized that cloned mammals skip a reprogramming step but their offspring are normal because of proper reprogramming in sperm and oocytes of cloned animals; these papers have been cited by many papers. His achievements on animal biotechnologies were recognized so world-widely that he was selected as the first Asian president of International Embryo Technology Society which is the largest society related to Embryo Technology in the world. Also he is one of the founders of Asian Reproductive Biotechnology Society established in 2005.



From 1984 to 2013 he worked at National Institute of Livestock and Grassland Science (NILGS), NARO; his last position at NILGS was Animal Breeding and Reproduction Division Director. After retirement from NILGS, he moved to Korea and become WCU Professor at Seoul National University, and then moved to Taiwan to be Deputy Director of Food and Fertilizer Technology Center. From 1 April, 2016 he is Head of International Relations Office, Department of Research Planning and Coordination Headquarters, National Agriculture and Food Research Organization (NARO) and also adjunct professor of Meiji University and Kinki University. During his academic and professional career, he always focused on animal biotechnologies and international activities. From 1996 to 2012 he was a teacher of bovine reproductive technology training course for foreign trainees from developing countries including many Asian countries; this course was organized by National Livestock Breeding Center(NLBC). He had one-day class of about 8-12 trainees (students).

He began to participate in the AAAP Animal Science Congress from 1996, and then presented many posters at the Congress. In 2006 he had an oral presentation at the 12th AAAP in Busan, Korea. He is organizing the NARO-FETC Joint Workshop on "Mitigation of greenhouse gases and adaptation to climate change in livestock production systems" as the satellite workshop at this 17th AAAP Animal Science Congress.

Awardees of 13th AJAS/CAPI Award

Sponsored by Cargill Agripurina Inc., Korea

Presented at the Opening Ceremony of 17th AAAP Animal Science Congress
on August 22, 2016 at Hotel Nikko, Fukuoka, Japan

Outstanding Research Award (Best Paper): Dr. Binghai Cao

Dr. Binghai Cao received BS in the Department of Animal Sciences at Hebei Agricultural University, China in 1985. After completion of his undergraduate study, Dr. Cao moved to Shinshu University, where he completed his MS degree in Animal Nutrition and Feed Sciences in 1995. He continued his study in Animal Nutrition and Feed Sciences at Gifu University, Japan for his PhD degree until 1998. After PhD course Dr. Cao appointed as Special Researcher (Post-Doc) of the Ministry of Education, Department of Agricultural Sciences, Shinshu University, Japan for 2 years (1998-1999) and served as the Special Researcher & Deputy Chief of Department of feed development, Research Institute of ITOCHU Feed Corporation, Japan until 2000, when he hired as Post-doc in College of Animal Sciences and Technology, China Agricultural University, China. Dr. Cao joined China Agricultural University as associate professor from 2002 and promoted to full professor in 2010. Dr. Cao's research area is very diverse, but he is best known specialist in beef cattle nutrition and feed nutrients-beef quality interaction. Dr. Cao did many excellent work looking at Relationship between feed nutrients and differentiation of adipocytes and pre-adipocytes. The winning article for The 13th AAAP/CAPI Outstanding Research Award (Best Paper) was published in Asian Australas. J. Anim. Sci. Vol. 28 P156-165 with the title of "Sequencing and characterization of divergent marbling levels in the beef cattle (*Longissimus dorsi* Muscle) transcriptome".



Outstanding Research Award (Most Cited Paper): Dr. Cheorun Jo

Dr. Cheorun Jo received his BS from Department of Animal Science, Seoul National University, Korea in 1991 and MS from the same institute with Muscle Food Science major in 1994. Then, he received Ph.D. with double majoring Meat Science and Food Science and Technology from Iowa State University, USA in 1999 after 1 and half years of working for private company in meat business sector, Korea. Dr. Jo had worked for Food Science and Biotechnology Division, Korea Atomic Energy Research Institute (2000-2006) as a senior researcher, Department of Animal Science and Biotechnology, Chungnam National University (2006-2013) as an associate professor, and currently is working for Animal Biotechnology major, Seoul National University (2013-) as a professor. His major research interest is quality and safety enhancement of animal origin foods including meat, egg, and their products. The winning article for The 13th AAAP/CAPI Outstanding Research Award (Most Cited Paper) was published in Asian Australas. J. Anim. Sci. Vol. 26 P772-779 with the title of "Comparison of quality traits of meat from Korean native chickens and broilers used in two different traditional Korean cuisines".



Distinguished Service Award: Dr. Xiangshu Piao

Dr. Xiangshu Piao is a Professor at Department of Animal Science and Technology, China Agricultural University (CAU) and Ministry of Agriculture Feed Industry Centre (MAFIC). She received PhD degree from Seoul National University, South Korea in 1999. She is a director of department of Education and Research in MAFIC. She published more than 120 scientific articles. She has been widely recognized for her dedicated research in monogastric nutrition, especially in the area of bio-active herbal extracts, and for professional teaching of "Swine Nutrition" course for undergraduate students in CAU. Dr. Piao currently serves as monogastric nutrition editorial board for *Journal of Animal Science*, and also participated review panel for 8 other international journals. Dr. Piao has acted as the reviewer of AJAS since 2005 and took a leading role in promoting AJAS in China and abroad.



Distinguished Service Award: Dr. Byung O Kwak

Dr. Byung O Kwak graduated from Animal Science Department at Seoul National University, Korea in 1981 and obtained his MS and PhD at the same institute specializing ruminant animal nutrition in 1991 and 1994, respectively. Dr. Kwak is currently CEO of Aninfont Co., Ltd. which is a system integration business in agricultural area. Before the establishment of Aninfont, he worked for TS Corporation as a R&D Chief for a number of years. As a nutritionist, he has provided technical consulting services for many private companies and cooperatives in Korea and China. Some of examples are: Kimhae Livestock Cooperative Federation, SF Co., Ltd., Farmsco Co., Ltd. and Cofeed Feed International in China. Dr. Kwak took a leading role in developing AJAS manuscript submission and handling software system in 2005 and operating the system from the very beginning of 2006 until the end of October 2014, when AJAS adopted a new web hosting service. AJAS is indebted highly to Dr. Byung O Kwak for his dedicated service.



List of collaborators

Fukuoka Prefecture

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Yoshihiro ISOZAKI
Motoyuki MAEDA
Hiroyuki MATSUI
Yuiko MORINAGA
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University of the Ryukyus

Yoshimi INURA

alphabetical order / titles omitted

Oral Session Program

Day1: Tuesday, 23 August [Kyushu Sangyo University]

Oral Session 01: Focus Session Animal Breeding, Genetics & Reproduction

Tuesday, 23 August 9:00-11:00 Room N201

Chair: Yoshinobu Uemoto National Livestock Breeding Center

- 0-01-1 Improvement the accurate genetic estimation of milk yield trait by addition of wind speed to THI in crossbred Thai Holstein**
Wascharapong Teawyuneyong¹, Monchai Duangjinda^{1,2}, Sayan Buaban³, Vibuntita Chankitsakul^{1,2}, Wuttigrai Boonikum^{1,2}
¹Department of Animal Science, Faculty of Agriculture, Khon Kaen University, Thailand,
²Thermo-tolerance Dairy Cattle Research Group, Khon Kaen University, Thailand,
³Bureau of Biotechnology in Livestock Production, Department of Livestock Development, Thailand
- 0-01-2 Estimation of additive genetic variance due to each autosome for carcass traits in Japanese Black cattle**
Shinichiro Ogawa¹, Hirokazu Matsuda¹, Yukio Taniguchi¹, Toshio Watanabe², Yoshikazu Sugimoto², Hiroaki Iwazaki¹
¹Graduate School of Agriculture, Kyoto University, ²National Livestock Breeding Center, ³Shokawa Institute of Animal Genetics
- 0-01-3 Analysis of realized heritability and other genetic parameters in a long-term selection experiment for non-destructive deformation in White Leghorns**
Olivier Gervais¹, Keijiro Nirasawa², Christian Vincenot¹, Yoshitaka Nagamine¹, Kazuyuki Moriya¹
¹Kyoto University, Graduate School of Informatics, ²WARO Institute of Livestock and Grassland Science, ³Nihon University, College of Bio-resource Sciences
- 0-01-4 Accuracy of Genomic-Polygenic Prediction for Milk Yield and Fat Percentage in the Thai Dairy Cattle Population**
Danal Jattawa¹, Skorn Koonawootrittriron¹, Mauricio A. Elzo², Thanathip Suwanasophee¹
¹Department of Animal Science, Faculty of Agriculture, Kasetsart University, Thailand,
²Department of Animal Sciences, University of Florida, USA
- 0-01-5 Screening of embryo secreted factors using bovine elongated embryos**
Hironori Masaka¹, Sayed Ali Askar Musavi^{1,2}, Md. Rashedul Islam^{1,2}, Nobuhiko Yamauchi¹
¹Department of Animal and Marine Bioresource Sciences, Faculty of Agriculture, Kyushu University, Japan,
²Department of Animal Science Agriculture Faculty Balkh University Afghanistan,
³Department of Genetics and Animal Breeding, Faculty of Veterinary and Animal Science, Haze Mohammad Danish Science and Technology University, Bangladesh
- 0-01-6 Genetic fluctuation study with microsatellite markers in germplasm-preserved Wujie Black Muscovy**
Yi-Ying Chang^{1,2}, Jeng-Fang Huang¹, Chih-Feng Chen², Hsui-Chou Liu¹
¹Ilan Branch Livestock Research Institute, Council of Agriculture, Executive Yuan, Taiwan,
²Department of Animal Science, National Chung Hsing University, Taiwan,
³Livestock Research Institute, Council of Agriculture, Executive Yuan, Taiwan
- 0-01-7 Establishment and characterization of bovine derived placenta stem cells**
Kang-You Liu, Shao-Yu Peng
National Fengring University of Science and Technology



O-01-8 Dynamics of spermatogenic cells on proliferation and desquamation during seasonal reproductive cycle in wild mice

Jun Ito

Graduate school of science and technology in Niigata University

O-01-9 Development of an in vitro model to study uterine functions using in vitro cultured rat uterine explants

Md. Rashedul Islam^{1,2}, Yuka Yoshii¹, Yuka Ikeguchi¹, Mohamed El-Sharawy^{1,3}, Nobuhiko Yamauchi¹

¹ Department of Animal and Marine Bioresource Sciences, Faculty of Agriculture, Kyushu University, Japan.

² Department of Genetics and Animal Breeding, Faculty of Veterinary and Animal Science, Hajeer Mohammad Danesh Science and Technology University, Bangladesh.

³ Animal Production Department, Faculty of Agriculture, Kafrelsheikh University, Egypt

O-01-10 The effects of different oocyte mtDNA haplotypes on somatic cell nuclear transfer embryos

Kanokwan Srirattana^{1,2}, Justin C. St. John^{1,2,3}

¹ Centre for Genetic Diseases, Hudson Institute of Medical Research, Australia.

² Department of Molecular and Translational Science, Monash University, Australia.

³ MitoStock Pty Ltd, Australia

Oral Session 02: Focus Session Animal Welfare & Health Management, others

Tuesday, 23 August 9:00-11:00 Room N301

Chair: TBD

O-02-1 Estimation of nitrogen, phosphorus and potassium flows in dairy cattle production in western China

Lin Wang¹, S. T. Takashi Tanaka^{1,2}, Hiroki Anzal¹, Yuki Hama¹, Kazato Oishi¹, Chagan Irbek¹, Hajime Kumagai¹, Tatsuya Inamura¹, Hiroyuki Hirooka¹

¹ Graduate School of Agriculture, Kyoto University, Japan.

² Biotechnology Research Center, Kunming University of Science and Technology, China

O-02-2 Influence of age on beef calves' play behaviour in an indoor and outdoor environment of a free barn

Yi Zhang¹, Ken-ichi Takeda¹

¹ Shimshu University, Graduate School of Agricultural Science, Japan.

² Shimshu University, Academic Assembly, Institute of Agricultural, Japan

O-02-3 A study on the correction factors between temperature-humidity index and body surface temperature for Hanwoo heifer (*Bos taurus coreanae*)

SeYoung Jang¹, Na-Yeon Kim¹, Sung-Jin Kim¹, Jung-Hwan Jeon², Won-Mo Cho¹, Byoung-Tae Jeon¹, Sang-Ho Moon¹

¹ Division of Food Bio Science, Konkuk University, ² Nation Institute of Animal Science, ANI, Korea

O-02-4 Milk Acidification to Control the Growth of Salmonella Dublin in Infected Milk

Alysa Parker, Katrina Bosward, John House, Mark Hazelton, Paul Sheehy

The University of Sydney, Faculty of Veterinary Science, School of Life and Environmental Sciences

O-02-5 Degradation of oleic acid and conversion to biogas during a mesophilic anaerobic process

Yuki Matsumoto, Yasuhiro Fukuda, Yutaka Nakai, Chika Tada

Laboratory of Sustainable Animal Environmental Science, Graduate School of Agricultural Sciences, Tohoku University, Japan

O-02-6 THE CHARACTERIZATION OF ADIPOSE TISSUE VIA A METABOLIC SYNDROME MINIPIG MODEL

Chia-Yu Wang, Twin-Way Wu, Jyun-Wai Chen, Sin-Jin Li, Chang-Yi Chen

National Taiwan University

- O-02-7 Differential levels of activity and stress response between Djungarian hamster (*P. sungorus*) and Robosovskii hamster (*P. roborovskii*)**
 Hiromi Ikeda¹, Takeshi Yamaguchi¹, Momoko Kodaira¹, Mohammad A. Bohry¹, Vishwajit S. Chowdhury², Shinobu Yasuo¹, Mitsuhiro Furuse¹
¹Laboratory of Regulation in Metabolism and Behavior, Faculty of Agriculture, Kyushu University.
²Division for Experimental Natural Science, Faculty of Arts and Science, Kyushu University
- O-02-8 The Role of Skeletal Muscle Glucocorticoid Receptors in Photoperiodic Response of Depression-like Behaviors**
 Ayako Tashiro, Ryosei Goda, Satomi Shibata, Yusuke Takai, Tsuyoshi Otsuka, Tatsuhiro Uchiwa, Mitsuhiro Furuse, Shinobu Yasuo
 Laboratory of Regulation in Metabolism and Behavior, Faculty of Agriculture, Kyushu University, Japan
- O-02-9 Effect of postnatal photoperiod on body weight and metabolomics profiles in skeletal muscle and plasma in mice**
 Tatsuhiro Uchiwa, Yusuke Takai, Ayako Tashiro, Satomi Shibata, Mitsuhiro Furuse, Shinobu Yasuo
 Laboratory of Regulation in Metabolism and Behavior, Faculty of Agriculture, Kyushu University, Japan
- O-02-10 Effect of mastitis on pregnancy function in prepartum goats**
 Nozomi Kodama, Yukinori Yoshimura, Naoki Isobe
 Hiroshima University

Oral Session 03: Animal Nutrition (Non-Ruminants) (1)

Tuesday, 23 August 9:00-11:00 Room N303

Chairs: Rusdi Rusdi Tadulako University
 Sirilaophasan Srisuda Rajabongkajit University of Technology-Iran, Sakornnakhon Campus

- O-03-1 Effect of Natural Acidifier and Phytobiotic Addition in Non-Encapsulation and Encapsulation Form on Egg Quality of Laying Hens**
 Maya Septiana^{1†}, Muhammad Halim Natsir², Csfar Sjoefjan¹
¹Department of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Taiwan.
²Faculty of Animal Husbandry, University of Brawijaya, Indonesia
- O-03-2 Is eleutherine (*Eleutherine americana*) potential as feed additive for poultry?**
 Rusdi Rusdi, Asriani Hasanuddin, Rosmiety Arief
 Faculty of Animal Husbandry and Fisheries, Tadulako University, Palu Indonesia
- O-03-3 UTILIZATION EFFECT OF BREAD WASTE AS CORN SUBSTITUTION ON HYBRID DUCK PERFORMANCES**
 Irfan Djunaidi¹, Dini Hardini^{2†}
¹The Assessment Institute for Agricultural Technology, Indonesia.
²Faculty of Animal Husbandry, Brawijaya University, Indonesia
- O-03-4 Responses of hens fed high levels of selenium from selenium-enriched kale sprout**
 Anut Chantreatikul¹, Lalita Boributh¹, Orawan Chinnasi¹, Piyaree Chantreatikul²
¹Faculty of Technology, Mahasarakham University, ²Faculty of Science, Mahasarakham University
- O-03-5 Effect of water extract of Green Grass Jelly leaves (*Premna oblongifolia* Merr) on Intestinal Characteristics and Performances of Laying Hen**
 Eko Widodo, Edhy Sudjarwo, Anna Lidiyawati
 University of Brawijaya Indonesia

O-03-6 EFFECT OF MINERAL MIXTURES SUPPLEMENTATION IN DRINKING WATER ON CARCASS QUALITY, GUT MORPHOLOGY AND GUT MICROFLORA OF BROILER CHICKENS

Nurhazirah Shazali¹, Teck Chwen Loh², Hooi Ling Foo^{3*}, Jalaludin Syed⁴

¹Department of Animal Science, Faculty of Agriculture, Universiti Putra Malaysia, Malaysia.

²Institute of Tropical Agriculture, Universiti Putra Malaysia, Malaysia.

³Department of Bioprocess Technology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, Malaysia.

⁴Institute of Biological Science, Universiti Putra Malaysia, Malaysia.

O-03-7 Effects of Multi-probiotics and Synbiotics on Laying Ducks Performance and Egg Quality

Srisuda Siritao-phaisan¹, Palwan Punyakaew¹, Pongsathorn Gunun¹, Thachawech Kimprasit¹, Nattaya Banglab²

¹Rajamangala University of Technology Isan Sakon Nakhon Campus.

²K.M.P. Biotech Co., LTD.

O-03-8 Effect of Dried Tomato Meal (*Solanum lycopersicum*) in Diet on Performance and Egg Quality of Native Chickens

Jein Rinny Loke, Jet Saartje Mandey, Jacqueline T Laihah, Friets Ratulang

Sam Ratulang, University Animal Husbandry Faculty

O-03-9 Digestibility Value of Broiler Diet Containing Fresh Mulberry (*Morus alba*) Leaves

Jet Saartje Mandey, Cathrin A Rahasia, Zebedeus Dady

Sam Ratulang, University Animal Husbandry Faculty

O-03-10 EFFECTS OF SUPPLEMENTAL EFFECTIVE MICROORGANISM ON PERFORMANCE, SOME HISTOLOGICAL AND BLOOD PARAMETERS OF BROILER

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Oral Session 04: Focus Session Animal Nutrition, Feeds and Feeding

Tuesday, 23 August 11:30-13:30 Room N201

Chair: Taketo Obitsu - Hiroshima University

O-04-1 How do Thai consumers respond to quality of pork with different marbling levels?: a preliminary study in different age ranges

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O-04-2 THE ROLE OF FORAGES IN REDUCING HOUSEHOLD LABOUR DEMANDS OF CATTLE FEEDING DURING THE DRY SEASON IN CAMBODIA

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Oral Session

Proceedings

O-03-8

Effect of Dried Tomato Meal (*Solanum lycopersicum*) in Diet on Performance and Egg Quality of Native Chickens

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INTRODUCTION

Native chickens contribute a lot to household nutrition and income in rural areas of the tropics (Norris et al. 2007). But, improving nutrition for increasing egg and meat production in native chickens in Indonesia is critical. It was harder than imported breeds on free range when little or no food is supplied by the owner (Henuk and Bailey, 2014).

Productivity of native chicken breeds may be doubled with improved diets and management conditions (Chowdhury et al., 2006). But, the native chickens have not attained their full production potential due to exposure to risks that influence against their survival and productivity under extensive management conditions. (Faruque et al., 2013).

Tomato pomace was a good source of protein, vitamins and minerals but may be limited in energy due to the high non-starch polysaccharides content. The wet tomato pomace contains 33% seed, 27% skin and 40% pulp, while the dried pomace contains 44% seed and 56% pulp plus skin (Sogi and Bawa, 1998). Dried tomato pomace (DTP) contains 10% moisture, 20.77% crude protein, 1760 Kcal/kg ME, 39.8% crude fiber, 7.3% ether extract, 4.24% ash, 0.5% calcium and 0.45% phosphorus (Jafari et al., 2006). The limiting factors of DTP in poultry diets are low energy and high fiber contents (Squires, et al., 1992). DTP contain remarkable amounts of α -tocopherol (Bordowski and Geisman, 1980), lutein, β -carotene, and lycopene, which could contribute to a darker yolk color that is desirable for the consumers (Mlodowski and Kuchta, 1998).

Habanabashaka et al. (2014) reported that up to 6% tomato waste meal can be added in laying hen diets without any adverse effect on egg quality and compromising egg production rate. This inclusion level also showed to be beneficial via enhancing yolk colour score and lycopene concentration and reducing egg yolk cholesterol content. The degree of yolk color is an important criterion in table eggs for consumption as well as manufacturing of egg-containing market food products (De-Groote, 1970). The color of egg yolks is produced by oxycarotenoids, as xanthophylls pigments, derived from the feed ingredients (Zahroojian et al., 2011). Vasupen et al. (2013) reported that feeding laying hens diets containing tomato pomace at inclusion 10% did not affect egg production, egg weight, feed consumption and efficiency of the hens. There are limited studies on the effects of dried tomato meal supplementation in birds, especially native chickens. It is therefore, the experiment was conducted to evaluate the effect of dried tomato meal in diet on performance and egg quality of native chickens.

MATERIALS AND METHODS

One hundred of native chickens (36 weeks of age) were allocated into five experimental diets and each was divided into four replications using a completely randomized design. Based diet was formulated to contain 53% corn, 10% rice bran, 10% fish meal, 6% CaCO₃, Top Mix 0.5%, NaCl 0.5% and 20% commercial diet. Tomato meal was included in four experimental diets at levels of 2, 4, 6, 8% to substitute based diet. Treatments were: R0 = 100% based diet (BD) + 0% tomato meal (TM); R1 = 98% BD + 2% TM; R2 = 96% BD + 4% TM; R3 = 94% BD + 6% TM; and R4 = 92% BD + 8% TM. Chemical composition of tomato meal were: 16.73% crude protein, 1.53% fat, 30.94% crude fiber, 0.98% Ca, 1.20% P, and 2416 Kcal/kg ME. Feed and water were provided *ad libitum*. Chemical composition of the diets were shown in Table 1.

The study was conducted over a period of 8 weeks. Data were collected on feed intake (FI), egg weight (EW), Hen-day egg production (HDP), egg mass (EM), FCR, egg shell weight (ESW), egg shell thickness (EST), egg yolk weight (EYW) and egg yolk color (EYC). Hen-day egg production was calculated as: (number of eggs-produced \times 100) / (number of hens \times number of hens in production). Yolk colour was determined using the yolk colour chart. Egg shell membrane was removed carefully and manually from the broken egg shell and the thickness of the shell measured using a micro-meter screw gauge (An et al. 2010). Data collected were subjected to one-way analysis of variance Treatment means were compared using Duncan's multiple range test (Snedecor and Cochran, 1967) using software IBM SPSS 22.

RESULTS AND DISCUSSION

The results of performance and egg quality of native chickens fed dried tomato meal in diets were shown in Table 2. Results showed that tomato meal could be used with inclusion levels up to 8% to native chicken diets having no detrimental effect on egg weight and egg shell thickness. Moreover, it was found that tomato meal had effects on the feed intake, Hen-day egg production, egg mass, FCR, egg shell weight, egg yolk weight and egg yolk color of native chickens.

Leke et al. (2015) in previous study reported that tomato meal can be used as an alternative feedstuff in laying hen diets to substitute based diet, at inclusion levels up to 8% without negative effects on egg quality. Studies by Nobakht and Safamehr (2007) indicated that feeding of dried tomato pomace increased feed intake, egg production, egg weight and eggshell weight. Feed conversion ratio of reference diet, dried tomato pulp were better than other treatments. Some authors have found that supplementing dried tomato pomace in laying hens diet did not influence performance parameters but increase yolk color value (Mansoori et al., 2008). In a study by Calislar and Uygur (2010), dried tomato pulp had a significant effect on the egg shape index and egg yolk index, whereas, dried tomato pulp had no significant effect on the albumen index and Haugh unit. This result is similar to those reported by Mitsuhiro et al. (1994) who found a significant increase in egg mass was observed with reference diet, 2% red pepper and 5% dried tomato pulp compare to the control diet. In current study, egg shell thickness was not affected by dietary treatments.

Jafari et al. (2006) reported no significant differences in egg shell thickness and Haugh unit of laying hens fed on diets containing dried tomato pulp compared to hens fed on a control diet. This result is similar to those reported by Yannakopoulos et al. (1992), Nobakht and Safamehr (2007) and Mansoori et al. (2008), that the dietary addition of dried tomato pomace did not have any significant effect on FI. However, Jafari et al. (2006) and Calislar and Uygur (2010) found that DTP resulted in greater FCR. It has been shown that feeding hen diets containing DTP at inclusion rates up to 10% increased EP (Nobakht and Safamehr, 2007). EW was not affected by dietary treatments, a finding which is in agreement with the previously reported data (Jafari et al., 2006; Mansoori et al., 2008). It was observed that the dried tomato meal used in this study did not exhibit any negative effects on the egg quality. These discrepancies in results may be attributed to tomato variety, levels of dietary supplementation with tomato by-product, tomato processing conditions, and breed of native chickens.

CONCLUSION

It can be concluded that tomato meal can be used in native chicken diets up to 8% without negative effects on performance and egg quality.

KEYWORD : Egg, Chicken, Native, Performance, Tomato

Table 1. Chemical Composition of the Diets

Nutrients	Diets				
	R0 (0% TM)	R1 (2% TM)	R2 (4% TM)	R3 (6% TM)	R4 (8% TM)
Crude protein (%)	17.34	17.30	17.29	17.27	17.26
Fat (%)	5.35	5.12	5.04	4.96	4.89
Crude fiber (%)	3.76	5.39	5.93	6.47	7.03
Ca (%)	2.93	2.81	2.77	2.73	2.69
P (%)	0.62	0.65	0.66	0.67	0.68
ME (Kcal/kg)	2742	2722	2715	2709	2702

Table 2. Effect of Dried Tomato Meal in Diet on Performance and Egg Quality of Native Chickens

Variable	Treatments					SEM	P Value
	R0	R1	R2	R3	R4		
Feed Intake	75.93 ^a	75.90 ^a	76.91 ^{ab}	77.85 ^{bc}	78.18 ^c	0.235	.000
Egg Weight (g)	39.88	40.08	40.01	41.11	41.51	0.228	.059
HDP (%)	57.76 ^a	64.01 ^c	62.49 ^b	62.44 ^b	62.31 ^b	0.476	.000
Egg Mass (g/hen/day)	40.10 ^a	44.66 ^b	43.40 ^b	44.15 ^b	44.94 ^b	0.414	.000
FCR	1.89 ^b	1.70 ^a	1.77 ^a	1.76 ^a	1.74 ^a	0.016	.000
Egg Shell Weight (g)	3.62 ^b	3.35 ^a	3.38 ^a	3.62 ^b	3.73 ^b	0.041	.002
Egg Shell Thickness (mm)	0.35	0.35	0.35	0.34	0.36	.001	.268
Egg Yolk Weight (g)	11.43 ^a	11.52 ^a	11.98 ^{ab}	12.46 ^b	11.88 ^{ab}	0.119	.031
Egg Yolk Color	10.75 ^a	11.56 ^b	11.58 ^b	11.90 ^b	12.38 ^c	0.121	.000

Notes: ^{a-c}Means in a row with different superscripts are significantly different at the *P*-value shown
¹SEM = pooled standard error of mean (n=5)

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CERTIFICATE OF PRESENTATION

This is to certify that

**Jein Rinny Leke
Jet Saartje Mandey
Jacqueline T Laihad
Friets Ratulangi**

**made an oral presentation on the following paper at
the 17th Asia-Australasian Association of
Animal Production Society Animal Science Congress
held in Fukuoka, Japan from 22 to 25 August 2016**

**Effect of Dried Tomato Meal (*Solanum lycopersicum*) in Diet
on Performance and Egg Quality of Native Chickens
(O-03-8)**



**Mitsuhiro Furuse, Ph.D.
President of the 17th AAAP Animal Science Congress**