

Influence of Diets on Milk Production and Composition of Etawah Grade Does Reared in Mined Land Reclamation

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Abstract This study was conducted in sand post-mining area that reclaimed for raising dairy goats. The study investigated effects of concentrate supplementation on milk production and its composition. Fifteen Etawah Grade does in lactation two and lactation three were randomly allocated into two groups. Each group was treated by differences type of feed supplementation (P1 = forage/control, P2 = forage and food industry waste). The forage that offered to animals consists of elephant grass (*Pennisetum purpureum*), *Calliandra calothyrsus* and *Glirycidia sepium*. Treatment P2 was supplemented with 1,4 kg of soybean skin (CP = 26,79%) and 0,6 kg of tofu waste (CP = 24,71%). Individual milk production was recorded daily, and milk samples were collected once every 2 weeks for the 8 weeks period and analyzed for density, fat, protein, lactose, and milk dry matter. Data of milk production and composition were analyzed using t test. Milk production, lactose and milk density of does was similar for each treatment although does was supplemented by concentrate ($P > 0.05$). Meanwhile the dry matter of milk was very significant higher ($P < 0,01$) in P2 than P1, while protein content and fat in milk of P2 was significant ($P < 0,05$). It can be concluded that the addition of supplemental feed will improve the quality of goat milk that reared on mined land reclamation.

Keywords Land Reclamation, Dairy Goat, Milk Production, Milk Quality

1. Introduction

The land reclamation program on sand post-mining in Cimalaka, Sumedang, West Java Indonesia has been conducted a few years ago. People used land for raising dairy goat assuming that the goat feces can be used to fertilize soil. However, the milk yield is very low. It is important to optimize the milk yield by supplementation of concentrate diets. On the other hand, Sumedang famous for tofu production that generate unused tofu waste and soybean skin. Concentrate supplementation improved milk production and quality [1]. This study was conducted to evaluate the effects of concentrate supplementation on milk yield and its composition.

2. Materials and Methods

The study was conducted in Simpay Tampomas Farmer Group, Cimalaka, Sumedang regency, West Java, Indonesia. This study used a total of fifteen Etawah Grade does. The animals were selected from farmers. They were in lactation two and lactation three and were randomly allocated into two groups. Each of animal remained in single indoor cages for treatment process. Each group was treated by differences type of feed supplementation as trials of this study (P1 = forage/control, P2 = forage and food industry waste). P1 was usual treatment by farmers daily. The forage offered to the animals consisted of elephant grass (*Pennisetum purpureum*), *Calliandra calothyrsus* and *Glirycidia sepium*. Treatment P2 was supplemented with 1,4 kg of soybean skin (CP = 26,79%) and 0,6 kg of tofu waste (CP = 24,71%). The supplementation

of diets had rational foodstuff 70% of forage and 30% of concentrate. Nutrient content of the diets are presented in Table 1.

Table 1. Nutrient content of trial diets

Feedstuff	DM	CP	CFat	CFiber	Ash	NFE
		-----%(g/100 DM)-----				
<i>Calliandra calothyrsus</i>	21.84	22.36	5.40	31.78	12.31	28.15
<i>Glirycidia sepium</i>	23.48	18.95	2.85	28.96	14.82	34.41
<i>Pennisetum purpureum</i>	13.54	18.76	1.55	35.30	14.84	29.54
Soybean skin	14.37	26.79	12.73	26.93	0.70	32.85
Tofu waste	12.06	24.71	16.75	23.38	3.40	31.76

Chopped forage was offered every morning and evening. Each animal of P2 was supplemented with soybean skin and tofu waste before feeding forage. Water was given *ad libitum*. Goats were milked once a day in the afternoon. The daily individual milk yield was collected and milk samples were collected once every 2 weeks in 8 weeks period and analyzed for density, fat, protein, lactose, and milk dry matter.

Data of milk yield and its composition was expressed in average values and standard deviation (SD). In order to determine the differences of each parameter between treatments (P1 and P2), the data was analyzed by *t*-test [2].

3. Results and Discussion

3.1. Milk yield

The dietary treatments did not changed milk yield ($P>0.05$). Table 2 shows that milk yield of control was 336.1 ml/head/d, meanwhile the concentrate supplementation was 368.6 ml/head/d.

Table 2. Milk yield and quality of Etawah Grade by control and concentrate supplementation

Parameters	Treatments	
	P1	P2
a. Milk yield (ml/day)	336±109	369±78
b. Milk quality		
- Dry matter (%)	15.27 ^B ±1.315	16.36 ^A ±0.285
- Crude fat (%)	6.01 ^b ±1.192	6.82 ^a ±0.305
- Crude Protein (%)	5.06 ^b ±0.329	5.25 ^a ±0.019
- Lactose (%)	3.35±0.280	3.40±0.042
- Density (g/ml)	1.0299±0.00247	1.0304±0.00051

P1, forage/control; P2, supplementation 30% of concentrate

The main factors influencing production and quality of milk are dry matter intake and the composition of feed [3]. Increasing of milk yield accordance with the supply of milk-forming component (water, fat, protein, lactose, vitamins and minerals). The research on Etawah Grade had milk yield of 287-795 ml/head/d [4]. Milk yield of Etawah Grade ranged from 0,45-2,1 l/head/d. Etawah Grade produces milk of 1308,44 g/head/d for single birth and increase until 1434,51 g/head/day for twin births [5]. The others data milk yield were 990 g/head/d [6], and 655,97-1158,45 g/head/day [7]. The milk yield in this study was lower than previous studies that could be caused by milking management. On this study, doe was milked only once a day, meanwhile the previous study was conducted twice a day. Milking management was correlated to milk yield [8]. The frequency of milking two times was 40% higher than those milked once, milking three times will be 5% -20% higher than those milking twice and four times will be 5% -10% higher than those milked three times. This study indicated that the milk yield of Etawah Grade in post-mining area is still very low.

3.2. Milk quality

Table 2. shows that the supplementation of concentrate affected milk quality. Dry matters, crude fat and crude protein of milk of goats offered feed supplemented by 30% concentrate was significantly higher than that of control ($P < 0.05$). The crude protein in this study also relatively higher than previous studies 3.75% [9], 3.52% [10], 2.93% [6], 4.94%-6.12% [4] and 4.17%-4.56% [7]. The goat milk protein content in this study could be influenced by feed intake. This study indicated that feeding 30% concentrate, resulted in the increased of propionate and butyrate production. Therefore, the milk protein increased.

Fiber content of feed is a factor that affected milk fat content. On this study crude fat content of P2 was significantly higher than P1. Meanwhile, study had the value of 4.29%-4.39% [5] and 6.68% [6] of crude fat content. This indicated that the high value of crude fiber in tofu and soybean skin increased fat content of milk.

4. Conclusion

Etawah Grade does raised in post-mining land produced low milk quantity. The addition of supplemental feed improved the quality of goat milk.

5. References

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