

Nutritional Quality and Milk Production of Complete Feed from Forage for Dairy Goats

Panca D. M. H. Karti*, D.A. Astuti, A.M. Fuah, M. Baihaqi, H. Apriyani

Faculty of Animal Science, Bogor Agricultural University, West Java, Indonesia

*Corresponding author: pancadewi_fapetipb@yahoo.com

Abstract This research was aimed to evaluate the nutritional quality of complete feed of *Indigofera zollingeriana* and *Sorghumbicolor* at different proportion of Torbangun leaves (*Coleus amboinicus* Lour). Experimental design of this research was randomized block design with three levels and three replicates. The first treatment (C0) contained complete feed with *Indigofera zollingeriana* and *Sorghum bicolor* ration 40:60, the second and third treatment were complete feed (P0) plus 2.5% (C1) and 5% (C2) of Torbangun leaves supplementation. Parameters measured of this research were proximate analysis such as dry matter, ash, organic matter, crude fiber, crude protein, fat, carbohydrate, BeTN and fiber fraction such as ADF, NDF, cellulose, hemicellulose and lignin, and consumption of dry matter and crude protein, ratio milk production with dry matter consumption and ratio milk production with protein consumption. The result showed that nutritional quality of complete feed from forage for dairy goats already appropriate from requirements of goats according to NRC (2005). Protein and dry matter consumption from C2 significantly ($P < 0.01$) lower than other treatments, but the production of milk is higher.

Keywords *Indigofera zollingeriana*, *Sorghum bicolor*, *Coleus amboinicus*, milk goat, nutritional quality

1. Introduction

A complete feed based on forage have the appropriate nutritional needs of livestock. The combination of *Indigofera zollingeriana*, *Sorghum bicolor* and supplementation Torbangun leaves (*Coleus amboinicus* Lour) is one of the utilization of forage that can be used as a dairy feed. *Indigofera* plants is one of forage legume type and has the characteristics of the leaves are arranged spiral, imparipinnate (many leaves on a stalk) and flowering shaped circuit [1]. [2] stated that the plant *indigofera* has the potential availability of a good feed as well as a type of ground cover crops because it can improve soil conditions due to over- grazing pasture and erosion experience. Productivity of this crop reached 2.6 tons of dry matter/ha [3]. Torbangun contains laktogague compounds that are useful in stimulating milk production in lactating mother [4] which can be supplemented into the diet with certain proportions. Lactating goat require greater nutrition than for basic living. Nutritional requirements for lactating goat is 66.42% TDN, 14.57% crude protein, 0.43% Ca and 0.36% P NRC (2005).

2. Materials and Methods

Materials used in this study is *Indigofera zollingeriana* and Torbangun (*Coleus amboinicus* Lour) obtained from Agrostology laboratory Faculty of Animal Science, and *Sorghum bicolor* were obtained from Cikabayan Garden, Bogor Agricultural University. Experimental design can be seen in Table 1. Parameters measured of this research were nutrient compositions such as

dry matter, ash, organic matter, crude fiber, crude protein, fat, carbohydrate, BeTN and fiber fraction such as ADF, NDF, cellulose, hemicellulose and lignin and consumption of dry matter and crude protein, ratio milk production to dry matter consumption and ratio milk production to protein consumption. The data were analyzed with analysis of variance (ANOVA) and the differences between treatments were analyzed with Duncan range test.

3. Results and Discussion

In Table 1, nutritional quality of complete feed from forage for dairy goats already appropriate as a goat ration according to NRC (2005). The content of NDF in C0, C1 and C2 feeds 44.22%, 45.24% and 47.10% respectively. NDF forage with low value about 20-35% generally has a high digestibility [5]. NDF levels on all treatments higher than [5] and will affect the digestibility

Table 1. Forage composition, nutritional quality, DM and CP consumption and ratio milk production with dry matter and protein consumption

Treatment	C0	C1	C2
Forage composition (%)			
<i>Coleus ambonicus</i>	0	2.50	5
<i>Indigofera zollingiana</i>	40	40	40
<i>Shorgum midrib</i>	59.50	57	54.50
Dicalciumphosfat	0.50	0.50	0.50
Total	100	100	100
Nutritional quality (% DM)			
Dry Matter (DM)	89.24	88.77	84.62
Ash	7.11	7.41	6.73
Crude Protein	19.79	19.56	20.62
Crude Fiber	25.32	25.20	26.93
NDF	44.22	45.24	47.10
ADF	32.14	33.59	33.23
Hemicellulose	12.70	11.64	13.86
Cellulose	7.23	8.73	7.55
Lignin	24.40	23.59	26.03
Crude Fat	1.33	1.11	1.60
Beta-N	45.68	45.84	42.88
TDN	63.36	62.67	63.49
Ca*	1.29	1.37	1.89
P*	0.26	0.42	0.50
DM and CP consumption ratio milk production with dry matter and protein consumption			
Consumption (DM)	2576.64 ^B	3363.38 ^A	1556.15 ^C
Crude Protein (CP)	321.85 ^A	262.20 ^B	135.09 ^C
Milk/DM	0.22 ^A	0.12 ^B	0.23 ^A
Milk/CP	1.76 ^B	1.58 ^B	2.7 ^A

Description: Superscript differently on the same row showed significant differences (P<0.01).

of dry matter and organic matter and VFA production. Levels of lignin, hemicellulose and cellulose as the three components of the fibers, relatively similar between treatments and greatly affect digestibility of dry matter and organic matter. The higher lignin content in the ration will decrease dry matter digestibility and organic matter.

Feeding response to the performance can be seen non-productivity of goat milk production. In Table 1 the ratio of protein intake to milk production, treatment and the addition *Indigofera zollingeriana*, *Sorghum bicolor* and *Coleus ambonicus* (C2) resulted milk production is higher than the other two treatments (C0 and C1). This proves that indigofera, shorgum and Coleus were able to improve the production of milk from goat. The data in Table 1 shows that protein consumption from C2 significantly lower than other treatments, but the production of milk is higher. The ratio milk to CP consumption was higher in treatment C2 due to the effect of Coleus.

4. Conclusion

Nutritional quality of complete feed from forage Coleus, Shorgum and Indigofera for dairy goats were already appropriate as NRC recommendation. Protein and dry matter consumption from C2 significantly lower than other treatments, but the production of milk was higher.

5. References

- [1] C. Orwa, A. Mutua, R. Kindt, R. Jamnadass, A. Simons Agroforestry Database: a tree reference and selection guide version 4.0. 2009. (<http://www.worldagroforestry.org/af/treedb/>)
- [2] A. Hassen, N.F.G. Rethman, Z. Apostolides. Morphological and agronomic characterization of *Indigofera* species using multivariate analysis. *J Tropical Grasslands* 40 (2006): 45-59.
- [3] A. Hassen, N.F.G. Rethman, W.A.Z. Apostolides and W.A. Van Niekerk. Forage production and potential nutritive value of 24 shrubby *Indigofera* accessions under field condition in South Africa. *Trop. Grasslands* 42 (2008): 96-103.
- [4] M.W. Lawrence, W. Naiyana, M.Z.M. Damanik. Modified Nutraceutical Composition. International Application Publishing. Melbourne (AU). 2005.
- [5] T.J. Tjelele. Dry matter production, intake and nutritive value of certain *Indigofera* species. Dissertation. University of Pretoria. 2006.