The 6th ISTAP International Seminar on Tropical Animal Production
“Integrated Approach in Developing Sustainable Tropical Animal Production”

PROCEEDINGS

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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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Phytobiotics Habbatus Sauda and Garlic Meal: Are Still Efficacious during the Spread of Marek’s Disease Outbreak

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ABSTRACT: When kept intensively in a closed-house poultry shed, additions of habbatus sauda (Nigella sativa; HSM) or garlic bulb meal (Allium sativum; GBM) in the diets were claimed to be efficacious used as growth promoter for broiler chickens. This study critically evaluated the effectiveness of both phytobiotics during the spread of Marek’s disease outbreak. A hundred male New Lohmann day old broiler chicks were divided into 5 dietary treatments. One-way ANOVA treatment structure in a Complete Randomized Design was used in this experiment. The treatment diets were: basal diets that meet dietary requirements of the breeder, without phytobiotics supplementation (control; P1); basal diets + 1.0% HSM (P2); basal diets + 1.0% GBM (P3); basal diets + 1.0% HSM + 1.0% GBM (P4); and basal diets + 0.5% HSM + 0.5% GBM (P5). Each treatment was replicated 5 times, with 4 birds in each replicate pen. Response parameters that evaluated in this study were growth performance (average daily gain, final weight, feed intake, and feed conversion ratio) and protein-energy efficiency (protein and energy intake, protein and energy efficiency ratio), based on 5 weeks rearing period. Results showed that, when the birds were raised in tropical opened-system poultry shed during the spread of Marek’s disease, dietary addition of 1.0% habbatus sauda and garlic bulb meal did not give any significant positive effects on all response variables that observed on growth performance and protein-energy efficiency parameters. It might be concluded that phytobiotics supplementation is only efficacious for improving productivity of broiler chickens when the birds are reared in closed-house poultry shed that free from disease outbreak.

Keywords: Phytobiotics efficacy, Marek’s disease outbreak, Growth performance, Protein-energy efficiency

INTRODUCTION

Available studies suggest that traditional poultry farmers face serious problems in disease attacks, such as: infectious bursal disease (Berg, 2010), Newcastle disease, infectious bronchitis, avian influenza, and Marek’s (Tabbu, 2000). Studies reported that development of the body self-defence might be depressed by low biosecurity level, poor sanitary condition, and low quality of feed stuffs (Gibbens et al., 2001). Uncontrolled farm condition and non-intensive poultry managements seem to be responsible for this problem. Traditional farmers might use antibiotics to solve this problem. Antibiotics have been administered mostly during the grow-out period to control growth and proliferation of exogenous pathogens, promote growth, maintain health, facilitate better feed efficiency, and improve meat quality. In order to limit the spread and development of antibiotic resistant microflora, the authorization of several antibiotics as feed additives has been withdrawn in European Union since 1997 (Dibner and Richards, 2005). However, the removal of antibiotics authorization resulted in substantial increase in infection in poultry (Knarreborg et al., 2002; Casewell et al., 2003).

Some studies showed that garlic bulb meal (GBM) and habbatus sauda meal (HSM) have been known to be efficacious as sources of phytobiotics for poultry. Numerous studies reported that GBM improved the growth performance of poultry with non-antibiotics diets (Mahmood et
al., 2009). On the other hand, habbatus sauda was also reported to be good as growth promoter for broiler chickens (Abu-Dieyeh and Abu-Darwish, 2008; Al-Beitawi and El-Ghousein, 2008; Shewita and Taha, 2011).

However, these studies were done in intensive poultry management, using good quality feed stuffs and closed-housed poultry system. Therefore, the results did not draw the ‘real’ condition. Since there is no study to report the effects of dietary supplementations of garlic bulb and habbatus sauda on New Lohman broiler chickens during the outbreak of poultry diseases, this study is important to evaluate the factual effects of phytobiotics supplementations on real condition in traditional farmers.

**MATERIALS AND METHODS**

**Birds, Diets, Housing, and Experimental Design**

A hundred male day old New Lohman broiler chicks from local commercial breeder were allocated to 5 treatments in a complete randomized fashion. Each treatment had 5 replicate pens with 4 birds per replicate pen. The treatment diets were: basal diets that meet dietary requirements of the breeder, without phytobiotics supplementation (control; P1); basal diets + 1.0% HSM (P2); basal diets + 1.0% GBM (P3); basal diets + 1.0% HSM + 1.0% GBM (P4); and basal diets + 0.5% HSM + 0.5% GBM (P5). These dose rates were based on the recommendation of the previous studies from the available literatures. The basal diets were composed of yellow corn, rice polished, soybean meal, meat bone meal, crude palm oil, Di-Calcium Phosphate, Calcium Carbonate, mineral-vitamin premix, methionine, salt, with garlic bulb meal and habbatus sauda meal added at different doses. All diets for starter and grower stages were prepared with the same batch of ingredients. The feeding program consisted of a single starter diet (from 0 – 14 days of age) and a layer diets (15 to 35 days of age). The diets were formulated to meet the recommendations of the National Research Council (1994) for broiler chickens. The ingredients and chemical compositions of the diets are presented in Table 1. Feed and drinking water were given for ad-libitum consumption. During the experiment, no enzymes or coccidiostat were added to the experimental diets. The chicks were vaccinated at the hatchery, and no additional vaccinations were administered during the study.

**Sampling Procedures and Statistical Analyses**

Response parameters that evaluated in this study were growth performance (average daily gain, final weight, feed intake, feed conversion ratio) and protein-energy efficiency (protein and energy intake, protein and energy efficiency ratio), based on 5 weeks rearing period. Body weight and feed intake data were taken on d 0 and 35 for calculation of average daily gain and feed conversion ratio. The protein and energy intake was based on the amount of feed intake, multiplied by protein and energy content in the feed. The protein efficiency ratio (PER) and energy efficiency ratio (EER) were calculated for each phase using the following formula:

\[
\text{PER (g/g)} = \frac{\text{Body weight gain (g)}}{\text{Protein intake (g)}} \quad \text{EER (g/100 kcal)} = \frac{\text{Body weight gain (g) x 100}}{\text{Gross energy intake (kcal)}}
\]

Growth performance data, as well as nutrient and energy utilization data, were analyzed statistically by Analyses of Variance employing Complete Randomized Design (Steel and Torrie, 1993). Significance was declared for the probability of less than 5%. All statistical analyses were performed using Statistical Procedures for Social Science (SPSS) for Windows versi 16.0 (SPSS Inc., Chicago, IL) software.
Table 1. Composition of experimental starter and grower diets (%)

<table>
<thead>
<tr>
<th>Items</th>
<th>Starter diets</th>
<th>Grower diets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
<td>P2</td>
</tr>
<tr>
<td>Yellow corn</td>
<td>38.29</td>
<td>38.29</td>
</tr>
<tr>
<td>Rice polished</td>
<td>7.93</td>
<td>7.93</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>41.10</td>
<td>41.10</td>
</tr>
<tr>
<td>Meat bone meal</td>
<td>7.25</td>
<td>7.25</td>
</tr>
<tr>
<td>Di-calcium phosphate</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>Calcium carbonate</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td>Mineral-vitamin premix</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Methionine</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Salt</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Garlic bulb meal</td>
<td>2.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Habbatus sauda meal</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Filler</td>
<td>2.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2. Growth performance response and nutrient – energy efficiency ratio of broiler chickens fed diets with phytobiotics supplementation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Treatment diets$^2$</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
<td>P2</td>
</tr>
<tr>
<td>Growth Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed intake. g/bird</td>
<td>748.77</td>
<td>752.00</td>
</tr>
<tr>
<td>Average daily gain. g/bird</td>
<td>296.90</td>
<td>334.49</td>
</tr>
<tr>
<td>Final weight. g/bird</td>
<td>333.90</td>
<td>371.49</td>
</tr>
<tr>
<td>Feed conversion</td>
<td>2.50</td>
<td>2.28</td>
</tr>
<tr>
<td>Nutrient and energy utilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein intake. g/bird</td>
<td>169.45</td>
<td>170.18</td>
</tr>
<tr>
<td>Protein efficiency ratio. g/kg</td>
<td>1.76</td>
<td>1.96</td>
</tr>
<tr>
<td>Energy intake. kcal/g</td>
<td>2175.3</td>
<td>2184.7</td>
</tr>
<tr>
<td>Energy efficiency ratio</td>
<td>13.72</td>
<td>15.28</td>
</tr>
</tbody>
</table>

Note: $^1$Means represent 5 pens of 4 bird each per treatment.

$^2$P1= control; basal diets + 1.0% HSM (P2); basal diets + 1.0% GBM (P3); basal diets + 1.0% HSM + 1.0% GBM (P4); and basal diets + 0.5% HSM + 0.5% GBM (P5).
RESULTS AND DISCUSSION

The effects of low dose phytobiotics supplementation on growth performance of broiler chickens are summarized in Table 2. Feed intake, average daily gain, and final weight feed conversion of the male birds fed diets containing garlic bulb meal (GBM) or habbatus sauda meal (HSM) did not different with those of the birds fed control diets. Dietary supplementation with 1.0% HSM individually or in combination with 1.0% GBM did not stimulate growth performance of male broiler chickens. These results might be attributed to the adverse effects of Marek’s disease on appetite and nutrients absorption. In a critical study with poultry, Tabbu (2000) showed that Marek’s disease was associated with poor appetite, which in turn reduced the amount of micro nutrient that available to be absorbed for daily metabolism. On the other hand, reduction of the body immune system due to the occurrence of Marek’s disease, initiated the body to maximally recover their health state. Consequently, available micro-nutrients in the intestine cannot be utilized to stimulate daily growth. Result in current study was in the line with the results of previous studies by Ashayerizadeh et al. (2009), Doley et al. (2009) and Dono (2012) where supplementation of 1.0% HSM did not stimulate growth performance in broiler chickens.

Results in Table 2 also showed that dietary supplementations with GBM or HSM did not stimulate nutrient and energy utilization. At the rate of 1.0% alone or in combination, supplementations of GBM and HSM did not influence nutrient and energy intake, as well as nutrient and energy efficiency ratio. This result might be attributed to the increase of competition for available micro-nutrients between pathogenic microbes and micro-villi in the intestinal wall (Dibner and Richards, 2004). Increase of the population of pathogenic microbes might stimulate production of intestinal mucus barrier and reduce micro-nutrients uptake, which in turn might interfere nutrients and energy utilities for daily metabolism. Result in this study was similar with result of Kirkpinar et al. (2010) that supplemented broiler diets with garlic essential oil.

CONCLUSIONS

It can be concluded from current study that when broiler chicken birds were kept in opened poultry-house research and raised during the spread of Marek’s disease, dietary supplementation of phytobiotics garlic meal and habbatus sauda meal did not have any significant benefits on the growth performance or nutrient-energy utilization of broiler chickens.

REFERENCES


This is to certify that

NANUNG DANAR DONO

has participated as ORAL PRESENTER at the 6th International Seminar on Tropical Animal Production "Integrated Approaching in Developing Sustainable Tropical Animal Production" October 20th - 22nd, 2015

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