

Leguminous Tree *Bauhinia purpurea* L. Leaf as Feed Alternative on Sheep Performance

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ABSTRACT

Sheep needs nutrient supply to optimize their performance. Ration nutrients especially energy and protein are the major factors affecting the productivity of sheep. One of the plants that has the potential to be used as a protein source for sheep is *Bauhinia purpurea* L. Previous study showed 15% (BpLM) in ration can be improved of (ADBWG) goat. The research aims to find out (DDMI), (DMD), and (ADBWG) sheep feed dietary consist of (BpLM). This study used 16 local sheep aged 14.4 ± 3.0 months and body weight 14.05 ± 1.51 kg. The ration consisted of 60% *Pennisetum purpureum* and 40% concentrate containing 0%, 5%, 10%, and 15% (BpLM). The collected data were analyzed using (ANOVA) and (DMRT). The results showed that the ration contained 5%, 10% and 15% (BpLM) *Bauhinia purpurea* L. leaves meal in concentrate improve is sheep performance because it increases average daily body weight gain.

Keywords: Leguminous tree, *Bauhinia purpurea* L, Performance, Sheep, Feed Additive.

1. INTRODUCTION

Sheep needs nutrients supply to optimize their performance. There are several complementing and alternative strategies to maximization of livestock productivity in tropical regions [1]. The protein content in tree legumes allows it to be used as a protein sources to improve livestock performance [2]. Especially on grass based feeding in summer season [3].

The main nutrients that have an impact on sheep's performance are energy and protein [4]. Various tree forages have been used as supplements of protein sources in the diets of ruminants. Nonetheless, the presence of plant secondary metabolites in the tree forages could limit their nutritional value [5].

Bauhinia purpurea L. with the local name “*daun kupu-kupu*” have 23.34% CP, 34.43% CF, 23.46% NFE, 51.93% TDN as feed or 7.96% CP, 1,34% EE, 11,39% CF, 9,43% NFE, in DM, and 40,45% TDN. This is a feed category as an energy source. It has the ability to support as a basal ration for ruminants such as sheep. The use of *Bauhinia purpurea* leaves meal (BpLM) as ruminant feed has not been intensively utilized by

farmers in Indonesia. Evaluation about its potential is still limited.

The effect of tree forages on ruminants' performance has not been consistent and variable in the published literature. The efficacy of *Bauhinia purpurea* leaves meal as sheep feed has not been investigated for five years ago. Therefore, the research aims to find out (DDMI), (DMD), and (ADBWG) sheep feed dietary consist of (BpLM).

2. MATERIALS AND METHODS

The animal is subjected to 90 days of feeding including 30 days for the feed adaptation period. Animals are weighed when their intake is stable. Complete feeds are offered twice a day (7 am and 5 pm) at of body weight.

Bauhinia purpurea L. leaves (butterfly leaves) are collected from the Faculty of Animal Science IPB University and Pajajaran Street, Bogor City. The collected leaves are dried for 3-5 days before the feeds grinded using a milling machine.

Table 1. Feed and nutrient composition

Items	Treatments			
	T1	T2	T3	T4
Ingredient				
<i>Roughage Pennisetum purpureum</i>	60	60	60	60
Concentrate	40	40	40	40
<i>Bauhinia purpurea</i> L	0	5	10	15
Rice bran	49	41.5	40.5	35
Sago dregs	20	22	24.22	30
Cassava peel	29.5	30	24	19
Urea	1.5	1.5	1.28	1.9
Nutrient Compositions				
DM	81.42	83.84	81.48	81.58
Ash	7.38	6.85	7.17	7.07
CP	9.38	9.45	10.22	10.03
EE	6.34	6.36	6.20	6.20
CF	17.65	17.88	18.23	19.24
NFC	40.77	42.10	39.44	39.04
TDN	70.38	70.33	69.24	69.19
Ca	0.50	0.24	0.36	0.45
P	0.26	0.28	0.32	0.38

This study used a randomized block design treatment consisting of 4 experimental rations.

T1= 60% *Penissetum purpureum* + 40% concentrate without BpLM.

T2= 60% *Penissetum purpureum* + 40% concentrate contains 5% BpLM.

T3= 60% *Penissetum purpureum* + 40% concentrate contains 10% BpLM.

T4= 60% *Penissetum purpureum* + 40% concentrate contains 15% BpLM.

Ingredient and nutrient composition are shown in Table 1.

The amount of feed and the rest of the feed were recorded daily for each experimental animal. The difference between the amount of feed and the amount of leftover feed is the amount of consumption based on g/d using the formula.

$$\text{DDMI} \text{ (gd}^{-1}\text{)} = \frac{(\text{offered nutrient} - \text{refusal nutrient})}{\text{number feeding day}} \text{ [6].}$$

Digestibility measurement is done by collecting consumption data, namely the amount of feed, the amount of leftover feed and the amount of feces in one

data collection period [6]. Digestibility measurement or dry matter digestibility was calculated as:

$$\text{DMD(\%)} = \frac{(\text{total amount of nutrient in feed} - \text{total amount of nutrient in feces})}{\text{total amount in feed}} \times 100 \text{ [6].}$$

Body weight measurement was carried out twice, namely at the beginning of the treatment and the end of the treatment. The difference between the final weight and initial weight measured at an interval of 15 days at the end of the treatment period.

$$\text{(ADBWG, gd}^{-1}\text{)} = \frac{(\text{final body weight} - \text{initial body weight})}{\text{number of feeding days quarantined for 15 days}} \text{ [6]}$$

DDMI (consumption), DMD, and ADBWG data were analyzed using ANOVA. The differences among treatmentst means were tested using Duncan’s Multiple Range Test (DMRT) by SPSS version 24.0.

3. RESULTS AND DISCUSSION

Dietary consist of 5%-10% /BpLM did not effect of DDMI or consumption. This result as result of DM did not different for all treatment. The protein level among treatment in the present study $9.90 \pm 0,5\%$ CP was enough to maintenance for a ruminant. Statement Mc. Donald *et al.* [4] that the minimum protein level requirement for animal maintenance is about 8% CP -

Table 2. DDMI, DMD, and ADBWG.

Parameter	Treatments			
	0% BpLM	5% BpLM	10% BpLM	15% BpLM
Daily dry matter intake (DDMI, gd^{-1})	431.2	433.7	437.5	441.5
Dry matter digestibility (DMD, %)	66.91	61.71	62.63	60.65
Average daily body weight gain (ADBWG, gd^{-1})	31.5 ^a	40.2 ^b	43.3 ^b	47.9 ^c

DM, but lambs lactating ewes need about 11% CP [5]. The nutritional composition of animal feeds is very essential which cannot be underestimated owing to its quality determination and contribution to animal performance.

Dry matter of all treatment feed to sheep is an indicator of nutrient quantity that is available to animals. Ash content in concentrate with 5% -15% (BpLM) is high. Report of Mbatchou & Dawda [7] that high ash in ration could impact changes on physiochemical as well as nutritional essential and toxic mineral elements [8]. Taklehaymanot [6] has reported that supplemented Tsara (*P.lucens*) in ration does with 7% as did not change of (DMI) if it was compared with supplemented *Cajanus cajan* with 6% ash in ration.

The level of 5 – 15% BpLM in concentrate did not affect dry matter digestibility (DMD). This means increasing (BpLM) levels does not inhibit dry matter degradation by rumen micro - organism. Report of Mousa (2012) that dry matter digestibility decrease with increasing *Acacia* sp inclusion in the rations. one of the factors that affect digestibility is the presence of tannins in the rumen derived from feed which have an impact on the activity of bacteria and protozoa in the rumen. The presence of tannins in the rumen has a positive impact on the breakdown by enzymes produced by rumen microbes, thereby increasing the amount of protein that passes into postrumen digestion.

The level of 15% BpLM in concentrate has the highest average daily body weight (ADBWG) than other treatment (0%, 5%, 10% BpLM), although it does not increase DDMI and DMD. The result indicates that (1) kinds of tannins in BpLM cannot inhibit the digestive process in rumen and absorption of nutrient, (2) tannin levels in BpLM treatment does not exceed tannin levels that can be tolerated by rumen microbes. The concentrate concentration of tannin was below 5% as the maximum level of tannin that could be tolerated by animals [2].

The use of 15% BpLm can increase ADBWG in male local goats without adverse effect on DDMI and dry matter digestibility [9]. The factors that affect body weight gain include the quality of protein source feed, the amount of animal feed consumption and the conversion of digested protein source feed.

4. CONCLUSION

In conclusion, the use of 15% *Bauhinia purpurea* L. leaves meal in concentrate can improve sheep performance because it increases average daily body weight gain.

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