The 6th ISTAP
International Seminar on Tropical Animal Production

"Integrated Approach in Developing Sustainable Tropical Animal Production"

PROCEEDINGS

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ISBN: 978-979-1215-26-8

Published by:
Faculty of Animal Science, Universitas Gadjah Mada Yogyakarta, Indonesia, 2015

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Part I

Animal Feed and Nutrition

The 6th International Seminar on Tropical Animal Production
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Responses of Growing-Female Crossbred Ettawa Goats Fed Concentrates Containing by-product of Traditional Fried Snack Industry with Different Levels of Urea

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ABSTRACT: The problem faced in West Nusa Tenggara (NTB) is lack of goats' feed in dry season result in low productivity of the goats. Furthermore, the cost of the feed is very expensive, and therefore it is needed to find alternative feeds which locally available, cheap and non-competitive with human needs. The purposes of this experiment was to evaluate the utilization of by-product of traditional fried snack industry ("*rontokan gorengan* = RG") as a concentrate in combination with rice bran (1:1) and different levels of urea on dry matter (DM) intakes of each feeds, total nutrient intakes, water intakes, feed conversion ratio (FCR), average daily gain (ADG) and DM intake as percentage of body weight (BW) of growing-female crossbred Ettawa goats given a basal diet consisted of field grass and banana peel. Sixteen growing-female crossbred Ettawa goats with an initial of body weight of 19±2.8 kg were allocated into four group of 4 goats each and fed one of dietary concentrate treatments containing 0%, 2%, 3% or 4% urea and arranged according to Completely Randomized Design. The results show that there were no significant difference ($P>0.05$) on DM intakes of each feeds; total nutrient intakes, DM intake as percentage of BW; water intake; ADG; and FCR. Nitrogen (N) intake was enhanced ($P<0.05$) by increasing level of urea in the concentrates. The goats receiving diet with 3% urea in the concentrate tended to have the best response in ADG (95.9 g/head/day) followed by the highest of DM intakes of field grass, total DM and OM (organic matter) intakes, total N intakes and the lowest of FCR. It is concluded that adding 3% urea in the concentrate based on "*rontokan gorengan*" and rice bran (1:1) can maintain productivity of growing-female crossbred Ettawa goats.

Keywords : by-product of traditional fried snack industry; crossbred Ettawa goats, daily gain, urea, concentrate.

INTRODUCTION

Crossbred Ettawa Goats in Indonesia, particularly in West Nusa Tenggara are being developed as a dual purposes goat type (meat and milk) to enhance nutritional status of local people. Currently, the crossbred Ettawa Goats' production is still low due to lack of feed availability, especially in dry season leading to slow growth of young goats which is very important in dairy goat selection. To obtain an optimum growth, the goats should be fed sufficient amount of good quality feeds. However, this is costly. Therefore, an exploration of potential locally available feed is needed.

There are many home industries producing traditional snack called 'gorengan' in Mataram. Banana peel and *"rontokan gorengan"* (RG) are their by-products which are polluting the traditional market environments and the rivers around the Mataram city (Asih *et al*., 2014). RG is by-product rich in fermentable carbohydrate but lack of protein and can be properly used as a concentrate by combining it with rice bran and urea. Previous study showed that feeding crossbred lactating Ettawa goats a concentrate consisted of 1:1 rice bran and RG with 3% urea increased productivity (Asih *et al*., 2014). It is not clear if the result with lactating crossbred Ettawa goats applicable to

growing-female goats. Therefore, an experiment was conducted to evaluate total dry matter (DM) intakes, DM intakes of each feeds, water intakes, average daily gain (ADG) and feed conversion ratio (FCR) in growing-female crossbred Ettawa goats fed field grass and banana peel as basal diets given concetrates based on rice bran and RG containing different levels of urea.

MATERIALS AND METHOD

Sixteen growing-female crossbred Ettawah goats (5 to 6 month old with the initial body weight of 19±2.8 kg) were divided into four groups of four goats and given one of four concentrates treatments (Table 1) according to Completely Randomized Design (Mead and Curnow, 1983).

Table 1. The composition of concentrate treatments as feeds

Treatments	Rice bran (%)	RG (%)	Urea (%)	Mineral (%)
U1	49.0	49.0	0.0	2.0
U2	48.0	48.0	2.0	2.0
U3	47.5	47.5	3.0	2.0
U4	47.0	47.0	4.0	2.0

Note: RG=Rontokan gorengan is by-product of traditional fried snack industry which is separated from the main products. Mineral is specific for goats and sheep produced by Eka Parma, Semarang.

The goats were penned individually and the feeding technique is shown in Table 2. Daily DM intakes of each feed types, total daily nutrient intake and daily water intake were measured for 10 weeks, while the average daily gain (ADG) of the goats was measured by weighing each goat weekly. The feed conversion ratio (FCR) was calculated as the amount of DM consumed (kg) over one kg weight gain, and DM intake was expressed as percentage of body weight. Data were analyzed using PROC ANOVA (Sas, 1990) and differences between treatment means were separated with Duncan multiple range test.

Table 2. Frequency, feeding time and amount of feed given of each goat in different dietary treatments

Feeds	U1	U2	U3	U4	Frequency and feeding time
Field grass (g)	ad-lib	ad-lib	ad-lib	ad-lib	Thrice a day (morning; noon; evening)
Concentrate (g)	300	300	300	300	Once a day (in the morning)
Banana peel (g)	1000	1000	1000	1000	Once a day (in the morning)
Water (ml)	ad-lib	ad-lib	ad-lib	ad-lib	Once a day (in the morning)

RESULTS AND DISCUSSION

Nutrient intakes, water consumption, ADG, and FCR are presented in Table 3. Nutrient and water intakes of growing-female crossbred Ettawa goats were not significantly ($P>0.05$) influenced by increasing urea levels in the concentrate. However, DM intake of field grass enhanced significantly ($P= 0.054$) with increasing urea levels in the concentrate, except for the goats received 2% urea treatment. It reduced due to one of the goats receiving this treatment suffered from diarrhea for one week. This reduced the appetite of that goat leading to a decrease its total DM and OM intakes,

although its concentrate consumption was numerically higher. Therefore, its ADG was lower than that of 0% urea treatment in the concentrate (Table 3). Vice versa, the goats received a concentrate containing 3% urea gave the highest response of the ADG followed by the highest responses of nutrient intakes and the lowest of FCR. This might be due to better fermentation and production of ammonia and volatile fatty acids (Galina *et al.* 2004). They reported an improvement in ammonia and volatile fatty acids production in goat kids pasturing Mexican rangeland given slow-intake urea supplementation. Furthermore, these results were in line with results of our previous experiment (Asih *et al*., 2014) that feeding a concentrate containing 3% urea to lactating does gave the highest responses on crude fiber and N digestibility. There was a tendency that further increase of level of urea in the concentrate up to 4% reduced the value of measured variables, although those were not significantly different (P>0.05).

The best responses of the 3% urea level in the concentrate on growing-female crossbred Ettawa goats are in accordance to the results of the previous similar experiment on lactating crossbred Ettawa does that incorporating 3% urea in the similar concentrate gave the best responses on milk production, positive body weight change at the end of the experiment, ADG of the pre-weaning offspring and nutrient digestibility (Asih *et al.,* 2014). In other word, 3% urea level in the concentrate based on "RG" and rice bran (1:1) is applicable to growing-female crossbred Ettawa goats for maintaining the crossbred Ettawa goats' production in Mataram city where "RG" is polluting the environment. The more we utilize "RG" as a concentrate for various physiologies of goats, the more we reduce pollution of the environment. Therefore, it is necessary to conduct similar experiment on other physiologies of goats such as on growing and adult male goats, dried does and pre-weaning goats.

Table 3. Nutrient intakes, water consumption, ADG, and FCR of growing-female crossbred Ettawa goats.

Parameter	U1	U2	U3	U3	SEM	P-value
DM Intake of feed						
Field grass (g/day).	565.2^{ab}	460.3^{b}	624.0^{a}	562.5^{ab}	36.965	0.0540
Banana peel (g/day).	122.5^{a}	112.3^{b}	123.8^{a}	120.9^{a}	1.5691	0.0009
Concentrate (g/day)	98.08^{a}	119.4^{a}	109.5^{a}	116.6^{a}	8.6822	0.3510
Total intake of nutrient						
DM (g/day)	785.8^{ab}	691.9^{b}	857.3^{a}	800.0^{ab}	40.993	0.0850
OM (g/day)	719.4^{a}	635.5^{b}	784.2^{ab}	733.0^{ab}	37.013	0.0870
N (g/day)	6.98^{b}	7.49^{b}	9.72^{a}	10.49^{a}	0.4792	0.0005
Crude Fiber (g/day)	30.45^{a}	28.19^{a}	33.54^{a}	31.83^{a}	1.6708	0.1963
Fat (g/day)	36.12^{a}	39.16^{a}	40.06^{a}	40.57^{a}	2.3986	0.5759
Ash (g/day)	66.34^{a}	56.39^{a}	73.10^{b}	67.04^{b}	4.0007	0.0733
Water (ml/day)	260^{a}	320^{a}	333^{a}	283^{a}	23.430	0.1623
ADG (g/day).	80.38^{a}	75.00^{a}	96.43^{a}	83.93^{a}	10.503	0.5426
DM intake/BW (%)	4.32^{a}	3.80^{a}	4.33^{a}	4.15^{a}	0.1686	0.1466
FCR (kg feed/kg BW change)	9.77^{a}	9.22^{a}	8.89^{a}	9.53^{a}	0.0905	0.0601

U1= 0% urea; U2= 2% urea; U3= 3% urea and U4= 4% in the concentrates

The ADG of growing-female crossbred Ettawa goats were not influenced by the urea levels in the concentrates since the total nutrient intakes (DM, OM, fiber, fat and ash) were not significantly different (P>0.05) among different levels of urea (Table 3). Consequently, the FCR of those goats was also not significantly different. However, the FCR of the goats received concentrate treatment containing 3% urea level gave the lowest FCR. This might be caused by significant increase in digestibility of fiber and N when the goats were fed that concentrate. These findings were in accordance with those reported previously (Asih *et al*. 2014) that increasing levels of urea in those concentrates up to 3% improved the digestibility of dietary fiber and protein significantly (P>0.05) and tended to have the highest DM and OM digestibility. This means that the 3% urea level in the concentrate based on RG and rice bran (1:1) could improve the nutrient content of feeds. This was supported by the previous finding that different protein sources (soy bean meal, cotton seed meal and urea) in the concentrates contained similar amount of energy did not affect microbial protein synthesis in the rumen of the goats (Asih *et al.* 2011) and there is still an opportunity to utilyze urea to enrich certain unconventional by-product for goats.

CONCLUSIONS

By-product of traditional snack industry is a potential feedstuff for goats. Feeding growing-female crossbred Ettawa goats a basal diet of field grass and banana peel with concentrate consisted of 1:1 rice bran and *"rontokan gorengan"* with 3% urea can maintain the goats' productivity.

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