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Local Lambs Performances Fed Cassava Waste Silage

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ABSTRAK

Limbah singkong seperti daun, batang dan kulit berpotensi sebagai pakan, namun masih mengandung HCN tinggi, sehingga perlu diolah sebelum diberikan ke ternak. Penelitian bertujuan mempelajari pengaruh penggunaan silase limbah singkong terhadap performa domba lokal. Limbah singkong diensilase dan disimpan dalam drum (silo) selama 21 hari. Rancangan acak lengkap (RAL) digunakan dalam penelitian ini dengan 5 perlakuan dan 4 ulangan. Perbedaan berbagai level kombinasi rumput Afrika (RA) dan silase limbah singkong (SLS) digunakan sebagai perlakuan untuk domba lokal jantan dengan bobot badan sebesar 14.84±2.96 kg (R0=100% RA), R1=75% AGS+25% SLS, R2=50% AGS+50% SLS, R3=25% AGS+75% SLS, R4= 100% SLS). Data dianalisis dengan sidik ragam dan perbedaan antar perlakuan diuji Duncan. Hasil menunjukkan terjadi perbedaan konsumsi bahan kering (P<0,05), tetapi tidak untuk kecernaan bahan kering dan bahan organik, pertambahan bobot badan dan konversi ransum. Domba mengalami penurunan bobot badan dengan rataan 18.53 kg/ekor/hari. Disimpulkan bahwa pemberian silase limbah singkong tidak memberikan performa terbaik domba lokal.

Kata kunci : Singkong, domba, performa, silase, limbah

ABSTRACT

Cassava waste such as foliage, stem and peel is potential as feed, but still containing high of HCN. Therefore, it must be processed before given to livestock. The research was aimed to evaluated optimum level of cassava waste silage utilization on Local lambs performances. Cassava waste was fermented trough silage's process and then stored in drum (silo) for 21 days. Completely Randomized Design (CRD) was used in this research with 5 treatments and 4 replications. Different utilization levels of African Star grass (ASG) and cassava waste silage (CWS) were offered to 20 heads Local Lambs with live weight of 14.84±2.96 kg (R0=100% AGS, R1=75% AGS+25% CWS, R2=50% AGS+50% CWS, R3=25% AGS+75% CWS, R4= 100% CWS). Data were analyzed by analysis of variance and differences among treatments were examined with Duncan's multiple range test. The result showed that the treatments had significant effect on dry matter intake (P<0,05), but not significant to the other variables measured. There was a body weight loss in all treatment with average 18.53 g/head/d. It concluded that utilization of CWS do not give the best results for the local lamb's performance.

Key words : Cassava, lamb, performance, silage, waste

INTRODUCTION

Sheep have the ability to utilize roughage as a source of energy. Sources of fiber is generally obtained from forage, however, forage production has a fluctuating quantity and quality and limited. This can be an obstacle in the development of sheeps in West Java, whose their population reached 5,311,836 head (Dinas Perkebunan Jawa Barat, 2008). Therefore, are required alternative feed ingredients that can substitute the limited of forages availability based on local potential for feed self-sufficiency for the development of sheeps farming.

The alternatives that can be used to deal the limited forage are utilization of estate and agricultural waste. An example is the waste from cassava estate, which consists of tuber, stems and leaves. West Java has an area of cassava estate about 105.508 Ha and has potential to produce 2,267,367 tons of waste.

Cassava waste can be used as an alternative feed ingredient for sheep in West Java.. However, the utilization of cassava limited by the presence of cyanide acid (HCN) content which is toxic for animals. The

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Table 1. Component and nutrition composition of the experimental rations

Items	Treatment				
	R0	R1	R2	R3	R4
African star grass	100	75	50	25	0
Cassava waste silage	0	25	50	75	100
Total	100	100	100	100	100
Chemical composition					
Dry Matter (DM)	23.79	25.35	26.91	28.46	30.02
Ash	9.62	11.06	12.5	13.93	15.37
Crude Fiber (CF)	33.85	29.75	25.66	21.56	17.46
Crude Protein (CP)	15.31	14.21	13.12	12.02	10.92
Nitrogen Free Extract (NFE)	36.94	39.55	42.15	44.76	47.36

fermentation process allows for a reduction in anti-nutrients and toxins contained in feed materials. Based on research conducted by Abdullah (2009), HCN contained in cassava peel decreased from 0.024% to 0.009% after 5 days of fermentation process. This research aims to utilization of cassava waste fermentation as sheep's feed.

MATERIALS AND METHODS

Animals: twenty male lambs with weight of 14.84 ±2.96 kg and 7-9 months old were randomly distributed into four groups (4 lambs per group). Each lambs was kept in individual cage. A daily ration was offered to each animal in its respective feed trough and drinking water *ad libitum*.

Diets: the diets were different level of African star grass (AG) and cassava waste silage (CWS). Cassava waste was consist of 30% foliage, 30% steam, and 40% peel. They were fermented by soybean sauce sludge as an additive in the anaerobe condition and then stored for 21 days. There is 100% AG (R0), 75% AG + 25% CWS (R1), 50% AG + 50% CWS (R2), 25% AG + 75% CWS (R3) and 100% CWS (R4). The diets was formulated as showed at Table 1. The lambs were adapted each diet for 14 days and used over period of 60 days. Data was collected every week were average daily gain (ADG), dry matter (DM) intake, and feed conversion rations (FCR).

Digestibility trials: a digestion trial was conducted for 14 days to assess the utilization of different dietary nutrients. During this period, animals were fed a fixed weight of ration. Representative feed and fecal samples collected to chemical analysis according to AOAC (1990).

Statistical analysis: Data were analyzed by analysis of variance (Gaspersz, 1991) and differences among treatments were examined with Duncan's multiple range test (Duncan, 1995).

RESULTS AND DISCUSSION

Dry matter intake

During research period, DM consumption range (Table 2) obtained is 407.14 to 527.20 g/day and still be in the range DM needs to lambs with a range of 15-30 kg body weight, which amounts to 260-640 g/head/day (Kearl, 1982). The treatment has significantly effect ($P<0.05$) on DM intake. This indicated that the increased of CWS in ration affect DM consumption. R0 has lower DM intake than treatment R4. Based on the consumption component of DM (Table 3), R0 consume more CF (137.82 g/day), compared treatment R4 which consume more NFE (249.68 g/day). High CF intake made rumen full faster, so the lambs feel full and stop consuming activity. Presumably these conditions affect the consumption of DM.

This corresponds well with the function of DM that is as filling the stomach. If the consumption of DM has been met, then the lambs will feel full. If DM in the ration of lambs was lack, it will cause the lambs was not satisfied and continued to increase its consumption until DM needs are met.

Dry matter digestibility

Dry matter digestibility in lambs, showed high feed substances that can be digested by rumen microbes, so the higher percentage shows the higher quality of the feed material. Average DMD of each treatment are presented in Table 2. DMD range from each treatment was 48.94 % to 57.97 %.
Treatments in the study are in the normal range DMD

Table 2. Performance of lambs under different treatments

Items	Treatments				
	R0	R1	R2	R3	R4
DM intake (g/d)	407.14 ± 57.11^{c}	481.34 ± 25.03^{abc}	515.69 ±58.25^{ab}	436.65 ±63.85^{bc}	527.20 ±41.00^{a}
DM digestibility (%)	51.61±8.20	54.79±4.72^{a}	57.97±9.17	48.94±1.74	51.69±11.35
OM digestibility (%)	82.09±3.33	84.15±6.31	88.35±4.58	88.51±6.14	92.15±2.60
ADG (g/d)	-42.86	-13.39	-10.27	-7.59	-20.98
FCR	-7.09	-35.97^{a}	-121.96	-96.07	-33.52

Note : Figures in the same row having different superscripts are not significantly different (P<0.05).

according Kariuki *et al.* (2001), are 50% to 57%. This shows that the nutrient rations sufficient of DM and CWS utilization up to 100% in the ration did not affect DMD.

In spite of DM intake are in the range requirement and give significantly different, but it was estimated still low for growing, so that lambs digest intensively. Consequently, all treatments cause the same of DMD. Dry matter digestibility of a ration is influenced by several factors, such as DM ration consumption and feed flow rate in the digestive tract (Tillman *et al* 1998).

Organic matter digestibility

Organic matter digestibility (OMD) is an important factor that can determine the quality of a feed ingredient. The average value obtained from the administration OMD African star grass and CWS in each treatment are presented in Table 2. Based on the results of measurements, the range OMD obtained was 82.09% - 92.15%. This value is higher than the normal range of organic matter digestibility expressed Gatenby (1986) that OMD for lambs ranged from 57.3 to 63.0%. Digestibility values obtained from this study is higher than OMD fermented cassava peel, which is 70.71% (Gusharyanto, 2005), and OMD in lambs fed 80% grass and 20% cassava field, which is 58.59% (Prayitno, *et al.*, 1999). OMD from each treatment were not significantly different (P> 0.05). It indicates that the African star grass and CWS has same OMD. Possibly, this was caused by DMD had the same result as a consequency of intensively digestion, taught the treatments were difference of ash content. According to Gatenby (1986), the factors that influence the digestibility of organic materials such as crude fiber and mineral in feedstuffs.

Average daily gain

The average daily gains (ADG) of lambs during the study period are presented in Table 2. The ADG produced negative or decreased body weight. R0 treatment provided 100% grass also decreased ADG with average 18.53 g/d.

Weight reduction may due to consumption of DM intake which still do not sufficient the needs of these growing lambs. If there are nutrients deficient, then the lambs will be trying to increase consumption to nutrient needs are met.

Decrease in body weight of lambs consuming CWS during the study period (R1, R2, R3 and R4), presumably because the accumulation of HCN in the body. HCN content of the final obtained after fermentation for 24 days (188.87 mg/kg DM) was considered toxic, since more than 100 mg/kg DM (Rukmana, 1997). Dose of HCN poisoning deaths was 1.4 mg /kg weight.

HCN is produced from the hydrolysis of glycosides cyanogenic. Cyanogenic glycosides degraded by enzymes produced by rumen microbes and rapidly absorbed into the body. Enzymatic activity of the enzyme HCN rodhanase can change into non-toxic form that is thyocianate. Liver and kidneys are the main source of rodhanase that has a role in detoxifying HCN. HCN poisoning occurs when thyocianate not entirely excreted through the urine and that HCN can interfere with the use of proteins, especially amino acids that contain sulfur such as methionine, cysteine, cystine, vitamin B12, minerals iron, copper, iodine, and the production of thyroxine. Disorders of protein can affect the growth. In the lambs who have lack of protein in addition to impaired growth, thus has an inefficient feed conversion Widodo (2005).

The other reason, is ideal pH range for the process of rumen digestion of cellulose is 6.2 to 6.8, when the rumen fluid pH less than 6.2, the digestion of fiber will be disrupted. Cassava waste silage may be s containing lactic acids caused low of pH. Lambs fed continually CWS suspected of causing rumen pH decreased and interfere with digestion of cellulose, so that the VFA production is lower and shortage of energy sources. Disorders of protein metabolism and lack of energy

Table 3. Nutrients intake of lamb during experiment period

Treatments	DM Intake	Ash	CF	CP	Crude Fat	NFE
		g/d				
R0	407.14	39.17	137.82	62.33	17.43	150.4
R1	481.34	53.22	143.21	68.41	26.15	190.34
R2	515.69	64.44	132.3	67.63	33.96	217.36
R3	436.65	60.84	94.13	52.47	33.79	195.42
R4	527.2	81.03	92.05	57.57	46.87	249.68
Means	473.6	59.74 (12.61%)	119.9 (25.31%)	61.68 (12.04%)	31.64 (6.68%)	200.64 (42.36%)

resources believed to be the cause of decrease in body weight. It should be not fed CWS everyday.

Feed conversion study

Feed conversion was influenced by the availability of nutrients in the diet and health of livestock, the higher the feed value of feed conversion means that are used to build up the unity of body weight the more weight or low feed efficiency (Siregar, 2011). The average feed conversion ratio obtained in this study are presented in Table 2, with a range of -7.09- -121.96. This conditions is due to a decreasing of ADG compare to DM intake. According to Siregar (2001), good feed conversion ratio was 8.56 to 13.29. Martawidjaja, et al, (1999) states, ruminant feed conversion is influenced by feed quality, nutrient adequacy to sufficient basic living needs, the magnitude of weight gain and digestibility values. Feed conversion ratio obtained in this study is considered very low compared to the normal range.

CONCLUSION

Utilization of Cassava waste silage, cannot give the best result on Local Lamb's performance, especially for average daily gain. To reduce the negative impact of HCN poisoning and rumen conditions that are too acidic, it is recommended to provide fermentation with lower HCN content, then can be safety to lamb.

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