# PROCEEDING

Animal Production International Seminar
APIS
3rd 2016

The 3rd Animal Production International Seminar
The 3rd ASEAN Regional Conference on Animal Production
3rd APIS & 3rd ARCAP – 2016

## Enhancing Synergistic Roles of Stakeholders for Development of Sustainable Livestock Production


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Bogor Agricultural University

**Perpustakaan Nasional: Katalog dalam Terbitan (KDT)**

**Proceeding 3rd Animal Production International Seminar (3rd APIS) & 3rd ASEAN Regional Conference on Animal Production (3rd ARCAP)**



Cetakan Ketiga, 2016



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# RECTOR SPEECH

Assalamualaikum warohmatullahi wabarakatuh
Distinguished Guests and Delegates, Ladies and Gentlemen,

It gives me great previlege and pleasure to extend to you all a very warm welcome on behalf of Brawijaya University and to say how grateful we are to the organizing commitee of The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) who made this important event happening from today onward. Your attendance in this conference will not be enough before exploring the serendipity of Batu city which has attracted so many visitors in the recent years. It offers you many attractive places to visit varying from leisure facilities to smallholder dairy farms that relevant to the topic of this conference.

The issues of livestock production and food security have been a hot topic of debates all over the world to challenge our capability to feed human population living on earth that is believed will reach 25 billion people by the middle of this millineum. The global call on quality human resources especially in developing countries may not be achieved without adequate supply of animal protein. This has urged animal scientists to make significant effort to increase animal production by inventing new technologies and approaches but have no negative impact on our natural resources because the majority of smallholder farmers face with scarcity of cultivable land to produce adequate quantity and quality fodder for their animals. The practice of uncontrolled fodder scavenging from forest and open land may provoke a serious natural disaster such as landslide, flood and loss of water resources for human beings. Through this stage I would like to extend my concern to all distinguished guests and delegates to pay more attention on sustainable development of animal production that assures our young generation lives on earth safely and happily.

As the rector of Brawijaya University, I am also delighted to welcome you in our green campus sometime in the middle of the conference to hasten mutual collaboration between Brawijaya University and either national or international partners . We are fully aware that in a modern life higher education quality should be built on the basis of collaboration for many reasons. Brawijaya University has 14 faculties that can be grouped into four science trees, that is engineering, humanity, economics, and life sciences. They have been growing significantly not only in the number of student enrollements but many prestigeous achievement on research findings, student competitions and administrative transparency are our flagships in the last ten years. Nevertheless, we also realize that first and foremost constraint for any institution is the limit of resources and thereby underpinning the importance of establishing mutual collaboration. It is our opportunities to meet delegates from varying places of origin that open initial discussion for further networking on relevant topics of interests concordance to the main topic of this conference and beyond.

To conclude my address, once again I would like to express my sincere gratitudes to all delegates, partners and conference committee who have made this important international conference occurs. I do hope that your stay and partcipation in these seminar and conference will be fruitful and unforgettable.

By the name of Almighty Allah Swt. I declare that The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) are officially open.

Thank you very much
Wassalamualaikum warohmatullahi wabarokatuh.

Batu, 19 October 2016
Brawijaya University
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Prof.Dr.Ir. Mohammad Bisri, MS.

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## OUTLINE OF THE CONGRESS

**Congress Name:**

3rd Animal Production International Seminar (3rd APIS) & 3rd ASEAN Regional Conference on Animal Production (3rd ARCAP)

**Themes:**

Enhancing Synergistic Roles Of Stakeholders for development Of Sustainable Livestock Production

**Chairman:**

Dr.Ir. Marjuki, M.Sc (Brawijaya University, Indonesia)

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**BRAWIJAYA UNIVERSITY**

**INDONESIAN SOCIETY OF ANIMAL SCIENCE**

**UNIVERSITI PUTRA MALAYSIA**

**MALAYSIAN SOCIETY OF ANIMAL PRODUCTION**

**RAJAMANGALA UNIVERSITY OF TEHCNOLOGY LANNA**

## Oral Presentation 5 Focus Session: Feed and Nutrition (2)

Friday, 21 October 12:30-14:40 Room: Panderman 2

| Time | Title | Presenter | Code |
|---|---|---|---|
| 12.30-12.40 | Legumes wafer for improvement the post-weaning etawah crossbreed goats performance[1]<br>[1] Brilian Desca Dianingtyas, Yuli Retnani, and Dwierra Evvyernie | Brilian Desca Dianingtyas | FN – 352 |
| 12.40-12.50 | Utilization of cricket meal in creep feed diet of growing etawah cross breed goats[1]<br>[1] Dewi Apri Astuti, Widya,L Khotidjah, A. Angraeny, K.Komalasari , and Dewi Apri Astuti | Dewi Apri Astuti | FN – 332 |
| 12.50-13.00 | Performance of first cutting of Pennisetum purpureun cv.Mott under different level of light and nitrogen fertilizer[1]<br>[1] David A. Kaligis, Selvie D. Anis, Johanis R. Tulung, and Sahrun Dalie | David A. Kaligis | FN – 360 |
| 13.00-13.10 | Amino acid characterization of tofu waste fermentation using effective microorganism-4 and Lactobacillus plantarum culture[1]<br>[1]Eka Fitasari and Budi Santosa | Eka Fitasari (MODERATOR 2) | FN – 325 |
| 13.10-13.20 | In vitro digestibility profiles of cricket meal as protein source in the ration[1]<br>[1]Dewi Apri Astuti, M. Miftakhul Solikhin, and Yuni Cahya Endrawati | Dewi Apri Astuti | FN – 331 |
| 13.20-13.30 | Production of roughage feed under different drying methods and evaluation of the feeding value[1]<br>[1]Jayaweera B. P. A. | Jayaweera B. P. A. | FN – 333 |
| 13.30-13.40 | In vitro nutrient digestibility of Chromolaena odorata-based silage treated with Corypha gebanga meal and rumen content[1]<br>[1]Yelly M. Mulik, Muhammad Ridla, Iwan Prihantoro, and Marthen L. Mullik | Yelly M. Mulik | FN – 335 |
| 13.40-13.50 | Production, characterization and purification of xylanase from Staphylococcus aureus MBXi-K4[1]<br>[1]Indah Wijayanti, Maggy T Suhartono, Khaswar Syamsu, and Yulin Lestari | Indah Wijayanti (MODERATOR 1) | FN – 336 |
| 13.50-14.00 | To estimate intestinal truly absorbed protein of alfalfa hay and alfalfa silage using new dutch system (DVE/OEB)[1]<br>[1]P. Kheyrandish, M. Danesh Mesgaran and A. Vakili | Parisa Kheyrandish | FN – 340 |
| 14.00-14.10 | Chitosan protection to saga leaves extract (Abrus precatorius Linn) and Lingzhi mushroom (Ganoderma lucidum) from rumen microbial degradation[1]<br>[1] Evvyernie D., Sukria H. A., Harlina E., Suningsih N., and Zetira H. | Dwierra Evvyernie | FN – 342 |
| 14.10- | Effects of different types of cakes in rations on the | Amani Osman | FN – 348 |

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## Keynote Speakers Presentation



## Oral Presentation 1 Focus Session: Feed and Nutrition (1)



## Oral Presentation 1 Focus Session: Feed and Nutrition (2)

**Oral Presentation 5 Focus Session: Feed and Nutrition (2)**



**Oral Presentation 5 Focus Session : Feed and Nutrition (3)**

# Chitosan Protection To Saga Leaves Extract (*Abrus Precatorius* Linn) And Lingzhi Mushroom (*Ganoderma Lucidum*) From Rumen Microbial Degradation

**Evvyernie D[1,2], Sukria HA[1,2], Harlina E[1,3], Suningsih N[2], and Zetira H[2]**

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[2]*Department of Nutrition and Feed Technology, Faculty of Animal Science, Bogor Agricultural University. Bogor 16680. West Java. Indonesia.*
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## Abstract

The purpose of research was study the use of 2% chitosan as a protector of herb saga leaves extract (*Abrus precatorius* Linn) and lingzhi mushroom (*Ganoderma lucidum*) from microbial degradation in the rumen in vitro. Randomized block design with five ration treatments and three times collection of rumen fluid as a block. The treatments were R0 (control) = basal ration (35% forage and 65% concentrates), R1: R0+ saga leaves extract, and R2: R0+ saga leaves extract protected by 2% chitosan, R3: R0+ lingzhi mushroom extract, and R4: R0+ lingzhi mushroom extract protected by 2% chitosan. Parameters observed were total population of rumen microbes (protozoa and bacteria), concentrations of total VFA and $NH_3$, dry and organic matter digestibility (DMD and OMD). The results showed chitosan protection to both extracts were not influence the population of bacteria and protozoa as well as $NH_3$ concentration, but decreased 16,4% VFA total ($P<0.05$) and 35% average digestibility ($P<0.05$) in saga leaves extract and also decreased 20% VFA total ($P<0.05$) in lingzhi mushroom extract without interfere the digestibility. As conclusion, 2% chitosan can be used as protector to lingzhi mushroom extract than to saga leaves extract from degradation of rumen microbes due to its ability maintaining the digestibility.

***Keywords:*** *chitosan, digestibility, in vitro, lingzhi mushroom* (*Ganoderma lucidum*)

## Introduction

Improvement of animal productions can be triggered by feed additive addition into the ration. The use of synthetic additives is common in the farm due to their continue availability, although they still left the residue in the animal products. Nowadays, as the development of health knowledge, the kind of residue has potency as carcinogenic factor for human who consume that kind of animal products. To reduce that risk, the investigation of save feed additives as an alternative should be done continuously.

Many herbs and mushroom have capacity as feed additives for anti bacteria, antioxidant, anti mastitis and anthelmintic. The use of them in animal ration is restricted by their anti nutrition content, which interferes the fermentation process in the rumen, for example saponin reduced the growth of protozoa (defaunation), hence impacts decreased the methane production (Guo *et al.*, 2008). Rahminiwati *et al.* (2010) said that kemuning and saga leaves extracts could be as prebiotic because their ability to reduce non-pathogenic

bacteria such as *Lactobacillus rhamnosus*, *L. agilis* and *L. amylophilus*. Moreover, addition of saga and kemuning leaves meal in goat lactation rations caused reducing only some amount of somatic cell count and EPG as well as the use of lingzhi mushroom meal in ration of dairy cow lactation (Evvyernie *et al.* 2012; Tresia *et al.* 2015). Although those finding results showed that herbs and mushroom have potency as anti mastitis and anthelmintic on dairy goat and cow, but the use of them were not more than 1% in ruminant ration due to their role as anti bacteria will kill the microorganisms in the rumen. So that, in this present research, herbs and mushroom in high level were used after they protected by chitosan. Chitosan is a natural biopolymer derived from the deacetylation of chitin and is not degraded in the rumen (Fadel El-Seed *et al.* 2003).

The purpose of research was study the use of 2% chitosan as a protector of herb saga leaves extract (*Abrus precatorius* Linn) and lingzhi mushroom (*Ganoderma lucidum*) from microbial degradation in the rumen in vitro.

## Methodology

This research used randomized block design with 3 (three) kinds of ration as a treatment and 3 (three) times collection of fresh dairy goat rumen fluid or inoculums as a block. The treatments were: R0 (control) = basal ration; R1: R0+ saga leaves extract, and R2: R0+ saga leaves extract protected by 2% chitosan, R3: R0+ lingzhi mushroom extract, and R4: R0+ lingzhi mushroom extract protected by 2% chitosan. The basal ration contained 35% forage and 65% concentrate which fulfill the requirement of dairy goat lactation 55% TDN and 12% crude protein. The forage was consist of 25% Napier grass and 10% Indigofera spp, and the concentrate was consist of coconut meal, tempeh waste, dates fruit waste, rice bran, premix, DCP and $CaCO_3$ (Yuniarti *et al.* 2014). Extraction of saga leaves and lingzhi mushroom used infuse method with water as a solvent. Spray dry method was used to protect the both extracts using 2% chitosan.

The variables measured for in vitro studies were: protozoa and bacteria total populations (Ogimoto and Imai 1981); VFA total concentration (General Laboratory Procedure 1996), $NH_3$ concentration (General Laboratory Procedure 1996), dry matter digestibility (DMD) and organic matter digestibility (OMD) (Tilley and Terry 1963). Data were analyzed using ANOVA and contrast orthogonal (Steel dan Torrie 1993).

## Results and Discussion

The rumen microbes and their products by feeding rations contain saga leaves or lingzhi mushroom extracts with or without 2% chitosan protection is provided in Table 1. There were no differences among population of protozoa and bacteria rumen of all treatment rations compared to control. That means addition of herb or mushroom extracts not interferes the growth of rumen microbes in this research.

In 4 (four) hours rumen fermentation in vitro, production of VFA total decreased around 18% when saga leaves and lingzhi mushroom were protected by chitosan (R2

Table 1. Rumen microbes and their products by feeding rations contain saga leaves and lingzhi mushroom extracts with and without chitosan protection

| Variables | Treatments | | | | |
|---|---|---|---|---|---|
| | R0 | R1 | R2 | R3 | R4 |
| Protozoa total (log cell $ml^{-1}$) | 6.97 ± 0.07 | 6.78 ± 0.28 | 6.66 ± 0.20 | 6.85 ± 0.08 | 6.85 ± 0.11 |
| Bacteria total (log CFU $ml^{-1}$) | 7.11 ± 1.30 | 7.18 ± 1.36 | 7.43 ± 1.46 | 6.95 ± 1.49 | 7.12 ± 0.98 |
| VFA total | 151.07b ± | 164.62a ± | 137.68c ± | 164.97a ± | 131.34c ± |

| | | | | | |
|---|---|---|---|---|---|
| (mM)* | 12.76 | 11.33 | 12.89 | 11.79 | 10.94 |
| $NH_3$ (mM) | 11.25 ± 4.23 | 9.91 ± 2.80 | 12.78 ± 1.24 | 13.05 ± 4.91 | 12.73 ± 2.90 |
| DMD (%)* | 74.50a ± 1.92 | 74.69a ± 2.30 | 51.86b ± 2.34 | 74.06b ± 1.19 | 71.75b ± 0.52 |
| OMD (%)* | 69.87a ± 2.56 | 70.18a ± 2.77 | 42.24b ± 2.49 | 69.61a ± 1.21 | 66.76b ± 0.41 |

Notes : R0: Control, R1: R0+ saga leaves extract, and R2: R0+ saga leaves extract protected by 2% chitosan, R3: R0+ lingzhi mushroom extract, and R4: R0+ lingzhi mushroom extract protected by 2% chitosan. VFA = volatile fatty acids concentration, NH3= ammonia concentration, DMD= dry matter digestibility, OMD= organic matter digestibility.*) significance in the same row

and R4) compared to R1 and R3 ($P<0.05$). The $NH_3$ concentration of R2 increased around 29%, but R4 decreased around 2%. Chitosan is alkaline due to high $NH_2$ content. Chitosan can solve in organic solvent like formic acid, acetic acid and glutamic acid by protonation $NH_2$ content to be $NH_3$ (Rinaudo, 2006). Through this mechanism, VFA production especially formic acid and acetic acid) from the chitosan protected-rations (R2 and R4) could be used to solve the chitosan and caused increasing the $NH_3$ concentration in R2, but almost not affected $NH_3$ concentration of R4 due to lingzhi mushroom content. However, the digestibility of R2 drastically decreased around 35% as consequently of alkaline ecosystem in the rumen (the fermentation process of digestion was 48 hours) ($P<0.05$). The average decreasing of R4 digestibility was only slightly around 4%, because rumen ecosystem almost the same to R3 after chitosan was solved by acid from VFA, where it might be caused by lingzhi mushroom content such as polysaccharide, peptidoglycan, beta-D-glukan, that have capacity to stabilized pH or rumen ecosystem.

## Conclusion

As conclusion, 2% chitosan can be used as protector to lingzhi mushroom extract than to saga leaves extract from degradation of rumen microbes due to its ability maintaining the digestibility.

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# THE 3RD ANIMAL PRODUCTION INTERNATIONAL SEMINAR
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