

Katuk and Torbangun Leaves as Galactogogue Forages for Improving Milk Yield of Dairy Goats in Indonesia

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Abstract A strategy to improve milk production of dairy goats is through utilization of forages containing certain bioactive compounds other than nutrients that may induce lactation (galactogogues). The present paper is aimed to highlight the use of galactogogue forages, i.e. katuk (*Sauropus androgynus*) and torbangun (*Coleus amboinicus*) leaves as supplements for enhancing milk yield of dairy goats in Indonesia. Katuk has a high total digestible nutrient (70.4% DM) and crude protein content (22.8% DM). Supplementation of katuk leaves at a level of 0.06% from body weight of Ettawa crossbred goats tended to improve the milk production from 1.13 to 1.36 l/d as compared to the control group. However, no significant differences were found with regard to milk quality. Torbangun leaves have lower TDN and crude protein contents than those of katuk, i.e. 63.8 and 18.6% DM, respectively. Supplementation of torbangun leaves (at 3, 6 and 9 g/kg body weight) into a basal ration fed to Ettawa crossbred dairy goats led to a significantly higher daily milk production by following a quadratic pattern. It can be concluded that the use of galactogogue forages, i.e. katuk and torbangun leaves is promising in order to boost milk production of dairy goats.

Keywords Galactogogue, Katuk, Torbangun, Goat

1. Introduction

Preference of consumers to drink goat's milk has been limited by, apart from other possible reasons, the high price of such product, which could be several times higher than that of cow's milk. In order to reduce the price, it is therefore extremely important to improve goat's milk yield at simultaneously lowering the cost associated with feed. One of the strategies is through utilization of forages containing certain bioactive compounds other than nutrients that may induce lactation (galactogogues) [1]. The present paper is aimed to highlight the use of galactogogue forages, i.e. katuk (*Sauropus androgynus*) and torbangun (*Coleus amboinicus*) leaves as supplements for enhancing milk yield of dairy goats in Indonesia.

2. Galactogogues

Galactogogues are substances that aid in the initiation and maintenance of lactation in humans or animals [2]. The primary mechanism of galactogogues is through antagonism of dopamine receptor and a subsequent release of prolactin, a hormone that induce the milk production. It has to be noted that prior to use galactogogues, other factors that may result in insufficient milk supply such as nutrients should be corrected first. Among the most well-known galactogogues are metoclopramide, domperidone, sulphiride, chlorpromazine, growth hormone, thyrotropin-releasing hormone, medroxyprogesterone and oxytocin [1-2]. A number of plant species have also been considered as galactogogues such as fenugreek (*Trigonella foenum-graecum*), shatavari (*Asparagus racemosus*), goat's rue (*Galega officinalis*) and milk thistle (*Silybum marianum*). Galactogogue plants are certainly more natural as compared to the synthetic ones and, as a consequence of that, potentially create less adverse side effects. Exploration and research concerning various galactogogue plants are therefore important, especially those possessing good nutritional values as well. Knowledge about these plants often comes from traditional or indigenous knowledge of people living within a particular area.

3. Katuk and torbangun leaves as galactogogue forages

Katuk (*S. androgynus*) and torbangun (*C. amboinicus*) leaves have been traditionally known to increase breast milk production of mothers, especially in rural areas of Indonesia. However, to date, studies attempting to evaluate the supplementation of the respective leaves on milk production of dairy goats are scarce (confirmed by verification in the Scopus database). With regard to nutrient composition, katuk has higher both total digestible nutrient (70.4 vs 60.3% DM) and crude protein content (22.8 vs 18.7% DM) than that of calliandra (*Calliandra calothyrsus*) [3], a common tree legume species used as a protein supplement for ruminants in the tropics [4]. Marwah et al. [3] attempted to supplement katuk leaves at a level of 0.06% from body weight of Ettawa crossbred goats (ranged from 36 to 55 kg). The control diet was consisted of 90% calliandra and 10% wheat bran. Results showed that supplementation of katuk leaves had similar dry matter intake as compared to the control diet. Dry matter- and organic matter digestibility of both diets were also similar. Supplementation of katuk leaves led to higher total volatile fatty acids (VFA) and ammonia (NH₃) concentration in the rumen by ca 36 and 37% than those of control diet, respectively (Fig. 1). Milk production of goats supplemented by katuk leaves tended to improve from 1.13 to 1.36 l/d as compared to the control group. No significant differences were found with regard to milk quality (milk density, milk fat, milk protein, total solid, solid not fat) between the groups.

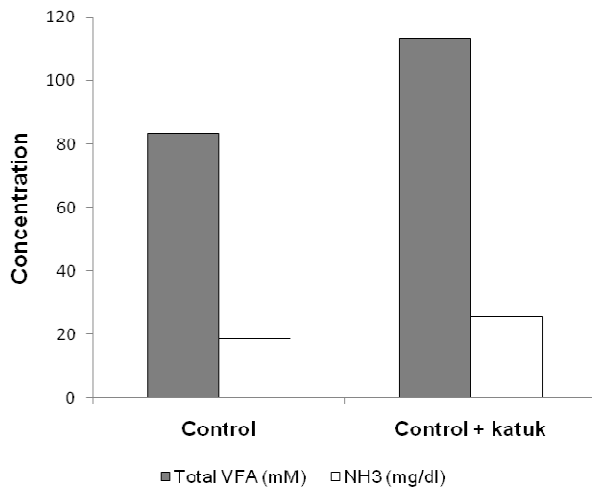


Figure 1. Ruminal total volatile fatty acid (VFA) and ammonia (NH₃) concentrations of Ettawa crossbred goats fed without or with supplementation of katuk leaves at 0.06% from body weight.

Source: Adapted from Marwah et al. [3]

Torbangun leaves have lower TDN and crude protein contents than those of katuk, i.e. 63.8 and 18.6% DM, respectively. The leaves had been supplemented into a basal ration consisted of king grass and concentrate (75:25) fed to Ettawa crossbred dairy goats. Contents of TDN and crude protein in the basal ration were 61.9 and 11.4% DM, respectively. The levels of supplementation were 3, 6 and 9 g per kg body weight [5]. Higher level of torbangun supplementation led to a significantly higher daily milk production by following a quadratic pattern, either without or with additional supplementation of Zn and vitamin E (Fig. 2). Such higher level of production was concomitantly accompanied with the increase of dry matter intake. Higher digestibility (both dry matter and organic matter) and total VFA production were also observed in the study at higher level of torbangun leaves inclusion.

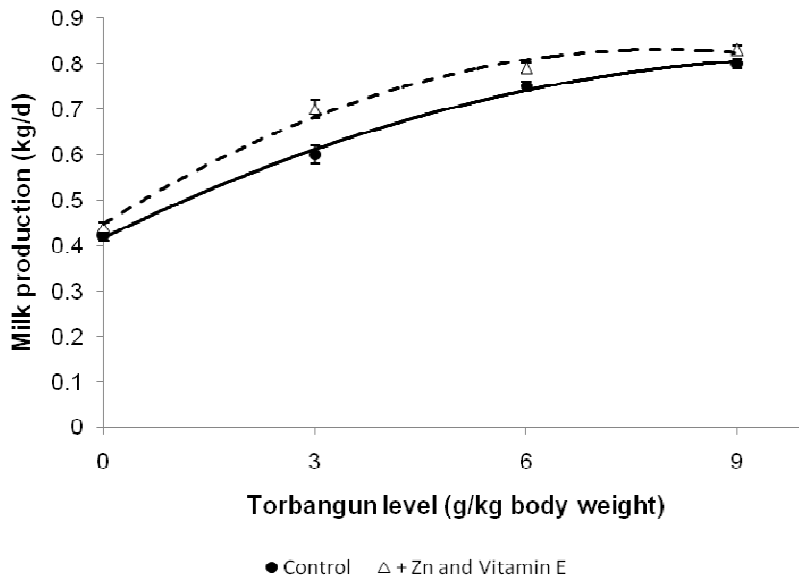


Figure 2. Influence of adding graded levels of torbangun leaves, either without or with additional supplementation of Zn and vitamin E, on daily milk production of Ettawa crossbred goats.

Source: Adapted from Rumetor et al. [5]

4. Conclusions

The use of galactagogue forages, i.e. katuk and torbangun leaves appears to be promising in order to boost milk production of dairy goats. Despite the evidence, still there is uncertainty whether the improvement of milk production is due to bioactive compounds in the plants or other factors; both katuk and torbangun leaves have high energy and crude protein contents in which these components may also contribute to the better productivity of dairy goats. Further studies are therefore required to elicit the exact mechanisms.

References

- [1] A. A. Zuppa, P. Sindico, C. Orchi, C. Carducci, V. Cardiello, C. Romagnoli, P. Catenazzi, Safety and efficacy of galactagogues: substances that induce, maintain and increase breast milk production. *J Pharm Pharmaceut Sci*, 13 (2010) 162-174.
- [2] M. P. Gabay, Galactagogues: medications that induce lactation. *J Hum Lact*, 18 (2002) 274-279.
- [3] M. P. Marwah, Y. Y. Suranindyah, T. W. Murti, Produksi and komposisi susu kambing Peranakan Ettawa yang diberi suplemen daun katuk (*Sauropus androgynus (L.) Merr*) pada awal masa laktasi. *Bul Pet*, 34 (2010) 94-102.
- [4] N. M. S. Sukmawati, I. G. Permana, A. Thalib, S. Kompiani, Pengaruh *complete rumen modifier* (CRM) dan *Calliandra calothyrsus* terhadap produktifitas dan gas metan enterik pada kambing perah PE. *J Ilmu Ter Vet*, 16 (2011) 173-183.
- [5] S. D. Rumetor, J. Jachja, R. Widjajakusuma, I. G. Permana, I. K. Utama, Suplementasi daun bangun-bangun (*Coleus amboinicus* Lour) dan zinc-vitamin E untuk memperbaiki metabolisme dan produksi susu kambing Peranakan Etawah. *J Ilmu Ter Vet*, 13 (2008) 189-196.