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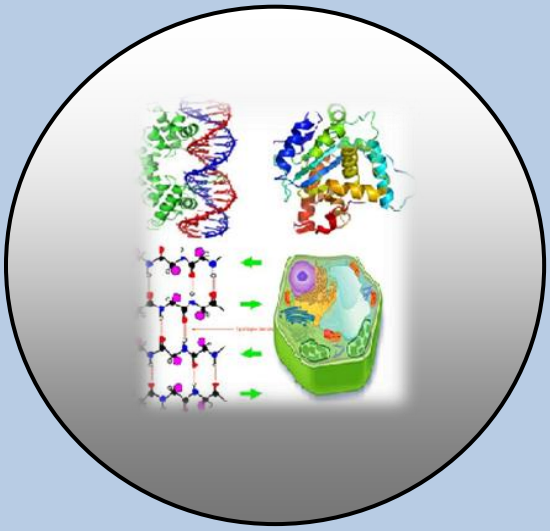

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RESEARCH PAPER

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The Effect of Urea Lime Mixture in Concentrate Containing Different Levels of Cassava on Performance of Ettawa Grade Goats

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ABSTRACT

An experiment was carried out to study the effect of urea lime mixture in concentrate containing different levels of cassava on performance of the ettawa grade goats through in-vivo experiment. Arandomized block design (RBD) consisted of four different rations and four replicates was used in this experiment. A total of 16 ettawa cross bred goats with initial body weight ranging from 12.4 -19 kg were aranged into 16 pens experiment. Four feed treatments were offered to four groups of four goats. The first treatment (A) was 50% elephant grass 50% concentrate (without cassava urea lime) as control diet, the second treatment (B) was 50% elephant grass 50% concentrate (without cassava, with 4% urea and 2% lime), the third treatment (C) was 50% elephant grass 50% concentrate (with 25% cassava, 4% urea and 2% lime), and the fourth treatment (D) was 50% elephant grass 50% concentrate (with 50% cassava, 4% urea and 2% lime). Ration was composed based on standard requirement of 15 kg body weight goat with 75 g daily weight gain. Results of this study showed that urea-lime was not significantly affect the consumption of dry matter (DM). Eenergy consumption in treatment C and D were significantly higher than the energy consumption in treatment A and B. Ttreatment D was significantly higher than other treatments because the consumption of DM tends higher in treatment D compared with other treatments. Feed Convertion Ratio (FCR) in treatment D was the least significant compared with other treatments. It showed that concentrate containing 4% urea, 2% lime and 50% cassava was the most efficient to use in ration. The utilization of 4% urea and 2% lime combine with 50% cassava could improve the ettawa grade goat's growth and feed efficiency.

Keyword: Urea-Lime, Cassava, Performance and Ettawa Grade Goats.

INTRODUCTION

Urea supplementation could be used as nitrogen sources however, urea could rapidly release nitrogen and produce ammonia in the rumen. Thiscould cause a bad impact or toxicity and even death in case of excessive dosages are given to ruminants (Stanton and Whittier, 2006). Huntington *et al.* (2006) reported that urea rapidly hydrolyze and release in the rumen and ammonia reach its peak production after offeredto ruminant forone hour. It is more efficient and safe to use ammonia slow released method derived from urea slow releasing N in rumen because this will prevent against ammonia toxicity (Galo *et al.,* 2003). Cherdtong *et al.* (2011) found that supplementation of urea-CaSO4 mixture in concentrate containing 70% cassava could improve rumen ecology and increase protein rumen microbe in beef cattle. The eficiency of urea utilization in ration needs energy or carbohydrate source which is soluble or available in the rumen since balancing of energy (VFA) and nitrogen (N-NH_3) are needed for optimum microbial protein synthesized. Generally, molasses is used as source of carbohydrate but it is too expensive and rarely available. In that case, an alternative source of carbohydrate such as cassava should be considered in the future. Chanjula *et al*. (2004) found that synchronization of using urea and starch derived from cassava or corn in dairy cow ration resulting in no different response to the productive performance of dairy cows.According to Rosegrant and Gerpacio (1979) starch content in cassava (48, 89%) was higher than corn (45, 35%), therefore cassava could be used as a potential energy source in goat feed. In present there is no available information about the optimumum balance of urea-lime to slow the release of N urea in ettawa grade goat ration. This research aimed to study the effect of urea lime mixture in concentrate containing different level of cassava on performance of the ettawa grade goat.

MATERIALS AND METHOD

Materials

Sixteen ettawa grade goats with initial body weight range from 12.4 to 19.0 kg were used in this in-vivo study. The animals were randomly assigned into four treatments and four replicates. Four different rations were offered as feed treatments (A, B, C and D) to the four respective groups. The first treatment (A) was 50% elephant grass 50% concentrate (without cassava, urea and lime) as control diet, the second treatment (B) was 50% elephant grass 50% concentrate (without cassava, with 4% urea and 2% lime). The third treatment (C) was 50% elephant grass 50% concentrate (with 25% cassava, 4% urea and 2% lime), and the fouth treatment (D) was 50% elephant grass 50% concentrate (with 50% cassava, 4% urea and 2% lime). Ration was made according to standard requirement of 15 kg body weight with 75 gm daily weight gain (Kearl, 1982).

Method

Data Collection, Sampling Procedure and Analysis

Feed were randomly collected and fecal samples were taken from total collection of individual cattle during the last 7 day of the study. Composites samples were dried at 70^{o}C. They were analyzed for chemical composition such as DM, ash, and crude fibre (CF) content with proxymate analyzed (AOAC, 1990), analysis for crude protein (CP) using semi-micro Kjeldahl method (ICW), even though analysis for gross energy (GE) content using *bomb calorimeter* instrument.

Consumption of DM were calculated: DM feed intake – (DM in fecal × fecal productions/day). Consumption of nutrients were calculated: nutrients feed intake – (nutrients content in fecal × fecal productions/day). Goats weighing had done every week. Goat's weight gain was obtained by subtracting the initial body weight to the final body weight. Daily live weight gain is a weight gain during the study divided by the length of the study.

Table 1. Composition and nutrient content of concentrate and elephant grass.

Feed Ingredients (% DM))	Concentrate				Elephant Grass
	A	B	C	D	
Cassava	0,00	0,00	25,00	50,00	-
Pollard	29,80	24,80	12,80	12,80	-
Soybean hull	25,00	25,00	25,00	25,00	-
Rice bran	41,00	40,00	27,00	2,00	-
Molasses	2,00	2,00	2,00	2,00	-
Urea	0,00	4,00	4,00	4,00	-
Lime	0,00	2,00	2,00	2,00	-
Salt	2,00	2,00	2,00	2,00	-
Vitamin Mineral	0,20	0,20	0,20	0,20	-
TOTAL	100,00	100,00	100,00	100,00	-
Nutrient content					
Dry Matter (%)	90,2789	92,4208	91,9213	88,5462	98,2871
Crude Protein (%)	14,3664	25,9614	23,5431	22,4767	8,9664
Ether Extract (%)	4,3506	4,1887	3,8053	1,7033	1,7308
Crude Fiber (%)	19,8096	15,4534	9,2115	6,8772	30,6123
Gross Energy /GE (kcal/g)	3,9835	3,6301	4,1741	4,2943	3,7585

Note:
A= Concentrate without cassava, urea and lime, as control diet
B= Concentrate without cassava, with 4% urea and 2% lime
C=Concentrate with 25% cassava, 4% urea and 2% lime
D= Concentrate with 50% cassava, 4% urea and 2% lime

All data were collected then analyzed using analyis of variances (Steel and Torrie, 1986), and whenever significant different between means was found analysis was continued using Duncan's Multiple Range Test.

RESULTS AND DISCUSSION

Effect of urea, lime and cassava on the performance of goats

Consumption of dry matter of goats given treatment A, B, C and D were 562.83; 558.96; 590.36 and 643.32 g/head/day were not significant different statistically (Table 2). Urea-lime was not significantly affecting the consumption of dry matter. It means that urea was not affect the palatability of the ration, but there's a tendency that the increaseing of dry matter intake of goats in treatment C and D compared with treatment A and B.

This occurs due to the use of cassava in treatment C and D. The increase consumption resulting in weight gain, and weight gain in treatment D was higher statistically significant different (P<0.05) than other treatments. Dry matter intake for 12 weeks in treatment A, B, C and D were 3.2; 3.3; 3.1 and 3.2% of the live weight. Consumption level was higher than that obtained by Partama (2000) at 2.8%. The difference is due to the different rations given, climate, environment and age of goats.

Table 2. Effect of offering urea-lime and cassava on performance of ettawa grade goats.

Variables	Treatments				
	A	B	C	D	SEM
Initial Body Weight (kg)	16,05 [a]	15,80 [a]	16,25 [a]	15,7 [a]	0,35
Finally Body Weight (kg)	19,1[b]	18,65[b]	20,8 [b]	23,4[a]	0,74
Body weight Gain (kg)	3.05[b]	2,85[b]	4,55[b]	7,70[a]	0,62
Daily Weight Gain (g/e/h)	36,31[b]	33,93[b]	54,17[b]	91,67[a]	7,33
Elephant Grass Consumption(gDM/d)	216,05 [a]	261,04 [a]	246,64 [a]	254,84 [a]	18,29
Consentrate Consumption (g DM/d)	346,78 [a]	297,93 [a]	343,73 [a]	388,48 [a]	29,44
DM Consumption (g/d)	562,83[a]	558,96[a]	590,36[a]	643,32[a]	21,78
OM Consumption (g/d)	506,11[b]	494,34[b]	535,71[b]	588,83[a]	19,55
Urea Consumption (g/d)	0	11,92	13,74	15,54	-
Urea Consumption (% DM)	0	2,13	2,30	2,41	-
Energi Bruto Consumption (Kcal/d)	2154[b]	1954[b]	2270[a]	2336[a]	79,55
Crude Protein Consumption (g/d)	64,42[b]	102,72[a]	99,82[a]	103,11[a]	3,49
Crude Fiber Consumption (g/d)	128,84[a]	122,68 [a]	98,12 [b]	99,83 [b]	4,03
Crude Fat Consumption (g/d)	17,31[a]	16,01[a]	16,30 [a]	10,09 [a]	0,91
Feed Convertion Ratio (FCR)	17,81[a]	16,8[a]	12,17[ab]	7,19[b]	1,91

Note: Average values in the same rows was the same letter are not significantl (P>0,05)
SEM = "Standard Erorr of the Treatment Means"

Consumption of protein in goat which given treatment A, B, C, and D were 64.42; 102.72; 99.82, and 103.11 g/head/day. The results of analysis of variance showed that protein intake on B, C, and D treatment were significantly (P<0.05) higher than treatment A. The difference of protein consumption amount caused by the difference of protein content in ration as a result of the addition of urea in concentrate B, C, and D. Protein consumption in this study was 9.78 g/kg$W^{0,75}$ was higher than the value that obtained by Partama (2000) was 7.08 g. The difference caused by the difference of using protein sources, which in this study using urea-lime as a source of NPN. Protein is one of the indispensable components of nutrients on growing goats. Energy consumption in treatment A, B, C, and D were 2154; 1954; 2270, and 2336 kcal/day (Table 2). Analysis of variance found that energy consumption in treatment C and D were significantly higher than the energy consumption in treatment A and B. It happened because the energy content of the concentrate ration in treatment C and D is higher than treatment A and B as a result of the addition of cassava. Consumption of dry matter in treatment C and D also tend higher compared with treatment A and B.

Weight gain of goats in treatment A, B, C, and D were 36.31; 33.93; 54.17; and 91.67 g/day (Table 2). The results of statistical analysis found that the weight gain in treatment D was significantly higher than the weight gain of goats to other treatments. This happened because the consumption of dry matter that tends higher in treatment D compared with other treatments. The high consumption of dry matter in treatment D also results in the highest consumption of urea (2.41%) of the dry matter intake. The high weight gain in treatment D could be attributed to the high energy consumption in treatment D.

The changes of body weight during the study showed that animals treated D had higher weight gain than the other treatments starting 7th week (Figure 1). The comparison of the dry matter amount that was consumed by goats and weight gain could be used to determine the efficiency level of feed using. The research found that Feed Conversion Ratio (FCR) of goats in treatment A, B, C, and D were 17.81; 16.8; 12.17, and 7.19. FCR of goats in treatment C was not significantly different from treatments D and FCR in treatment D was the least significant compared with other treatments (Table 2). It showed that concentrate containing 4% urea, 2% lime and 50% cassava was the most efficient to use ration. It happened because goats in treatment D consumed a balanced protein and energy.

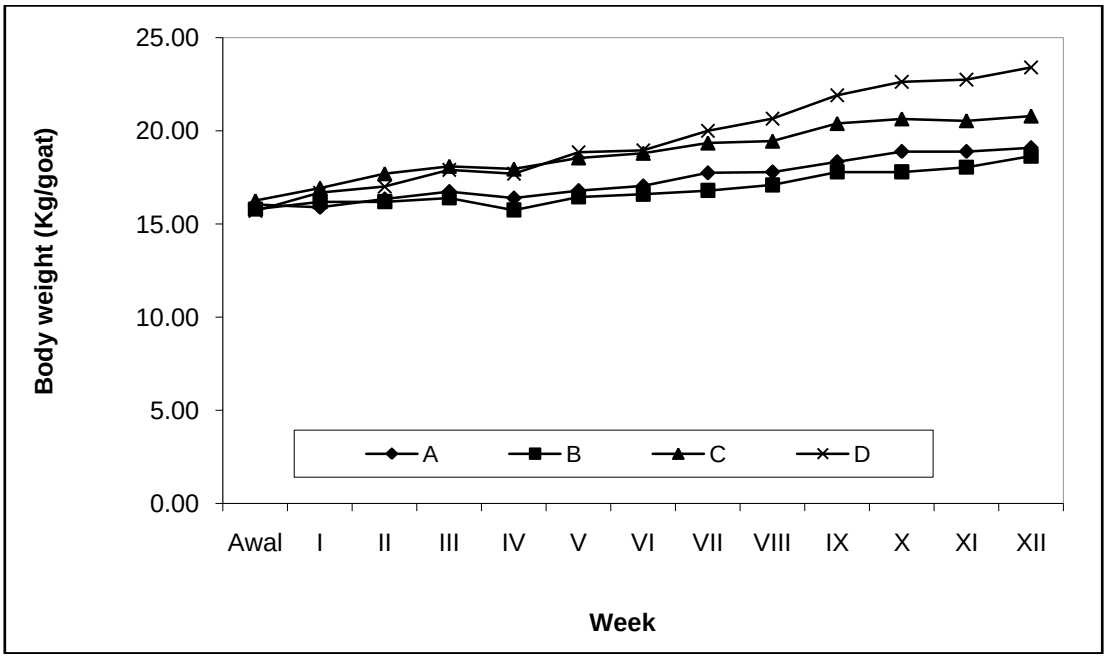

Figure 1. Goats weight chart every week. A = Concentrate without cassava, urea and lime, as control diet; B = Concentrate without cassava, with 4% urea and 2% lime; C = Concentrate with 25% cassava, 4% urea and 2% lime; D = Concentrate with 50% cassava, 4% urea and 2% lime.

CONCLUSION AND RECOMMENDATION

Conclusion

Based on the results and discussion, it can be concluded that the utilization of 4% urea and 2% lime combine with 50% cassava in concentrate could improve the ettawa grade goats growth and feed efficiency.

Recommendation

Based on the results obstain it could be recommended to use 50% concentrate containing 4% urea , 2% lime and 50% cassava in order to improve the growth and feed efficiency of the ettawa grade goats.

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