

**PROCEEDING  
OF ISAE INTERNATIONAL SEMINAR  
BANDAR LAMPUNG  
AUGUST 10-12, 2017**

**“Strengthening Food and Feed  
Security and Energy Sustainability to  
Enhance Competitiveness”**

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Competitiveness”**

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## PREFACE

Alhamdulillahrabbi'alamin, I would like to express how grateful we are to finished "Proceeding of ISAE International Seminar 2017, Bandar Lampung, August 10-12, 2017 with theme "Strengthening Food and Feed Security and Energy Sustainability to Enhance Competitiveness". We are here to communicate and gather dissemination of information and research results in the field of agriculture as part of planning the development of agriculture in the future towards food and biomass-based energy self-sufficiency. Through this proceeding, we shared the problem, ideas, knowledge and technology to arrange solutions that communicated and discussed at ISAE International Seminar, Bandar Lampung, August 10-12, 2017. This proceeding contains 118 papers that divided by 8 categories namely Agricultural Engineering, Agribusiness, Agricultural Technology, Agricultural Science, Energy, Food, Natural Resources, and Sistem and Agricultural Management from many universities and many institutes in Indonesia.

I would like to extend gratitude for all authors of the proceeding who communicated and shared their research results, editorial team who work together to executed this proceeding, Agricultural Engineering Departement of University of Lampung, Faculty of Agriculture of University of Lampung, University of Lampung, PERTETA and committee members. Salutations to Dr. Ir. Sam Herodian, M.S. as Professional Staff of The Minister of Agriculture of Republic of Indonesia; Ir. Sutono, MM as Regional Secretary of Lampung Province; Prof. Dr. Ir. Hasriadi Mat Akin, M.P. as Rector University of Lampung; Prof Dr. Ir. Irwan Sukri Banuwa, M.Si. as Dean of Agricultural Faculty of University of Lampung; Prof. Mikio Umeda from Kyoto University, Japan; Prof. Dr. Ir. Irwandi Jaswir, M.Sc. from International Islamic University, Malaysia; Dr. S. D. Filip To, PHD. PE from Mississippi State University, USA; Dr. Rosanna Marie C. Amongo from University of the Philippines Los Baños, The Philippines; Prof. Dr. Ir. Lilik Sutiarto, M.Eng. from Universitas Gadjah Mada, Indonesia; and Prof. Raden Achmad Bustomi Rosadi, M.S. from University of Lampung.

Last, we hope that you will have a great memories about the experience in Bandar Lampung and the relationship that have managed at Seminar can become better in the future.

Best Regard,

Dr. Ir. Sandi Asmara, M.Si  
Chairman of ISAE IS 2017

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## THE EFFECT OF RATION BASED OF THE FERMENTED PALM OIL BY PRODUCT AND ZN-LYSINATE ON THE PERFORMANCE AND DIGESTIBILITY GOAT

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### ABSTRACT

*The objectives of this research were to find out:* the influence of fermented palm by product based ration to digestibility of dry material and organic material, and the performance (feed consumption and daily gain) of goats. There are nine goats which consist of 3 treatments and 3 replications. Some treatments which are tested in this research are R1 = control ration (15% king grass and 85% concentrate consists of cassava waste, tofu waste, rice brand, molasses, urea, premix), R2 = fermented palm oil by product based ration (*cassava waste, rice brand, mollases, urea, premix + palm leaves, and palm kernel meal*), R3= R2 + Zn-lysinate (40 ppm). The results of this research are: first, the R1 treatment results the digestibility of dry material and organic material as well as the best performance; second, The digestibility of dry material and organic material on R2 treatment is higher than R3 treatment; and the third, the R3 treatment results the better performance rather than R2 treatment. The additional of Zn-lysinate influence the performance of goats.

Keywords : palm oil by product, Zn-lysinate, digestibility, performance

### I. INTRODUCTION

Goat was one of ruminant that has potential to develop to support availability of animal protein in Indonesia. Feed was one of the essential factors to support livestock production. Potential feeds resources were leguminous. However, there were competition utilization of leguminous between human and animals, therefore we need alternative feed. Feed alternative that could be used as feed was potential by product.

Utilization of palm oil by product need to be optimalize because they contain highs crude fiber and low crude protein. The palm oil by product consisted of leaf midrib and palm cake. The constrain utilization of palm oil by product could reduce the processing and add some feed supplement. There were many processing agriculture product to improve their utilization.

Fermentation was biological processing that used to improve nutrition value of agriculture by product because the fermentation process support chemicals processed of organic material (Mandels dan Parizek, 1990). Meanwhile, supplement Zn Organic in ration could be support growth of rumen microbial and improve livestock performance (Muhtarudin *et al.*, 2003).

### II. MATERIALS AND METHODS

The research design which was used was random block design, weight gain was based. There are nine cattle which consist of 3 treatments and 3 replications. Some treatments which are tested in this research are: R1 = control ration (15% king grass and 85% concentrate consists of cassava waste, waste tofu, rice brand, molasses, urea, premix), R2 = fermented palm oil by product based ration (*cassava waste, rice brand, mollases, urea, premix + palm leaves, and palm kernel meal*), R3= R2 + Zn-lysinate (40 ppm). Parameters of this research consisted :

#### A. *Fecal collection to Digestibility*

Fecal collection during five day. Is collected to calculated value of dry matter digestibility and organic matter digestibility. The calculation dry matter and organic matter digestibility used method total collection (Tillman *et al.*, 1991)

### B. Ration consumption

Ration consumption was calculated by subtraction among of ration that gives by residuals of rations. The consumption which was measured during 24 hours residuals of rations was weighed on 07.00—08.00 PM (Mathius et al. 2002).

### C. Daily Gain

Daily gain was calculated by formula i. e.:

$$\text{Daily gain (kg)} = \frac{(W2 - W1)}{(t2 - t1)} \quad (1)$$

Information:

W1 = early weight of animals (kg)

W2 = late weight of animals (kg)

t1 = early observation (day)

t2 = late observation (day)

Body weight was measured once a month to evaluated giving of ration body weight was done at 07.30—08.30 p.m.

Nutrient content of treatment ration can be seen on the table 1. The data observation were analyzed of variance (ANOVA) on 5% of parametric test and or 1% and continued with LSD (least significant different).

Table 1. Nutrient content of treatment ration

Ration	Nutrient content of treatment ration (%)						
	DM	CP	CF	EE	Ash	BETN	
R1	F	17,67	12,29	24,42	1,83	17,87	43,60
	C	68,38	18,02	11,14	8,37	7,68	54,81
Total (15% F+85% C)		60,77	17,16	13,13	7,39	9,20	53,13
R2 and R3	F	35,66	8,20	43,84	4,94	10,81	32,21
	C	55,55	16,63	12,76	5,66	18,1	46,85
Total (15% F+85% C)		52,57	15,37	17,42	5,55	17,00	44,65

Explanation:

DM = dry matter;

C P= crude protein;

C F = crude fiber;

EE= ether extract;

N N M = Non nitrogen material;

F= forage;

C= concentrate.

Resources: Analysis of feed laboratory, Departement of Animals Husbandry, Agriculture Faculty, Lampung University (2017).

## III. RESULTS AND DISCUSSION

### A. Effect treatments on dry matter and organic matter digestibility

Based on the analysis of variants showed that treatment had significant effect ( $P < 0.05$ ) on dry matter digestibility based on least significant different test (LSD). R1 treatments had higher digestibility compared to R2 and R3. The R1 treatment had better nutrient than R2 and R3 treatments, The R1 treatment had more protein, low of crude fiber, and ash. Tillman (1998) said that nutrient, digestibility had strong correlation with their chemical composition (content of protein, crude fiber, and ash).

Organic matter digestibility of rations was resulted from subtraction between organic matter consumption and organic matter in faces. The rate value of organic matter at R1 treatment was higher than R2 and R3 treatment. Sutardi (1990) said that the improvement of organic matter digestibility was the same with the improvement of dry matter digestibility.

### B. Effect treatments on ration consumption

Based on the analysis of variants showed that the treatment had significant effect ( $P < 0.05$ ) to ration consumption. According to least significant test ( $P < 0.05$ ) showed that R1 treatment had higher ration consumption compare to R2 treatment (Tabel 1). R2 and R3 treatment which is consisted of palm oil by product have less palatable. So, utilization of palm oil by product was decreasing palatable of rations. Suwigyo (2004) said that different kind of ration composition would be supported by different palatability and nutrient contents. Different nutrient content in rations especially crude fiber, resulted R1 treatment had more consumption than another treatment (R2 and R3). Ration that had high of crude fiber could make degradability in rumen slow.

Furthermore, it caused the decreasing of feed consumption. Soebarinoto (1991) statement said that one of the characteristic of agriculture by product was high of lignocelluloses content in rations. It caused the differences on the digestive by ruminant.

In Table 1, it is showed that goat consumption at R2 treatment (consisted of palm oil by product) had lower consumption than other treatments. Midrib of palm oil plant influenced the difficulties of consumption. Furthermore, it caused its palatability decreased (Hassan and Ishak, 1991). According to Ravindran and Blair (1992), palm cake had less palatability as feed, because of physical characteristic of palm cake. In table 2 also showed that R3 treatments had more consumption than R2 treatment. This matter was influenced by the supplementation of Zn-lysinate in R3. Zn-lysinate would be degraded into lysine and Zn, so lysine was used by rumen microorganism to improve digestibility. Church (1983) said that microbial growth in rumen would be optimal if their entire precursor were available. The rate of consumption in this research was up to 1460.42 g/animal/day. Saragih (2014) reported that the ration which contain palm oil by product had the consumption was up to 421.35 g/animal/day. Other statement was by Ismoyo and Widyaningrum (2008) they said different time period of giving between concentrate and forage resulted rations consumption was up to 719.67 g/animal/day. Hartanto (2004) said that the supplementation of organic Zn on kacang goat had resulted ration consumption was up to 387.47 g/animal/day. Based on all of the statement above, it is showed that the processing of palm oil by product, different of time period in rations, utilization of mineral had different respond of ration consumption.

### C. Effect treatments on goat daily gain

Daily gain was parameter to evaluate goat performance and also to evaluate quality of rations. The rate of daily gain was presented at table 2. The highest of daily gain happened at R1 and the lowest at R2 treatment. That matter had correlation with consumption parameter. According Tanuwiria et al (2006), said that nutrient that is consumed is needed to maintenance, production, and reproduction of animals. Parakkasi (1999) also said that daily gain was influenced by feed consumption. Utama and Budiarsana (1996) reported that daily gain of ettawa grade was up to 48.3 g/animals/day (age of goat was 12 month).

Table 2. The effect treatment to digestibility and performance

Parameter	Ration Treatment		
	R1	R2	R3
Dry matter digestibility (%)	70.86 <sup>a</sup>	58.31 <sup>b</sup>	50.81 <sup>c</sup>
Organic matter digestibility (%)	74.77 <sup>a</sup>	64.38 <sup>b</sup>	55.49 <sup>c</sup>
Ration consumption (g/animals/day)	1460.42 <sup>a</sup>	933.29 <sup>b</sup>	1038.53 <sup>a</sup>
Dail gain (kg/animals/day)	0.12 <sup>a</sup>	0.7 <sup>b</sup>	0.10 <sup>a</sup>

Explanation:

lower case with different superscript on the same line show the significant different ( $p < 0,05$ )

R1 = control ration (15% king grass and 85% concentrate consists of cassava waste, tofu waste, rice brand, molasses, urea, premix),

R2 = fermented palm oil by product based ration (cassava waste, rice brand, mollases, urea, premix + palm leaves, and palm kernel meal),

R3 = R2 + Zn-lysinate (40 ppm).

## IV. CONCLUSION

The results of this research are: first, the R1 treatment results the digestibility of dry material and organic material as well as the best performance; second, The digestibility of dry material and organic material on R2 treatment is higher than R3 treatment; and the third, the R3 treatment results the better performance rather than R2 treatment. The additional of Zn-lisinat influence the performance of goats.

## REFERENCES

- Chruch, D.C. 1983. Digestive Pysiology and Nutrition of Ruminant. Vol 1. 2 Rd. Corvali. Oregon. USA
- Mandels and R. Parizek. 1990. Enchanced Cellulose Production by Mutant of *Trichoderma Viride*. J. Appl. Microbiol
- Hartanto, I. 2004. Pengaruh Penggunaan Zn Organik dalam Ransum Terhadap Performans *Feedlot* Kambing Kacang Jantan. Skripsi. Jurusan Peternakan, Fakultas Pertanian, Universitas Lampung. Lampung
- Hartati, E. 1998. Suplementasi Minyak Lemuru dan Seng ke dalam Ransum yang Mengandung Silase *Pod Kakao* dan Urea untuk Memacu Pertumbuhan Sapi *Holstein* Jantan. Disertasi. Program Pascasarjana. Institut Pertanian Bogor. Bogor
- Hasan, A.O. and M. Ishada. 1991. Effect of Water, Mollases, and Urea Addition on Oil Palm Frond Sillage Quality, Fermentation, and Palatability Proceedings of Third International Symposium on The Nutrition of Herbivora. Penang
- Iswoyo dan Widiyaningrum. 2008. Pengaruh Jarak Waktu Pemberian Pakan Konsentrat dan Hijauan Terhadap Produktivitas Kambing Peranakan Etawa Lepas Sapih. Jurnal Ilmiah Ilmu Peternakan. Sumber Rejo, Vol 11 Nomor 2
- I.W., I.B. Gaga, dan I.K. Utama. 2002. Kebutuhan Kambing Peranakan Etawa Jantan Muda akan Energi dan Protein Kasar, Konsumsi, Kecernaan, Ketersediaan, dan Pemanfaatan Nutrien. Fakultas Peternakan, Universitas Udayana. Denpasar

- Muhtarudin, Liman, dan Y. Widodo. 2003. Pembuatan dan Penggunaan Zn-Proteinat dalam Ransum untuk Meningkatkan Nilai Hayati Dedak Gandum dan Optimalisasi Bioproses dalam Pencernaan Ternak Kambing. *Jurnal Penelitian Pertanian Terapan*. Lampung
- Parakkasi, A. 1999. Ilmu Nutrisi dan Makanan Ternak Ruminansia. Universitas Indonesia
- Ravindran V. and R. Blair. 1992. Feed Resources for Poultry Production in Asia and The Pasific II. Plant Protein Sourrces *World's. Sci. J.* 48: 206-231
- Saragih, H. 2014. Penggunaan Limbah Perkebunan untuk Pengembangan Ternak Kambing. *Jurnal Penelitian Peternakan*. Medan, Vol 4 Nomor 1
- Soebarinoto, S. Chuzaemi, dan Mashudi. 1991. Ilmu Gizi Ruminansia. Universitas Brawijaya. Animal Husbandry Project. Malang
- Sutardi, T.1980. Landasan Ilmu Nutrisi I. Departemen Ilmu Makanan Ternak, Fakultas Peternakan, Institut Pertanian Bogor, Bogor
- Sutama, I.K. dan I.G.M. Budiarsana. 1996. Kambing PE Penghasil Susu sebagai Sumber Pertumbuhan Baru Sub-sektor Peternakan dan Veteriner. Prosiding Seminar Nasional Peternakan dan Veteriner. Departemen Pertanian. Bogor
- Suwignyo, B. 2004. Sektor Peternakan Komoditi Utama Penggerak Perekonomian. *Cyber News*. Suara Merdeka. Yogyakarta
- Tanuwiria, W., Garnida, dan I.Y. Asmara. 2006. Pengaruh Tingkat Protein dalam Ransum terhadap Performan Entok Lokal pada periode pertumbuhan. Seminar Nasional Teknologi Peternakan dan Veterinerr. Universitas Padjadjaran. Bandung.