The 6th ISTAP
International Seminar on Tropical Animal Production

"Integrated Approach in Developing Sustainable Tropical Animal Production"

PROCEEDINGS

October 20-22, 2015
Yogyakarta Indonesia

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Faculty of Animal Science, Universitas Gadjah Mada Yogyakarta, Indonesia, 2015

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commemorating:

BERSINERGI
DIES NATALIS UGM 2015

46th DIES NATALIS
FAKULTAS PETERNAKAN UGM 2015

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PREFACE

On behalf of Faculty of Animal Science, Universitas Gadjah Mada, I am pleased to present you the 6th International Seminar on Tropical Animal Production (ISTAP) which is held on October 20 – 22, 2015 at Auditorium drh. Soepardjo, Faculty of Animal Science UGM, Yogyakarta. Under the main theme "Integrated Approach in Developing Sustainable Tropical Animal Production", we expect that information and ideas on animal production systems in the tropics and its related problems will be shared among participants, thus we can elaborate an integrated approach in developing sustainable tropical animal production. I believe, this can be achieved since more than 250 animal scientists, researchers, students, and producers from more than 15 countries join this seminar.

In this moment, I have to address my great thanks to all people who have contributed for the success of this seminar. First, to all participants, thank you for your contributions, time, and efforts in participating in all sessions in this seminar. We also would like to extend our gratitude to the reviewers and editors for dedicate their expertise and precious time in reviewing and editing the papers. I deeply appreciate the hard work of all members of the Steering Committee, Organizing Committee, and students of Faculty of Animal Science UGM for making this seminar achieved a great success!

I hope all of you enjoy the seminar and Jogja as well!

Dr. Cuk Tri Noviandi

Editor in Chief

REPORT FROM ORGANIZING COMMITTEE

Dear all of the scientists, delegates, participants, ladies and gentlemen,

Praise be to The Almighty for His Merciful and Beneficent to raise up this memorable moment for all of the scientists and delegates from all over the world who were interested in Animal Science field to meet up together.

On behalf of all the members of Board Committee, it is my great pleasure and honor to welcome all of you and impress thankful, and present a high appreciation for your participation in joining the 6th ISTAP in Yogyakarta, one of the Special Region in Indonesia where culture and tradition live in harmony with the modern nuance and educational spirit makes it a beautiful venue of this seminar.

During this event, we have distinguished scientists from all over the world to present plenary papers Livestock Management, Production, and Environment; Feed, Land, and Landscape for Sustainable Animal Production; Livestock Industry and Technology; Economics, Social, and Culture in Livestock Development; and Special issue on Halal Food, Safety and Regulation. It is noted that around 200 scientists as well as livestock producers, companies, graduate and postgraduate students from 15 countries attend the seminar; and more than 160 research papers will be presented. We can see great enthusiasm of all the scientists to solve livestock problems as well as to share valuable information and knowledge for human prosperity all over the world.

The 6th ISTAP Program consists of scientific and technical programs as well as social and cultural activities. The scientific and technical programs offer 4 plenary sessions, field trip, and many scientific sessions (both oral and poster presentation). The social and cultural programs of the 6th ISTAP are very important as the scientific and technical programs since the promotion of friendship and future scientific cooperation are also central to this seminar. Opening Ceremony offers you the Seminar Program a glance. Participants will attend a warm invitation from Dean Faculty of Animal Science UGM in a Welcome Dinner that will give you the most memorable moment to attend. Field trip activity offers a wonderful sightseeing to the most spectacular natural landmark in Yogyakarta, Merapi Lava Tour and Ulen Sentalu Museum. We do hope that you will not miss any of these wonderful opportunities.

Closing Ceremony will be held on October 22nd, 2015, immediately after the last session of presentation. The 6th ISTAP award will be announced for some participant as an appreciation for their valuable research.

Finally, on behalf of 6th ISTAP Committee, I wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all scientists participating in the seminar.

High appreciation I may acknowledge to the Rector of Universitas Gadjah Mada and Dean Faculty of Animal Science UGM, who have concerned to facilitate the seminar site host.

Special thank to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar successfully organized.

Terima kasih (Thank you).
Sincerely Yours,

Prof. I Gede Suparta Budisatria, Ph.D
Chairman
The Organizing Committee of the 6th ISTAP

WELCOME ADDRESS

Selamat pagi (Good morning)

Dear Rector of Universitas Gadjah Mada, all of Invited Speakers, honorable guests, all of delegates, participants, distinguished guests, Ladies and Gentlemen

Attendants of The 6th ISTAP,

It is my great pleasure and honor to extend a warm welcome to all of you at The 6th International Seminar on Tropical Animal Production, which be held on October 20 – 22, 2015 at Auditorium drh. Soepardjo, Universitas Gadjah Mada, Yogyakarta Indonesia. This seminar is proudly organized by Faculty of Animal Science Universitas Gadjah Mada.

The contribution of this seminar to the development of national food security is truly significant for introducing of new scientific knowledge and equipments that is much needed in Indonesia to maintain a safe and secure environment and to look at more effective ways to meet future challenges. We can see great enthusiasm of the entire participant to present their latest research as well as to share valuable information and knowledge for human prosperity all over the world.

In these 3 days of seminar, we have invited some Plenary Speakers and Invited Papers who are qualified as scientists and bureaucrats in animal science field to share their valuable information and knowledge. Other participants can deliver their precious research through oral and poster presentations.

Finally, on behalf of Faculty of Animal Science, we would like to extend our sincere gratitude to the Minister of Rural, Rural Development, and Transmigration, Republic of Indonesia, Mr. Marwan Jafar, for his generosity to be with us here to give Keynote Speech. Then, it is our great honor and pleasure to have qualified scientists and bureaucrats as Plenary Speakers and Invited Papers to share their valuable knowledge during the plenary and concurrent sessions. Moreover, special thank you is for the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar a great success. Also, we would like to congratulate and deliver high appreciation to the Organizing Committee as the organizer for their great contribution and generous efforts to make the seminar successfully organized.

And to all of the participants, I hope that this seminar will always success and bring some acknowledgement for all of us. Also, I wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all participants.

With all of our hospitality, we will try our best to make your brief visit to our country become a wonderful and memorable moments.

We are looking forward to meeting you all in the future event.

Wish you all a very pleasant and most enjoyable stay in Yogyakarta, Indonesia, beside you scientific journeys.

Terima kasih (Thank you).

Sincerely Yours,
Prof. Dr. Ali Agus
Dean Faculty of Animal Science UGM

OPENING REMARKS

Dear all of Scientists, distinguished guests, delegates, participants, Ladies and Gentlemen,

On behalf of Universitas Gadjah Mada, I am happy to welcome you and present a high appreciation for your participation in joining the 6th International Seminar on Tropical Animal Production hosted by the Faculty of Animal Science UGM in Yogyakarta from 20 – 22 October 2015.

Under the theme of "Integrated Approaches in Developing Sustainable Tropical Animal Production", we do hope that this seminar concludes with shared ideas and best practices, technology, and global networks that are required to increase animal production. The increase of animal production as one source of food is crucial to feed the world given that the population is expected to increase from 6 billion to about 8.3 billion in 2030. According to FAO (2008, 2009), the consumption of animal food increased from 10 kg/per annum in 1960, 26 kg/per annum in 200, and it is expected to be 37 kg/per annum. Animal production is an integral part of food production and contributing for the quality of human food supply. Animal and agricultural production is an important component in the integrated farming systems in developing countries as this produces high quality foods, provides job opportunities in rural areas, as well as enriching livelihood.

As a tropical country with high animal biodiversity, Indonesia and other tropical countries, have a variety number of indigenous and local animal genetic resources and germ plasm. This variety of animal germ plasm could be explored and developed not only for animal and food production but also for animal conservation. Apart from being exploited as food resources, it is therefore important to consider animal conservation. Conservation will protect the genetic potency of local bred and their family, and the domesticated animal bred, and this would secure our future food resources.

In these 3 days of seminar, we believe those aforementioned issues will be discussed, and technical solution as well as recommendation will be provided to solve the existing problems in tropical animal production.

Finally, on behalf of Universitas Gadjah Mada, we would like to congratulate and thanks to the Faculty of Animal Science UGM as the organizer for their great efforts to make the seminar successfully organized. To all of participants, I wish all of you have a great discussion and interaction with other scientists participating in the seminar as well as enjoying your time in Yogyakarta.

Thank you

Prof. Ir. Dwikorita Karnawati, M.Sc., Ph.D.
Rector of Universitas Gadjah Mada

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The 6th International Seminar on Tropical Animal Production
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Utilization of Skipjack Tuna (*Katsuwonus pelamis L.*) Gill in Diet as a Sourceof Protein on Carcass Quality of Broiler Chickens

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ABSTRACT: In the prospect of skipjack tuna (*Katsuwonus pelamis L.)* fish that abundant in Sulawesi Ocean, using as a protein source for chicken diets, a study was carried out to determine the effect of skipjack tuna gill meal (STGM) on carcass percentage, abdominal fat percentage and mortality. Five dietary treatments containing 0, 3, 6, 9,and 12% levels (factor A) substituted to fish meal and three methods of processing containing sun dried, steamed, boiled processing (factor B) were fed to 225 broiler chickens according to factorial design constructed from completely randomized design with three replication. Treatments were administrated during 35 days and feed and water were provided *ad libitum.*Result showed that dietary skipjack tuna gill meal up to 12% exert no significant difference (P>0.05) compared to control on carcass percentage, abdominal fat percentage and mortality, and methods of processing exert no significant effect (P>0.05) too on carcass percentage, abdominal fat percentage and mortality. There was no signinificant interaction (P>0.05) between levels and methods. It can be concluded that skipjack tuna meal can be substituted to fish meal up to 12%.

Keywords: Skipjack Tuna Meal, Fish Meal, Carcass Quality

INTRODUCTION

In recent year, poultry nutritionists have aimed theirresearchs towards the use of non-traditional feedstuffs in partial or total replacement of the conventionalingredients. Agro-industrial by products are being evaluated to access their nutritive potential to support poultry productivity. Fish meal is a conventional animal protein source when added to the diet increases poultryproduction cost (Islam, 1993). Research has confirmed that fishmeal is a useful protein source for poultry (Machin *et al.,* 1990). However, there are a number of unfavorable characteristics, which present limiting factors in fishmeal usage (Mikulec *et al.,* 2004). Moreover,poultry is a competitor of human being in respect of dry fish consumption.Effort of reducing production cost from feed needs to find alternative feed materials of relatively same nutritive value as the fish meal

There are many non-conventional feeds and by-products could be utilized effectively to improve the supply of local poultry feeds. Fish by-products are the most important by-products available at reasonable prices. These fish by-products have the potential as high protein supplements for poultry. One of them is skipjack tuna gills as animal-derived protein source of poultry feed. The gill of skipjack tuna as protein source will decay if it is not processed due to containing good components for bacterial growth. Skipjack gill is also a living habitat for bacteria beside intestine and skin. For these reasons, the skipjack gill could be utilized as bird feed through processing techniques. Processing to make gill meal can be done through a) sun drying, b) steaming, and c) boiling. The important factor needed to be considered in fish processing is drying temperature. In semi-conventional or conventional processing of the skipjack gill often occurs the protein

denaturation due to over-heating. The animal protein in the ration should be less or equal to one-third the total protein of the ration. The animal protein about one-fourth the total ration protein could still give good performance of the broiler growth rate. Carcass is part of the body after the cut and discarded chicken feathers, abdominal fat, organs, legs, head, neck and blood, except the lungs and kidneys (Rizal, 2006). According to Lesson (2000), nutrients in diet were the factors that affect the carcass weight. Percentage of carcass weight is calculated by dividing the carcass weight multipliedby 100% live (Rizal, 2006). The objective of this study wasto evaluate the effect of different administration levels of the skipjack gill meal as fish meal substitute in the ration on the carcass percentage and abdominal fat percentage.

MATERIALS AND METHODS

Two-hundreds and twenty-five Arbor Acres CP 707-strained broiler chicks were use in this study with initial mean weight of 44.50 g and coefficient of variant5.23 %. These chicks were randomly placed in 45 units of cages, each of which had 5 individuals of broiler chicks. The composition of diets were 15 kinds of rations as treatments, i.e 5 administration levels of skipjack gill meal, 3, 6, 9 and 12%, and 3 processing methods, sun-drying, steaming, and boiling with 3 replications. All rations were made in 22 % of protein and metabolizable energy of 3200 Kcal/ kg according to NRC (1994). The nutrients of skipjack tuna gill meal and the composition of feedstuffs and nutrients in diet were shown in Table 1 and Table 2.

Tabel 1. Nutrients in skipjack tuna gill meal (STGM)

Nutrients	STGM sun-dried	STGM-steamed	STGM-boiled
Water (%)	10.80	10.65	10.95
Crude protein (%)	42.56	41.71	40.67
Crude fat (%)	7.39	7.10	6.67
Crude fiber (%)	0.28	0.32	0.12
NFE	6.08	6.27	7.69
Ash (%)	32.89	33.95	33.90
Ca (%)	10.27	10.39	10.88
P (%)	6.36	6.12	7.52
Gross energy (Kcal/kg	4760	4150	4060

Notes: STGM = skipjack tuna gill meal

This study used Factorial Completely Randomized Design (5 x 3). Factor (A) was 5 administration level of skipjack gill meal, and factor (B) was 3 gill processing methods. The chicks were divided into 15 groups of treatments, each of which consisted of 3 cages as replication and each cage kept 5 individuals. Data obtained was analyzed using analysis of variance (Steel and Torrie, 1980).

Parameters measured for carcass quality were carcass percentage and abdominal fat percentage. All data generated were subjected to the analysis of variance technique according to factorial completely randomized design.

Tabel 2. Diets and nutrients in diets

Ingredients	Diets												
	K0	j1	j2	j3	j4	k1	k2	k3	k4	R1	R2	R3	R4
	%												
Corn	55.95	55.95	55.72	54.7	54.14	55.4	54.8	54.4	54.25	55.8	54.78	54.15	53.6
Rice bran	6	6	5.75	5.05	5.1	5.55	5.05	5	5	6.05	6.05	6	4
Soybean cake	17	17	17	17.8	17.25	17	17	17	17.5	16.5	17	17	18
Coconut cake	3	3	2.5	2.5	2.5	3	3	2.5	2	2.5	2.5	2.5	3
Fish meal	12	12	9.98	7.97	5.96	10	8.07	6.1	4.15	10.1	6.25	6.25	4.33
STGM sun-dried	0	0	3	6	9	0	0	0	0	0	0	0	0
STGM-steamed	0	0	0	0	0	3	6	9	12	0	0	0	0
STGM-boiled	0	0	0	0	0	0	0	0	0	3	9	9	12
Coconut oil	5	5	5	5	5	5	5	5	5	5	5	5	5
Grit	1	1	1	1	1	1	1	1	0.05	1	0.01	0.05	0.05
Top Mix	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total	100	100	100	100	100	100	100	100	100	100	100	100	100
Nutrients:													
Protein (%)	22.41	22.26	22.42	22.1	22.04	22.3	22.2	22	22.17	22.1	22.18	22.13	22.4
ME (Kcal/kg)	3200	3204	3202	3201	3202	3202	3204	3204	3230	3202	3201	3213	3223
Ca(%)	1.3	1.48	1.66	1.84	2.03	1.49	1.67	1.86	1.76	1.51	1.71	1.62	1.82
P(%)	0.47	0.6	0.73	0.86	1	0.59	0.72	0.84	0.95	0.63	0.8	0.96	1.13

Notes: Jo= Control diet, J1=3% STGM sun-dried, J2= 6 % STGM sun-dried, J3= 9% STGM sun-dried, J4= 12 % STGM sun-dried, K1= 3% STGM-steamed, K2= 6 % STGM-steamed, K3= 9% STGM-steamed, K4= 12 % STGM steamed, R1= 3% STGM-boiled, R2= 6 % STGM-boiled, R3= 9% STGM boiled, R4= 12 % STGM-boiled.

RESULTS AND DISCUSSION

Carcass Percentage. The percentage of carcass based on the administration level and processing method of the skipjack gill meal is presented in Table 3.

Tabel 3. Effect og skipjack tuna gill meal on carcass quality of broilers

Variables	Processing Methods	administration level of the skipjack gill meal				
		R0	R1	R2	R3	R4
Carcass (%)	Sun-dried	74.56	73.40	74.30	74.07	73.59
	Steamed	74.19	74.03	74.18	74.31	74.44
	Boiled	74.39	72.11	72.87	73.16	74.01
Abdominal Fat (%)	Sun-dried	2.04	1.89	1.99	1.93	1.87
	Steamed	1.85	1.94	1.93	1.95	1.93
	Boiled	2.02	2.00	1.86	1.83	1.83

Result showed that the skipjack gill meal administration level and processing method interaction did not give significant effect ($P > 0.05$) on the carcass percentage of the broiler. Aliyani (2002) stated that weight of live of broiler was affected by feed consumption, feed quality, and activity of broiler. Carcass percentage values recorded in ranged 73.18 to 74.38% This result

agrees with Bell and Weaver (2002) that carcass of 1520 g/body weight is 65.5 %.Shanin and Abdul ElAzeem (2005) suggested that chicken carcasses fed with ahigh content of fiber, both with high or low protein contenthave the proportion of carcass weight with higher bone thanthe chickens fed with a low content of fiber, both with contenthigh or low protein.

Abdominal fat percentage. Abdominal fat percentage of the broilers based on administration level and processing method of skipjack gill during this study is given in Table 3. Result showed that gill meal administration level and processing method interaction, administration level, and processing method did not significantly affected (P>0.05) abdominal fat percentage of broilers. Average of abdominal fat percentage was in common range, 1.87 to 1.97%. North (1984) stated that the abdominal fat content of the broiler should not be higher than 4%. It reflected that the use of the administration level and the processing methods in this study produces the abdominal fat lower than 4 %, meaning that the abdominal fat of the broiler is the normal range.

In the fat developing process, the body fat is produced from carbohydrate, protein, food fat, after the carbohydrate is absorbed in glucose form and glycogenic glucose is changed to glucose and then transferred to the liver to be stored as glycogen, while some fat enters the circulatory system through lymphatic system and can directly stored in the tissue. Since each certain cell possesses the highest limit of protein storage, excessive amino acid will be degraded to be energy source and will stored as body fat. Non-significantly different abdominal fat could result from that the energy and protein content in the ration is the same despite similar energy consumption. Abdominal fat could also rise if high energy level is given (North and Bell, 1990). This study used the ration of 22% protein and metabolizable energy of 3200 Kcal/kg. Beside for major living need, the excessive energy is then stored in fat form occurring in the body cavity and attaching to the organs. Resnawati (2004) stated that the percent of abdominal fat at 5 weeks old ranged from 1.5 to 2.11%. The broilers used in the study had the same age and lived in the same environment. The skipjack (*Katsuwonus pelamis L*) gill waste through steaming processing method and administration of 12% as a replacement of anchovy meal protein in the ration gave good response to the percent of carcass weight and abdominal fat.

CONCLUSION

This study concluded that skipjack tuna gill meal can replace up to 12% of fish meal in broilerdiets without affecting carcass quality ofbroiler meat and it would be economically profitable toinclude STGM in feed mixtures for broiler production aspart of their balanced diet.

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CERTIFICATE

This is to certify that

JEIN RINNY LEKE

has participated as

ORAL PRESENTER

at the 6th International Seminar on Tropical Animal Production
"Integrated Approach in Developing Sustainable Tropical Animal Production"
Faculty of Animal Science Universitas Gadjah Mada, Yogyakarta-Indonesia
October 20th - 22nd, 2015

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