Application of Papaya Leaves Level on Multinutrient Block as Feed Supplement upon Palatability and Feed Consumption of Thin Tailed Sheep

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ABSTRACT
Papaya leaves as feed addition contain saponins, which has function as defaunation agents in the rumen. However, the saponin content can cause a bitter taste that is disliked by livestock. This study aims to evaluate the addition of several papaya leaves levels to the multinutrient block (MNB) as feed supplement for thin tail sheep on its palatability and feed consumption. The materials used in this study were 12 male sheep with an initial average weight of 22 ± 1.45 kg, MNB, papaya leaves, basal feed in the form of odot grass and concentrate. The design used in this study was a completely randomized design with 4 treatments in triplicate. The treatments consisted of: T0, basal feed + MNB 0% papaya leaves; T1, Basal feed + MNB with 4% papaya leaves; T2, Basal feed + MNB with 6% papaya leaves; and T3, Basal feed + MNB with 8% papaya leaves. Parameters observed were the consumption and digestibility of the feed as well as the average daily body weight gain. The highest feed consumption was obtained at T3 (971g/head/day on dry matter) with an average daily body weight gain of 115g/head /day. It was concluded that there was a significant difference in the effect of increasing palatability and feed consumption of thin tail sheep along with the increase level of papaya leaves in the multinutrient block.

Keywords: *Feed supplement, Multinutrient block, Papaya leaves, Sheep*

1. INTRODUCTION

Feed is the main factor to increase livestock productivity. In order to be applied easily by farmers, the development of providing practical nutrients is needed to increase ruminant productivity. The problem that often occurs is that there are still many livestock that are only given forage feed with low quality, this causes low feed digestibility, so it needs to be given complementary feed or supplements.

Papaya leaves can be used to improve digestibility, which increase the animal appetite and productivity of livestock [1]. The saponin content of papaya leaves has function to suppress the number of protozoa in the rumen, thus feed digestibility will increase [2,3]. Leaves of papaya has lots of vitamin C, vitamin E, papain enzymes and β-carotene as well as other compounds such as alkaloids, carpains, saponins, flavonoids and tannins [4]. The flavonoids can be a reducing agent for protozoa. The decrease in protozoa can lead to an increase in cellulolytic bacteria.

However, the contents of tannins and saponins can cause a bitter taste that are avoided by livestock. Therefore, in this study, the provision of papaya leaves was combined with feed supplements in the form of multinutrient blocks. Multinutrient block is a complementary feed that has a variety of nutrients such as energy, protein, and minerals. Feed supplement is an additional feed that can improve rumen performance by optimizing the activity of rumen bacteria and digestibility [2].

The advantage of multinutrient blocks is that they can be used as a solution when the quality and quantity of forage are not good in the dry season, thus livestock nutrients are still fulfilled and livestock productivity increases [5]. Multinutrient blocks contain energy, minerals and protein that can increase nutrient efficiency in the body of livestock based on low quality diet [6].

Feed palatability is a determinant of the level of livestock preference for feed. Palatability is the degree of preference of livestock on a particular feed seen from the response given by livestock to the feed given [7]. Palatability is one of the factors of animal feed consumption. Feed consumption is influenced by palatability which can be seen from the appearance, form of feed, smell, taste and texture of feed. Digestibility needs to be known to determine the quality of feedstuffs. Digestibility will determine the amount of nutritional value contained in feedstuffs for livestock production [8].

2. MATERIALS AND METHOD

2.1. Materials

The object used in this study was male thin tailed sheep aged 10 months with an initial average weight of 22 kg ± 1.45 as many as 12 heads. Sheep cage, chopper, grinder, mixer, cast plastic, plastic wrap, analytical balance, hanging scale with a capacity of 50 kg and sensitivity of 10 g, bucket, and shovel.

The analytical tools included weighing bottles, analytical balances with a capacity of 220 g with sensibility at 0.1 mg, oven, desiccator and tweezers, porcelain crucible, electric furnace, filter flask, soxhlet, upright cooler, and water bath. The feedstuffs used for the study included rice bran, pollard, cassava pulp, coconut cake, coffee hulls, molasses, distillers dried grains with solubles (DDGS), odot grass, rice straw, papaya leaves, bentonite, urea, salt and clamshell flour.

Basal feed, multinutrient block, fermented cassava cobs and concentrates were prepared in this study. The preparation of the concentrate begins by mixing the constituent ingredients of the concentrate, consisting of cassava, coffee husk, molasses, distillers dried grains with soluble (DDGS), rice bran, pollard, and coconut cake until homogeneous using a mixer. The proportion of the constituent ingredients on the concentrate can be seen in Table 1.

Table 2. Ingredient of concentrate

No.	Feedstuffs	Proportion
		----- (%) -----
1.	Rice brand	20
2.	Pollard	35
3.	Cassava cobs	11
4.	DDGS	17
5.	Coconut cake	10
6.	Coffee hulls	3
7.	Molases	4
	Total	100

Note : DDGS: distillers dried grains with soluble

Basal feed was made from cassava cobs fermented with EM4 and rice bran as additives. The fermented cassava cobs was stored for 14 days in tightly packed barrels. The manufacture of multinutrient block begins with fermenting the rice straw for 14 days. Besides that. fresh papaya leaves were collected and then dried under the sun for 3-4 days. The dried papaya leaves were ground using a grinder. The ingredients were weighed following Table 3 to prepare the multinutrient block.

2.2. Methods

Table 1. Nutrient content of concentrate

No	Feedstuffs	Water content	Nutrient content (% DM)				
			CP	CF	EE	Ash	NFE
		---------- (%) ----------					
1	Rice bran	9,90	5,16	38,86	1,38	16,63	37,97
2	Pollard	12,02	18,09	10,23	2,80	4,55	64,33
3	Cassava pulps	11,99	3,66	22,05	1,09	1,75	71,45
4	Coconut cake	11,54	18,38	14,61	15,42	5,39	46,22
5	Coffee hulls	12,60	12,87	31,32	0,92	10,78	44,11
6	DDGS	9,50	28,09	9,14	6,68	4,58	51,51
7	Molasses	28,36	1,02	0,00	2,05	5,88	91,05
8	Fermented cassava cobs	11,11	9,46	27,44	2,52	6,79	53,79

Note : CP : crude protein, CF : crude fiber, EE : extract ether, NFE : nitrogen free extract, DM : dry matter; DDGS : distillers dried grains with soluble

Table 3. Ingredient of Multinutrient Block

No	Feedstuffs	Proportion			
		Level 0%	Level 4%	Level 6%	Level 8%
		---------- (%) ----------			
1.	Fermented rice straw	36	32	30	28
2.	Papaya leaves	0	4	6	8
3.	Molasses	40	40	40	40
4.	Clamshell flour	10	10	10	10
5.	Salt	3	3	3	3
6.	Urea	4	4	4	4
7.	Bentonite	7	7	7	7
Total		100	100	100	100

The method of making multinutrient blocks was conducted by heating molasses at 40ºC for 10 minutes. The ingredients for the multinutrient block were mixed in a bucket with the order of feedstuffs having the highest volume to those with the smallest volume. Then, all ingredients were mixed until homogeneous and supplemented with papaya leaves according to the given level. The multinutrient blocks were then made according to the papaya leaf level, consisting of 0%, 4%, 6% and 8% for 50 grams, respectively. Multinutrient block was given once a day at 07.00 before giving concentrate and basal feed for 60 days. Drinking water was provided ad libitum. Weighing of sheep body weight was conducted every 2 weeks, in the morning before feeding.

Data collection was carried out by conducting a total collection for 1 week before the study was completed. Faecal was collected every day for 24 hours and the wet weight was weighed, then 10% of the wet weight sample was taken every day to be dried, after 1 week the sample was homogenized and 10% sample was taken for analysis..

2.3. Design Study

The experimental design used was a completely randomized design with 4 treatments in triplicate. The treatment was applied, such as:

T0 = Giving 50 grams of Multinutrient block with 0% papaya leaves,

T1 = Giving 50 grams of Multinutrient block with 4% papaya leaves,

T2 = Giving 50 grams of Multinutrient block with 6% papaya leaves,

T3 = Giving 50 grams of Multinutrient block with 8% papaya leaves,

2.4. Parameters Observed

Parameters observed were the consumption and digestibility of the feed as well as the average daily body weight gain. Data was analyzed with ANOVA.

3. RESULT AND DISCUSSION

3.1. *Total digestible nutrient*

Based on the research, the average of Total Digestible Nutrition (TDN) of thin tail sheep was obtained after fed a complete feed with additional feed supplements in the form of multi nutrient blocks plus different levels of papaya leaves as shown in Table 5.

The best result of average TDN were found in T3 treatment with the addition of papaya leaf level as much as 8%, which was able to increase TDN in experimental sheep. The increase in TDN value was due to improved feed quality and increased digestibility of feed nutrients.

Papaya leaves contain saponins that has function as defaunation agents. That is suppressing the number of protozoa in the rumen, thus fibrinolytic bacteria can work optimally in the fermentation process of feed which causes digestibility to increase [2,

Table 4. Proximate Analysis of Multinutrient Block

Feedstuffs	Water content	Nutrient content (% DM)					
		CP	CF	EE	Ash	NFE	TDN
Molasses	28,36	1,02	0,00	2,05	5,88	91,05	81,30
Fermented rice straw	20,89	7,72	30,88	2,41	21,34	37,65	54,99
Papaya leaves	10,07	25,55	36,41	5,00	15,11	17,93	51,27
Salt	13,80	0,00	0,00	0,00	0,00		
Clamshell flour	0,69	0,045	1,32	0,36	66,70	31,57	28,66
Urea	13,05	46,00	0,00	0,00	0,001	54	89,51
Bentonite	1,10	0,00	0,00	0,00	33,00	67	69,79

Table 5. Total digestible nutrients of thin tail sheep given papaya leaves level on multinutrient block as feed supplement

Replication	Treatment of papaya leaves			
	T0 (0%)	T1 (4%)	T2 (6%)	T3 (8%)
	---------- (% DM) ----------			
U1	62,83	61,59	66,26	69,04
U2	55,15	63,74	65,00	67,10
U3	60,40	61,64	64,96	72,90
Average	59,46^{d}	62,32^{c}	65,41^{b}	69,68^{a}

Superscript with different lowercase letters on the same line shows a significant difference ($p<0.05$). T0 = 50g multinutrient block, T1 = T0 + 4% papaya leaves, T2 = T0 + 6% papaya leaves, T3 = T0 + 8% papaya leaves,

3.2. *Feed intake and palatability*

Table 6. Feed consumption of thin tail sheep given papaya leaves level on multinutrient block as feed supplement

	T0	T1	T2	T3
	--------(g DM/head/day)----------			
U1	845,63	852,45	925,8	968,38
U2	757,99	853,79	835,22	969,61
U3	877,26	868,52	826,31	975,01
Average	826,96^{d}	858,25^{c}	862,43^{b}	971^{a}

Superscript with different lowercase letters on the same line shows a significant difference ($p<0.05$). T0 = 50g multinutrient block, T1 = T0 + 4% papaya leaves, T2 = T0 + 6% papaya leaves, T3 = T0 + 8% papaya leaves. U1-U3 : replication 1-3.

The data in Table 6 showed that feed intake (T0, T1 and T2) was lower than the range required for sheep from the previous study. The dry matter consumption required of male thin tailed sheep was ranged from 901.64 – 956.71 grams/head/day [9]. However, T3 showed higher feed intake refer to the required. The high dry matter intake could be caused by the high palatability of the feed. Feed palatability is also influenced, among others, by physical form, nutrient content, appearance and texture of feed.

Feed intake increased during addition of multinutrient blocks containing papaya leaves. Thus, it could be assumed that papaya leaves had no negative effects on livestock health and given multinutrient blocks with various levels of papaya leaves is safe for feed intake of livestock and can improve their health. The provision of multinutrient blocks is expected to increase the productivity and health of livestock [10].

The provision of multinutrient blocks as a feed supplement can stimulate the growth of rumen microbes, thereby accelerating the absorption of nutrients that can be used for animal healing. Multinutrient block as feed supplements given are able to stimulate the growth of rumen microbes so that the crude fiber from the feed can be digested properly. The content of urea as a non-protein nitrogen which is balanced with molasses as a soluble carbohydrate causes the crude fiber of the feed to be more easily digested by rumen microbes. [11]. In addition, the provision of protein sources that are balanced with soluble energy sources will increase the utilization of forage feed, causing an increase in feed intake following with average daily body weight gain [12].

3.3. *Average daily body weight gain*

Table 7. Average daily body weight gain of thin tail sheep given papaya leaves level on multinutrient block as feed supplement

Replication	Treatment			
	T0	T1	T2	T3
	----------(gram)----------			
U1	83,60	86,40	102,90	116,80
U2	89,00	98,30	105,00	109,30
U3	73,10	96,90	108,60	119,50
Average	81,90^{d}	93,87^{c}	105,50^{b}	115,20^{a}

Superscript with different lowercase letters on the same line shows a significant difference ($p<0.05$). T0 = 50g multinutrient block, T1 = T0 + 4% papaya leaves, T2 = T0 + 6% papaya leaves, T3 = T0 + 8% papaya leaves. U1-U3 : replication 1-3.

Daily body weight gain of local sheep ranged from 85.52 – 108.73 grams/head/day [11]. The results of analysis of variance showed that the administration of multinutrient blocks containing papaya leaves with different levels had a significant effect ($P<0.05$) on body weight gain of livestock. One of the factors that affect average daily weight gain is the consumption of animal feed. Dry matter consumption can affect average daily weight gain, the higher the consumption, the higher the body weight gain [14]. The level of giving 8% papaya leaves to the multinutrient block resulted in the best average daily weight gain. The bitter taste caused by saponins in papaya leaves can be neutralized by

multinutrient blocks, so it does not interfere with the palatability of livestock.

Papaya leaves have anthelmintic properties to reduce worm infestations. Apart from that, leaves of papaya have active ingredients such as alkaloids, saponins, papain and tannins which have anthelmintic activity [3]. Papaya latex or papaya leaf extract as traditional medicine is easier to obtain, cheap, applicable and has no side effects compared to the accumulated use of factory drugs. Almost all parts of the Papaya (*Carica papaya* L.) plant can be empirically used to eradicate worms in the digestive tract of sheep [3].

4. CONCLUSION

Based on the research results, it was assumed that there was a significant difference in the result of increasing palatability and feed consumption of thin tail sheep along with the increase level of papaya leaves in the multinutrient block until level of 8 % in the multinutrient block.

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