



Feeding Effect of Soybean Meal Tannins Protected Against Nitrogen Balance of Thin Tailed Sheep

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Abstract

The study was aimed to determine the effect of granting Soybean meal protection against nitrogen balance of thin tailed sheep (male). The experimental animals were 16 thin tailed sheeps (males) aged 8 months old with average body weight of 11.81 ± 1.65 kg. The research was assigned in completely randomized design (CRD) 4 treatments and 4 replicates T0 (complete feed + soybean meal without tannins), T1 (complete feed + protected soybean meal 0.5% tannins), T2 (complete feed + protected soybean meal 1% tannin), and T3 (complete feed + protected soybean meal 1.5% tannins). The parameters observed dry matter intake (DMI), DMI /% BB, DMI / $BB^{0.75}$, nitrogen intake (NI), N-Faecal, N-Urine, N-Digested and N-Retention. Data were variance analyzed by F test ($P < 0.05$), followed by Duncan's Multiple Range Test. The results showed that DMI, DMI /% BB, DMI / $BB^{0.75}$, nitrogen intake (NI), N-Faecal and N-Digested no effect ($P > 0.05$) of treatment. N-Retention Lowest in T2 (9,87 g/day) while T0 (11,76 g/day), T1 (11,71 g/day), T3(11,86 g/day) no significant ($P > 0.05$), inversely with N-Urine decreased in T2 (3,09 g/day) dan T0 (2,04g/day), T1 (2,23 g/day) dan T3 (1,95 g/day) no significant ($P > 0.05$) as a result of treatment. Based on the results of this study concluded that the use of various mangrove leaf tannin levels up to 1.5% to protect soybean meal no effect on consumption, N-Faecal, and N-digested but protection cake with tannin 1% decrease N-retention and increase the excretion of N-Urine.

Keyword: thin tailed sheep, tannin, nitrogen balance, soybean meal

A. Introduction

Sheep is one ruminant which has been developed in Indonesia, especially Java. Local sheep populations highest spread in West Java (61%), Central Java (16%) and East Java (8%), 18% spread outside Java (Director General of the Ministry of Agriculture Livestock and animal health RI, 2013). Sheep are animals producing meat, leather, milk and wool. Development of sheep should be promoted as an effort to reduce beef imports. In addition to meeting the substance of domestic beef demand, and also create opportunities to meet the demand of foreign markets. These small ruminants have high adaptability to various environmental conditions and feed which is poor, because the maintenance is relatively inexpensive, quickly produce benefits and can be used as savings (Mahaputra, et al., 2003; Purbowati, 2011).

Adequacy of feed for livestock is very important because it is needed to meet the basic necessities of life, growth, production and reproduction. Feed with sufficient nutrient content and according to the needs of livestock produce optimal productivity. Biologically ruminant feed

quality is influenced by the availability of feed protein that is able to contribute to the proliferation of microbes in the rumen and capable of supplying the feed protein in the intestine (Cahyani *et al*, 2012). Fulfilling the needs of protein in ruminant feed should be calculated the amount of protein that can be degraded in the rumen and the amount of protein is not degradation in the rumen.

Soybean meal has the potential to be used as a source of protein feed because of a protein contained in soybean meal may reach 44-49%. Ruminant feed utilization as necessary to get attention so that not much degraded in the rumen so as to supply the amino acid requirements of ruminant directly without much interference from the role of microbes. Therefore protein soybean meal needs to be protected from rumen microbial degradation. How the protection of the protein can be done by giving the condensed tannin from mangrove leaves. Therefore, measurement of nitrogen balance Thin Tailed sheep to determine the effect of tannin protected soybean meal with different levels of administration. This study aimed to determine the effect of soybean meal to the balance of tannins protected nitrogen thin tail sheep ram.

B. Methodology

1. Materials

Research conducted at the stables at the Agricultural Faculty of Animal Science Diponegoro University for 5 months, consisting of 1 months of preparation and 4 months of maintenance. Proximate analysis carried out in the Laboratory of Nutrition Feed, Faculty of Animal Husbandry and Agriculture, Diponegoro University, Semarang. Using a thin tail sheep ram 16 tail 8 months old with a body weight of 11.81 ± 1.65 kg were placed in individual cages at random to obtain treatment. Before entering the fold of quarantine treatment and the provision of vitamin B complex and worm medicine Albendazole.

2. Methode

The ration consisted of complete feed supplemented with soybean meal as a protected mangrove leaf tannin treatment. Tannins obtained from the mangrove leaves mangrove leaf extract using soxhlet method with 96% alcohol solvent (Marnoto *et al*, 2012). Pumpkin filled with solvent 100 gram sample of about 2/3 of the contents of the flask, soxhlet ignited. Sampling was conducted after the cycle 12x solventmoisture. Results of the extraction solvent is evaporated to separate the compounds and then crystallized into crystalline tannins.

Soybean meal is protected with the way the crystals are dissolved in water tannins. Soybean meal was sprayed with a solution of tannin respectively 0%; 0.5%; 1% and 1.5% until evenly distributed, the percentage of tannin is calculated based on the volume per weight. Complete feed formulated using elephant grass, rice bran, soybean meal protected, cassava peel and minerals. The composition of the feed material used in the study, are presented in Table 1.

Table 1. Formulation and Nutrient Content of Feed Materials Used in Research

Feed Stuffs	Composition Kg (Dalam BK)	BK* %	PK* -----%BK -----	SK* -----%BK -----	TDN**
Bulrush	29	94,84	17,33	39,38	53,65
Bekatul	29	91,38	3,41	32,76	82,71
BKT	15	88,39	46,00	5,09	89,73
Leather Cassava	26	88,12	4,69	20,08	58,20
Mineral	1	93,92	0	0	0
Full feed	100	90,24	14,13	26,90	69,12

Description: BKT = Protected soybean meal, BK = Dry ingredients, PK = Crude protein, LK = fat Rough, SK = Coarse fiber and TDN = Total Digestible Nutrient.

Source: *) Proximate analyzed at the Laboratory of Nutrition and Feed Faculty of Animal Science and Agriculture, University of Diponegoro, **) Based on calculations using formulas Hartadiet *al*. (1993)

3. Design of Experiments and Data Collection

The study was conducted based on completely randomized design with 4 treatments and 4 replications. T0 (soybean meal without tannins), T1 (tannins protected soybean meal 0.5%), T2 (protected soybean meal tannins 1%) and T3 (tannins protected soybean meal 1.5%). The preliminary study was conducted over a one week study followed for ten weeks, and the recording is done daily feed consumption. The feeding is done three times a day i.e. morning at 07.00 am, at 14:00 noon, and at night at 21:00 pm, while the drinking water supplied ad libitum.

Total collections held in the fifth week for seven days, taking stool done every hour for 24 hours during the collection period. To prevent evaporation of nitrogen in the feces then sprayed sulphuric acid (H₂SO₄) 20%. Total feces during the collection period was mixed until homogeneous, then take 10% for the analysis of N-Stool. Total urine for total collection is homogenized and then added 20% H₂SO₄ to lower the pH to about 3. The urine was sampled approximately 10% and stored in a freezer for N-Urine analysis. Proximate analysis were performed: 1) analysis to determine the water content of dry material by heating the sample in an oven at a temperature of 105-110°C for 4-6 hours until a constant weight is obtained, 2) analysis of nitrogen using methods Kjeldahl.

C. Result and Discussion

Summary results of the study are shown in Table 2. Includes dry matter intake (DMI), based on the weight of the metabolic DMI, DMI based on the percent of body weight, consumption of nitrogen (N), N-Faeces, urine-N, N-digested, and N-retention for , Average DMI (g/day) is shown in Table 2. The results of analysis of variance showed that the protective effect of soybean meal with the tannins are not significant ($P>0.05$) on DMI, DMI (g/Kg^{0.75}), DMI (%W), consumption of N, N-faeces expenditure and N-digested but significant ($P<0.05$) against the N-urine, and N-retention.

Table 2. Average Consumption Dry (BK), Consumption N, N-Faeces, N-Urine, N-Digested and N-Retention on Experiments Animal

Parameter	Treatment			
	T0	T1	T2	T3
DMI (g/day)	649,37±102,58	666,54±97,52	607,63±43,51	657,49±81,67
DMI (g/kg ^{0.75})	91,73±3,06	91,31±3,15	88,29±2,11	91,19±2,73
DMI (%W)	2,09±0,03	2,12±0,06	2,15±0,10	2,13±0,07
N- Intake (g)	16,34±2,58	16,77±2,45	15,29±0,87	16,54±2,05
N-faeces (g)	2,54±0,15	2,84±0,22	2,33±0,15	2,73±0,23
N-Urine (g)	2,04±0,42 ^b	2,23±0,76 ^b	3,09±0,39 ^a	1,95±0,45 ^b
N-Digested	13,80±2,74	13,93±2,39	12,96±0,94	13,81±2,37
N-Retention	11,76±1,17 ^a	11,71±0,73 ^a	9,87±1,13 ^b	11,86±0,92 ^a

Description: Different superscripts in the same row shows the real effect ($P<0.05$); N (nitrogen).

Based on F test DMI no real effect ($P>0.05$) as a result of treatment. The range of average dry matter consumption of lamb is from 607.64 to 666.54 g/day. This suggests that the difference in the percentage of tannin does not result in taste and a distinct fondness for thin tailed sheep so that the amount of feed consumed relatively the same. Besides the feed has the same nutritional value and feeding each sheep so that there is no difference in dry matter intake. This is explained by Anggorodi (1994) which states that the palatability of feed qualitatively affected by the physical properties of feed that include shape, smell, taste and texture. Furthermore Puastuti *et al.* (2006) states that the protection treatment of soybean meal with banana juice does not affect the taste or smell so do not reduce consumption. Results were much lower than the results Arifin (2009) using a complete feed from various agricultural wastes that have physical properties and the same particle size, the value of DMI ranged from 901.46 to 956.71 g/day.

Dry mater consumption is measured based on metabolic body weight (DMI^{0.75}) analyzed using ANOVA also affect not significant ($P>0.05$) with an average ranging between 88.29 to 91.72 g/kg^{0.75} (Table 2), Hal it indicates that the protection of soybean meal does not give effect to the experimental unit caused by the type and form of feed given to each experiment the same. Described by Kamalidin *et al.* (2012) and Yulistiani *et al.* (2010) states that the different types and forms of feed ingredients that make up the ration may lead to differences in the level of palatability which ultimately led to differences in the amount of feed consumed by livestock. Results were much higher than the results reported by Sunarso (2012) that the male goats PE DMI^{0.75} by king grass silage ranged from 36.97 to 54.98 (g/kg^{0.75}).

DMI level by percent weight (%W) effect was not significant ($P>0.05$) to the experimental unit. Average DMI (%W) range 2,09- 2,16% in the same range as the result of research Sunarso (2012) is between 1.79 to 2.70% of body weight, the average range of the DMI more higher than

the basic living needs of 1.70% (Devendra & Burns, 1994). Feed intake is the foundation that supports basic needs, growth, production and reproduction (Sunarso, 2003; Mayulu, 2009).

Average consumption of N each treatment T0 (16.34 g/day), T1 (16.77 g/day), T2 (15.29 g/day) and T3 (16.54 g/day). Consumption of N was positively correlated with the consumption of DM in Table 2. Consumption of N depends on dry matter intake and N content of each treatment. Described by Yulistiani et al. (2011) that the consumption of nitrogen increases with increasing levels of protein in the feed concentrate. In quantitative terms relative dry matter intake as much and qualitatively each treatment contains the same percentage of N then statistically analyzes of variance showed that the effect was not significant ($P>0.05$). The amount of N consumed will be used by rumen microbes to synthesize microbial protein, the other part will escape from the relegation process and then be distributed to post-rumen digestive organs. This is in accordance with the opinion of Kariuki & Norton (2008) that the purpose of protecting soybean meal with condensed tannins is to decrease protein degradation in the rumen and increase the supply of protein in the gut.

Total N-digested as shown in Table 2 ranged from 12.96 to 13.93 g/day. Based on the results of statistical analysis of the treatment effect was not significant ($P>0.05$) to the N-digested. The absence of the effect of treatment on the N- undigested influenced by the consumption of the same relative N and N-stool did not show any difference from each treatment. Total N-stool as shown in Table 2 (2.33 to 2.84 g/day) effect was not significant ($P>0.05$) as a result of treatment. Fecal nitrogen output level was positively correlated with the consumption of nitrogen. In line with those reported by Yulistiani et al. (2011) that the output of N in the feces are not affected by the presence of tannins in soybean meal, so that absorption of N to be better compared to the control.

Nitrogen is nitrogen consumption in the stool that is not absorbed in the digestive tract and wasted as faeces, means more faecal N content, the lower the amount of N absorbed in the body of a sheep. The high N feces caused by tannins loose from binding endogenous N protein complex from the intestinal tract. Meanwhile, the research Komolong et al. (2001) quebraco tannin supplementation extracts can lead to an increase in faecal N, N retention as a result, no different from the feed without supplementation. The high N feces caused by tannins loose from binding endogenous N protein complex from the intestinal tract.

Table 2 shows that the protection of soybean meal with different tannin levels significant effect ($P<0.05$) N retention. Retention N is the number of N that can be used body after N-consumption reduced by N-feces and N-urine. The average retention of N ranged from 9.87 to 11.86 g / h, T2 different from T0, T1 and T3, but T0, T1, and T3 no significant ($P>0.05$) as a result of treatment. Differences in N retention is also influenced by the N-urine output are different ($P<0.05$) between treatments. Retention of N and N-urine output has a value which is inversely proportional, in which the N-urine output T2 highest and lowest N retention. This is in contrast to the results of research Puastuti et al. (2006) that the use of protected soybean meal has no effect on the value retention of nitrogen. N-urine showed the extent of nitrogen that can be utilized by livestock body well absorbed from the gastrointestinal tract as well as from the animal's body. Protection protein by mangrove tannin extract to 1.5% proven not affect the solubility protein soybean meal. Suspected concentration of tannin used not quite able to lead to effective protection, it indicates that the amount of N excretion (feces) is relatively the same, which means N digested equally.

D. Conclusion

The use of various levels of tannin leaf mangrove up 1.5% to protect soybean meal no effect on consumption, N-stools, and N-digested but protection cake with tannin 1% decrease N-retention and increase the excretion of N-Urine.

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