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To cite this article: J. Riyanto and Sudibya 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **119** 012020

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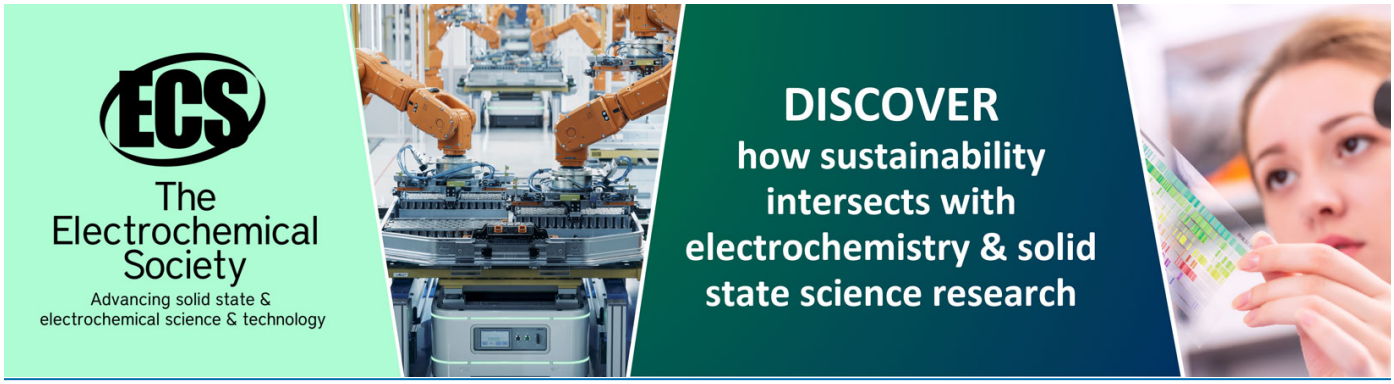

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Evaluation of Feed for Thin-Tailed Sheep Fattening with Supplemented Protected and Unprotected Aldehide

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Abstract

The purpose of this study was to determine the effect of the use of soybean protection supplements in sheep ration in vivo in terms of consumption, digestibility, nutrient value index, and the digestible nutrients in the ration. Livestock used in this study were 15 heads of thintailed sheep male with an average body weight of 20.81 ± 1.40kg. The rations used in this study consisted of elephant grass, basal concentrate, soybean groats protected and without protected. The comparison between elephant grass and basalt concentrate is 30:70. Feed treatment in the form of supplementary concentrate from soybean groats ingredients without protection and protection. Protection of soybeans using 37% formaldehyde. The treatment given is P0 = 30% Elephant grass + 70% Basal concentrate, P1 = 30% Elephant grass + 60% Basal Concentrate + 10% soybeans groats without formaldehyde protection, and P2 = 30% Elephant grass + 60% Basal Concentrate + 10% soybeans groats formaldehyde protection. Supplementation of 10% soybean protected feeding in male thin tail sheep fattening ration had significant effect (P <0.05) on crude protein digestibility, nutrient value index and digested crude protein. The use of 10% of soybean protected 37% formaldehyde protected soy by 1% of the dry weight of the concentrate in thin tail fattening rations could improve protein digestibility, nutrient value index and abrasive proteins that can be ingested in vivo.

1. Introduction

Fattening tailed sheep requires adequate nutrient intake to produce maximum weight gain. Protein is a nutrient that is needed for fattening. One of the feed ingredients that have high protein content comes from soybeans. Soy soybeans are soybean seeds obtained from the process of soybean seed peeling from pods then dried to obtain soybean fragments [1].

Soybeans are the ingredients of protein sources containing 35% protein content similar to whole soybeans [2]. On the other hand, during fermentation in the rumen, proteins are degraded and bio hydrogenated by the rumen microbes, so the utilization of proteins cannot be maximized. There is a need for protection against soybeans protection in order to avoid excessive degradation and bio hydrogenation so that it can go directly to the small intestine. One way of protection is done by using 37% formaldehyde. The use of 2% formaldehyde showed better results used as a protective substrate mixture of soybeans: lemuru fish oil ratio of 4: 1 compared to 2: 1 ratio [3].

Use of soybeans that are protected with formaldehyde can improve the performance of fattening beef cattle [1]. Through the method of protection with formaldehyde it is expected that protein in soybeans can be protected so that it can directly experience the enzymatic process in abomasum and intestine into amino acids [4]. Evaluation in vivo is a method of determining the digestibility of feed using thin-tailed sheep based on the digestion of feed ingredients that occur in the

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entire digestive tract, so that the value of the digestibility of the feed obtained close to the true value. Parameters that can be generated from the in vivo test can mainly be measured the level of consumption and digestibility of nutrient content of feed such as dry matter content, organic matter, protein, fat, crude fiber,extract material without nitrogen and Total Digestibility Nutrient (TDN) [5]. Based on the description above, this study was conducted to determine the effect of the use ofsoybean protected formaldehyde in thin tail fattening ration in terms of in vivo test parameters.

2. Material and Methods

This research was conducted at Boyolali, Central Java. Analysis of feed, waste of food waste and feces was carried out in the Laboratory of Nutrition and Feed Livestock, Animal Husbandry Program, Faculty of Agriculture Sebelas Maret University of Surakarta. Livestock used in this study were 15 male tailed sheep with an average body weight of 20.81 ± 1.40kg.

The research were used 15 thin tailed sheep maleindividual stage with a length of 110 cm and a width of 60 cm, made of bamboo and wood. Each cage is equipped with a permanent feeding and drinking place from a plastic bucket. At the time of data collection, the cage is equipped with a collection of feces made of nets and urine placed under the cage. Equipment used include sheep, feed weights, feces scales, feed grinders, feed mixers (feed mixers) and a set of detergent / van soest analysis tools, and tools for proximate analysis.

The rations used in this study consisted of elephant grass, basalt concentrate, soybean groats protected and without protection. Basal concentrate consists of palm cake, coffee skin, pollard, bran, mineral and molasses. The amount of feed given is 3% DM of body weight. The comparison between elephant grass and basalt concentrate is 30:70. Feed treatment in the form of supplementary concentrate from soybean ingredients without protection and protection. Protection of soybeans using 37% formaldehyde. Use of formaldehyde as much as 1% of the dry matter of the basal concentrate. Protection is done by means of water mixed with formaldehyde ratio of 10: 1. Formaldehyde solution was then sprayed on the soybean meal flour evenly and then watered for 12 hours then dried [3] and [6].

The nutritional needs of male thintailed sheep for fattening can be seen in Table 1, the composition of rations and nutrient content of the treatment ration can be seen in Table 2. This study used Randomized Block Design design with 3 treatments and 5 groups. When anova shows significant or significant differences, it is followed by a Duncan Multiple Range Test (DMRT) test. The treatment given was:

P0 = 30% Elephant Grass (EG) + 70% Basal Concentrate (BC)
P1 = 30% Elephant Grass (EG) + 60% Basal Concentrate (BC) + 10% soybeans groats without formaldehyde protection (SGUP)
P2 = 30% Elephant Grass (EG) + 60% Basal Concentrate (BC) + 10% soybeans groats formaldehyde protection

Table 1. The nutrient requirement of male thin tailed sheep for fattening

Requirement Nutrient	Content (%)
Crude Protein	8,93
Total Digestible Nutrient (TDN)	54,55
Calcium (Ca)	0,50
Phosphor (P)	0,35

Sources : Kearl (1982)

Table 2. Ration composition and nutrient content of treatment ration

Feed Ingredient	Treatment		
	P0 (EG 30% + BC70%)	P1 (EG 30% + BC 60% + SGUP 10%)	P2 (EG 30% + BC 60% + SGP 10%)
Elephant grass (EG)	30,00	30,00	30,00
Basal Concentrate (BC) :			
Bran	21,00	18,00	18,00
Pollard	19,00	16,00	16,00
Coffee skin	12,00	10,00	10,00
Palm cake	14,00	12,00	12,00
Mineral	1,00	1,00	1,00
Molasses	3,00	3,00	3,00
Soybean groats without protected (SGUP)	-	10	-
Soybean groats protected (SGP)	-	-	10
Total	100,00	100,00	100,00
Nutrient content (%)			
Crude protein	9.90	11.98	12.05
Crude Fat	4.53	5.54	5.49
Crude fiber	25.80	24.09	24.35
Ash	11.09	10.95	11.03
Extract material without nitrogen	44.74	43.53	43.57
Organic matter	84.91	85.05	85.37
Dry matter	89.19	89.67	88.88
Total Digestible Nutrient	63.72	65.38	62.48
NDF	65.77	60,53	59,90
ADF	26.15	23.50	22.83

This research was conducted through three stages, namely treatment feed adaptation, data collection and data analysis. The feed adaptation stage was conducted for two weeks according to [7]. The adaptation stage lasts for a minimum of 7 days. Feed is given three times a day, i.e., morning, noon and night. Feeding is done with a concentrate first and then elephant grass with a lag time of 1 hour. Provision of drinking water is ad libitum.

The data collection stage is conducted for 10 days. Collections carried out, among others, waste collection of fodder and feces. The remaining feed is accommodated and counted daily. Feed consumption is calculated by weighing the difference between the feed given and the remaining feed

each day. Stool collection is done every day at the same time at 06.00 (1x24 hours). Taking feces for 10 days continuously. Feces collected whenever defecation cattle are then weighed and recorded the weight then taken 10% of the total stools to be dried in the sun. Sample of feed and feces then analyzed proximate and van soest in laboratory to know digestion.

The variables in this study include nutrient consumption and digestibility, nutrition value index, and nutrient can be digested.

1. Feed Consumption : a. Consumption of Dry matter (DM) (g / head / day), b. Consumption of Organic Matter (OM) (g / head / day), c. Consumption of Crude Protein (CP) (g / head / day)
2. Digestibility : a. Digestibility DM(%), b. Digestibility OM (%), c. digestibility CP (%)
3. Evaluation of nutrient index (NVI) : a. NVI DM (g / head / day), b. NVI OM (g / tail / day), c. NVI CP (g / head / day).
4. Evaluate the digestible nutrients in the ration : a. DM that can be digested (%), b. OM that can be digested (%), c. CP that can be digested (%)

3. Result and Discussion

Feed intake, digestibility, nutrient value index, and nutrient digestible ingredients of dried, organic, and crude protein rations containing protective soybean and non-in vitro protection in thin sheep can be seen in Table 3.

The result of analysis of variance of soybean protected soybean regimen had no significant effect ($P > 0.05$) on consumption of dry matter (DM). This indicates that the provision of soybean protected soybeans at the level of 10% of the total ration given had significantaffect the consumption of DM in livestock. Protection of soybeans with formaldehyde did not change the texture and smell of food when it is mixed homogeneously with concentrate so as not to reduce appetite in the cattle because basically when the cattle are hungry then the livestock will cope with the consumption of feed.

Protected soybeans also have the same palatability as control feeds when administered to livestock, so as not to disturb the appetite of livestock in consuming the feed and cause the consumption of BK to be the same between treatments. According [8] that one of the factors that influence feed consumption is palatability that is reflected by organoleptic on a feed ingredient such as appearance, smell and taste. The physical and chemical conditions of the feed are shown by the appearance of smells, flavors and textures that foster attraction and stimulate livestock to consume them. The results of this study are in line with the results of the research by [3] and [6], showing that the use of protected fish meal and soybean did not affect the consumption of DM in Simmental Ongole crossbred male. Rough protein digestion is the amount of crude protein from consumed rations that can be ingested in the digestive tract of livestock. The use of protected soybean soda has no effect on the digestibility of male thin-tailed sheep protein and has not been able to improve the digestibility of crude protein, this may be due to 2% less effective use of formaldehyde to rumen performance, the use of formaldehyde at 0.5 to 1% level effective for the performance of microbial in cattle rumen, so the use of 2% formaldehyde can not improve rumen performance, thus affecting the digestibility of the crude protein, which has no effect on the digestibility of crude protein [6]. Protected proteins are not able to be degraded in the rumen. It is thought that supplying protected soybeans can not be degraded by microbial rumen. In the small intestine too, the soybeans groats protection is still too strong for microbial rupture in the small intestine. It can also affect the rumen microbial activity, with the overcrowded protection of the rumen microbes unable to degrade the protein optimally, so the administration of soybean protected soy does not affect the digestibility of crude protein because the microbial can not break the soybean brewing protection so its activity can be disturbed [7]. Proteins degraded by microbial rumen into ammonia and will be utilized bacteria as a food source which will then be absorbed in the small intestine which will be utilized by livestock for metabolic processes, while non-degraded proteins will go directly into the small intestine and directly absorbed by bacteria.

Table 3. Average nutrient consumption of rations, digestibility, NVI and nutrients can bedigestedration for fattening thin sheep male tail in vivo.

Variable	Treatment		
	P0 (EG 30% + BC70%)	P1 (EG 30% + BC 60% + SGUP 10%)	P2 (EG 30% + BC 60% + SGP 10%)
	----------	(g/head/day)	----------
Feed intake of Dry Matter	788.06±60.62	794.80±77.28	796.63± 38.88
Feed intake of Organic Matter	669.17±51.48	676.01±65.73	680.09±33.19
Feed intake of crude fiber	780.18±60.02	786.85±76.51	788.67±38.49
	----------	(%)	----------
Dry matter digestibility	61.36± 0.88	62.41± 1.29	61.35± 1.58
Organic matter digestibility	67.03± 0.91	66.90± 1.01	67.40± 1.09
Crude fiber digestibility	72.23± 1.41[a]	75.31± 1.58[b]	75.15± 1.54[b]
	----------	(g/head/day)	----------
DM Nutrient Value Index	483.64±38.57	495.49±42.22	488.56±21.69
OM Nutrient Value Index	448.61±36.60	452.48±46.89	458.31±22.19
CP Nutrient Value Index	564.71±51.38[a]	566.59±45.69[b]	576.64±23.41[b]
	----------	(%)	----------
Dried materials can be digested	54.73±0.78	55.66±1.15	54.72±1.41.
Organic materials can be digested	56.91± 0.77	56.81± 0.85	57.23± 0.93
Crude protein can be digested	7.16±0.14[a]	8.64±0.19[b]	8.81±0.19[b]

[ab]Different superscripts on the same line showed significantly different (P <0.05). EG (elephant grass), BC (basal concentrate), SGUP (soybean groats unprotected), and SGP (soybean groats protected)

In line with research of [9] the average of crude protein digestibility in fish meal and soybean cultivation is protected by using formaldehyde respectively are 68.88% and 71.87%. Although the digestibility value is higher, the result of variance analysis in the study is not significant. The concentration of ammonia in rumen fluid depends on the digested protein and the quality of the feed protein. The more protein that is digested then the concentration of ammonia in the rumen is also higher. The results of research conducted by [3] concentration of NH_3 on fish meal, soybean cake, and protected palm oil meal showed unreal result. According to [10] that microbial protein biosynthesis reached its peak at ammonia concentrations in rumen fluid of about 10 mg% and an excess of 98.3% ammonia no longer stimulated microbial growth.

The productive function of feed can be measured by the nutritive value index which is the product of consumption with relative digestibility and predict the amount of ingested food intake [10]. The amount of Nutritive Value index of Dry Matter shows the amount of dry matter digested by livestock. Result of research on consumption of Dry Matter and Dry Matter Digestibilty showed no effect (P> 0.05). It is suspected that the value of NVI DM is significantly different due to the same amount of dry matter consumption. In line with the [6] study which stated that dry matter consumption significantly different from dry matter digestibility was not significant resulted in different NVI DM values was not real.

This shows that at the same level of digestibility the amount of consumption of dried ingested ingredients is not the same, the higher the consumption of feed the higher the amount of nutrients are also digested and vice versa. The organic matter NVI is closely related to the dry matter NVI, since the substances contained in the organic matter are contained also in the dry matter. The results showed that NVI OM is directly proportional to NVI DM. This is in line with research [6], which states that at the same level NVI OM is directly proportional to NVI DM.

This suggests that administration of soybean protected soybeans has not been able to increase the value of NVI OM in male thin tail sheep. NVI OM values are also influenced by the consumption of organic matter and the digestibility of organic matter. Result of research on consumption of BO and

Organic Matter Digestibilty showed no effect (P> 0.05). Riyanto *et al*[1] mentioned that nutrient digestibility figures indicate nutrients that can be utilized by livestock.

Digestible organic matter is the digestion of organic matter contained in a feed material that can be absorbed by the intestinal wall. The results showed that the treatment ration had no effect (P> 0.05) to the Digestible organic matter value. Meaning that with the addition of protective soybean broth did not increase or decrease the amount of digested organic material. Digestion is influenced by the rate of food travel in the digestive tract, the physical form or the size of the diet of the ration composer, the chemical composition of the ration and the influence of other food compounds [8].

The addition of protected soy broth in this study has not been able to affect the digestibility of organic matter. According to [7] the quality of feed ingredients is influenced by the composition of feed and will further affect digestibility, so if the quality of feed and composition of feeds [8] the digestibility of organic matter is the amount of food consumed by livestock, where the greater the amount consumed, the faster the travel rate of food in the digestive tract. According to Pujiastuti [1] and [3], the provision of soybeans, fish meal and soybean meal protected in Ongole crossbred cattle has not been able to improve the digestibility of organic matter. This shows that with the same dietary intake, the digested organic material will be the same, so it does not affect the digestibility of organic matter.

4. Conclusion

The use of 10% of soybean protected 37% formaldehyde protected soy by 1% of the dry weight of the concentrate in thin tail fattening rations can improve protein digestibility, nutrient value index and abrasive proteins that can be ingested in vivo.

Acknowledgment

Thank you to the Ministry of Research and Technology and higher education for the cost of this research in the first-year for Penelitian Unggulan Perguruan Tinggi (PUPT) scheme in 2017.

Reference

[1] Riyanto, J, E. Baliarti, T. Hartatik, D.T. Widayati and L. M. Yusiati. 2014. Supplementation Of Pufa Protected In Cattle Feed Based On Rumen Fermentation and Nutrient Digestibility Products By In Vitro Proceedings of International Conference the 16th Animal Science Congress of the Asian-Australasian Association of Animal Production Societies (AAAP). The theme of the 14th AAAP Animal Science Congress is "Sustainable Livestock production In thePerspective Food Security,Folicy,Genetic, Resources,And Climate Change" Faculty of Animal Sciences,
Gadjah Mada University, Yogyakarta, November, 10-14, 2014

[2] Riyanto, J., S. D. Widyawati, W. P. Suprayogi, A. P. Astuti danT. R. Setiadi. 2013. Degradasi secara in vivo tepung ikan, menir kedelai dan bungkil kelapa sawit terproteksi dalam ransum sapi potong. Dalam: Prosiding Seminar Nasional Peternakan Berkelanjutan 5. Jatinangor. Hal 247-
251.

[3] Riyanto, J, E. Baliarti, T. Hartatik, D.T. Widayati and L. M. Yusiati. 2015. Characteristics of polyunsaturated fatty acids and nutrient digestibility feed cattle of the fermented rumen fluid by one and two stage in vitro Proceedings of The 6th International Seminar on Tropical Animal Production (ISTAP 6) Faculty of Animal Sciences, Gadjah Mada University,
Yogyakarta, October, 20-22, 2015.

[4] Kiernan, J. A. 2000. Formaldehyde, Formalin, Paraformaldehyde And Glutaraldehyde: What They Are And What They Do. Article published in Microscopy Today 00-1 pp. 8-12.

[5] Johnson, R. R. 1966. Techniques and procedures for in vitro and in vivo rumen studies. Journal Animal Science. 25: 855-875.

[6] Widyawati, S.D., W. Pratitis dan J. Riyanto. 2015. Suplementasi Asam Lemak Tak Jenuh (*Poly Unsaturated Fatty Acid=Pufa*) Berbasis Minyak Sawit Dan Minyak Ikan Lemuru Terproteksi Dalam Ransum Ditinjau Dari Performan Produksi Dan Kualitas Daging Domba. Proceeding of National Seminar on Zootechniques for Indogenous Resources Development. ISSN 978-602-097-243-5. ISAA Publication No. 1/2012. Faculty of Animal Agriculture Diponegoro University, Semarang, Indonesia.

[7] Tillman, A. D., H. Hartadi, S. Reksohadiprodjo, S. Prawirokusumo, dan S. Lebdosoekojo. 1998. Ilmu Makanan Ternak Dasar. Gadjah Mada University Press. Yogyakarta.

[8] Anggorodi. 1990. Ilmu Makanan Ternak Umum. P.T. Gramedia Pustaka Utama. Jakarta.

[9] Puastuti, W., I. W. Mathius dan D. Yulisiani . 2006. Bungkil kedelai terproteksi cairan batang pisang sebagai pakan imbuhan ternak domba : *in sacco* dan *in vivo* . Jurnal Ilmu Ternak dan Veteriner. 11 : 106-115.

[10] Soebarinoto, S. Chuzaemi dan Mashudi. 1991. Ilmu Gizi Ruminansia. Universitas Brawijaya. Malang.