

Effect of a Phytostimulant Blend as Feed Additive on the Performance of the Lactating Saanen Goat

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Abstract: The aim of the present trial was to assess an herbal blend as additive on the performance and *in vivo* digestibility of producing Saanen goats. In the trial nine goats in the middle of production, individually caged were used to evaluate the effect of the addition of an herbal mixture (Fortimax[®]; 0, 0.5 and 1.0 kg ton⁻¹) to the concentrate. The herbal mix increased the daily feed intake as well as the milk yield (plus 36.74 and 24% with 0.5 and 1 kg ton⁻¹; p<0.05) with no effect on milk nutrient concentration (p>0.05) but slightly affected their daily yield. On the other hand, the nutrients total tract digestibility was no affected (p>0.05). Therefore, it can be concluded that with the addition of an herbal blend to the concentrate there is an improvement on the productivity of the dairy goat without affecting digestibility.

Key words: Saanen goats, milk, nutrients, productivity, digestibility

INTRODUCTION

Goats are among the smallest domesticated ruminants and have served mankind longer than cattle or sheep. Also, dairy goat production is an alternative enterprise suitable for many small-scale (Haenlein, 2004; Lebbie, 2004). The milk production is the main purpose of a dairy goat farm and its quality is an important criterion for determining animal health and transformation purpose of the liquid. In recent years, the demand for goat products has increased in both developing and developed countries.

But milking procedure and sanitary program are factor that affect milk yield and quality (Sudarwanto *et al.*, 2006; Lebbie, 2004). Normally, daily milk yield per goat is 6.5-8.5 L, this is almost half of the ideal production of dairy goat with condition of arid and semi-arid areas in Mexico (14-16 L day⁻¹).

On the other hand, different herbs have been used as feed additive to stimulate animal production and the results suggest that the main benefit of using herbs is its affordability, accessibility and safety of product for human health (Bunglavan *et al.*, 2010; Hogberg *et al.*, 2005; Mizraei *et al.*, 2011; Garcia *et al.*, 2011; Sallam *et al.*, 2009). Hence, there is an opportunity of herbs as enhancer

of milk production. The aim of the present trial was to assess the effect of an herbal blend in the production and digestibility of the Saanen goat.

MATERIALS AND METHODS

The present experiment was performed under commercial conditions using nine adult Saanen goats in 10±2 weeks on milk. Animals were lodged in individual stalls (1.5×1.0 m) with concrete floor which was cleaned twice a day having regular feeding and watering facilities so, clean and fresh water was always available for consumption. Goats were blocked by milk production and were randomly divided into three uniform groups of three animals in each, assigned one to each treatment assessed. During the trial all the goats received a feed consisting of 30% concentrate (Table 1; crude protein 15.3%, neutral detergent fiber 14%, acid detergent fiber 8%, calcium 0.08% and net energy 0.82 kcal kg⁻¹) and 70% of ground corn stalk to meet their nutritional requirements and this was offered once at 12:00 am daily.

The goats in group one were not given any herbal preparation and acted as control and the herbal blend (Fortimax[®] as by Olmedo-Sanchez *et al.*, 2009) was added to the concentrate (0.5 and 1.0 kg ton⁻¹). A 3×3 Latin

Table 1: Concentrate composition

Ingredients	Values (kg/100 kg)
Sorghum grain	68
Canola	14
Soybean meal	11
Molasses	4
Microminerals*	3

*Microminerals breeding sheep® VIPRESA

square designed trial (20 days each period) was used where the last 5 days of each period the feed consumption and daily milk yield of each animal was recorded. Also total fecal collection was performed. For the latter milking machine was used. Samples of the milk produced were obtained daily for nutrient composition which was done using the Sacco Milk Analyzer®. At the start and at the end of each period, goats were weighted to evaluate body change and the initial weight was used as covariate for weight change.

Digestibility trial was applied during the last week of the study. Offered feed, orts and feces samples were collected and weighed every day and pooled at the end of the week, then 100 g sample was dried at 55°C for 48 h and ground (Willey mill) to pass a 1 mm sieve for chemical analysis. Feed stuffs and fecal samples were analyzed for ash (550°C in a furnace) crude protein (Kjeldahl Method) and neutral detergent fiber (NDF; van Soest Method). Content of NDF was assayed with the use of heat stable alpha amylase and without sodium sulfite. Data were statistically analyzed by ANOVA using the General Linear Models Procedure of the SAS (2006) program ($\alpha = 0.05$). Duncan's multiple range test was used to determine significant differences between means.

RESULTS AND DISCUSSION

The dry matter intake averaged 1.79 kg day⁻¹ and adding the herb mixture to the feed increased the parameter in 460 and 250 g day⁻¹ with 0.5 and 1 kg ton⁻¹, respectively ($p < 0.05$; Table 2). Similar tendency was observed on the consumption of organic matter, neutral detergent fiber and protein. Garcia *et al.* (2011) adding an herbal blend to the feed for lambs reported no change on intake. Also, Ringdorfer (2011) with an herb mixture reported a variable effect in the intake of Merino lambs. Whilst, Kamra *et al.* (2008), Kraszewski *et al.* (2004) and Nurdin *et al.* (2011) observed little or no effect of the herbal blend addition to the feed on the dairy cow consumption. On the other hand, body weight of the goat was not affected by the evaluated treatments ($p > 0.05$) similar tendency was observed in studies with lambs (Ringdorfer, 2011) and dairy cows (Pankaj *et al.*, 2011).

The productive performance data and milk analysis are shown in Table 3. Milk yield averaged 1.34 L day⁻¹

Table 2: Effect of an herbal blend on intake and digestibility of dairy goat

Composition	Herbal blend (kg ton ⁻¹)			p-values
	0	0.5	1	
Intake (g day⁻¹)				
Dry matter	1.55	2.01	1.80	0.244
Organic matter	1.45	1.87	1.68	0.254
Neutral detergent fiber	0.38	0.49	0.44	0.243
Protein	0.25	0.32	0.29	0.239
Digestibility (%)				
Dry matter	70.68	63.81	69.67	0.286
Organic matter	71.60	64.85	70.55	0.267
Neutral detergent fiber	81.05	77.14	79.56	0.393
Protein	70.92	65.36	69.90	0.382

Table 3: Effect of herbal mixture addition to the concentrate on goat milk quality

Nutrients	Nivel de adición (kg ton ⁻¹)			p<0.05
	0	0.5	1.0	
Solids				
Percent	12.00	10.15	10.18	NS
(g day ⁻¹)	128.28	162.61	125.95	NS
Protein				
Percent	3.49	3.32	3.28	NS
(g day ⁻¹)	37.51	53.58	40.55	NS
Fat				
Percent	3.35 ^a	1.66 ^b	1.81 ^b	*
(g day ⁻¹)	4.30 ^a	2.70 ^b	2.28 ^b	*
Lactose				
Percent	4.07	4.08	4.03	NS
(g day ⁻¹)	43.37 ^a	65.23 ^b	49.87 ^{ab}	*

^{a,b}Different letter per line indicates statistical difference ($p < 0.05$)

and was augmented 36.74 and 24% when 0.5 and 1 kg ton⁻¹ the polyherbal mixture was added to the feed ($p < 0.05$), respectively compared to control treatment without the additive. The augmentation of milk production is in line with the observation of various researchers (Bhatt *et al.*, 2009; Patra and Saxena, 2009). Furthermore, Mirzaei *et al.* (2011) added a multi-herbal mixture to the feed of Alpine goats and increased production. Such effect could be related to the goat rumen fermentation as suggested by some researchers who used herbal mixture (Bhatt *et al.*, 2009; Kamel, 2006; Preciado *et al.*, 2011). For instance, Bhatt *et al.* (2009) using herbal extracts in the feed, linked the increased of milk yield of the cow to the rumen fermentation and synthesis of essential volatile fatty acids. However, Kraszewski *et al.* (2004) and Pankaj *et al.* (2011) adding herbal mixture to the ration of dairy cows did not affect milk production.

In the present experiment adding the polyherbal blend to the goat diet had no effect on the percentage of milk protein and lactose ($p > 0.05$; Table 3), however those of fat and solids were reduced ($p < 0.05$). Kraszewski *et al.* (2004) induced milk quality variation when feed was added with an herbal mixture.

Some researcher with goats (Abo El-Nor *et al.*, 2007; Allam *et al.*, 1999; Mirzaei *et al.*, 2011; Pankaj *et al.*, 2011) reported no effect of herbal supplementation on milk nutrient percent. But Nurdin *et al.* (2011) using dairy cows

in mid-lactation reported a reduction on milk protein and fat. However, Kraszewski *et al.* (2004) using polyherbal mixture in the concentrate, augmented the solid, lactose, protein and fat content in milk and suggested that the active components of herbs stimulated the mammary gland producing cells.

However, with the addition of the herbal blend to the feed, the daily production of butyric fat (gram per day) in the milk was reduced ($p > 0.05$). Nurdin *et al.* (2011) and Kraszewski *et al.* (2007) using an herbal mixture increased the daily fat yield without an effect on the fat in milk. Despite the fat content of milk, the 4% fat corrected milk was increased (1.067, 1.592, 1.237 L day⁻¹ for 0, 0.5 and 1.0 kg ton⁻¹, respectively; $p < 0.05$). Also, Mirzaei *et al.* (2011) using and herb blend in the Alpine and Betal goat feed reported an augmentation on the 4% fat corrected milk. In the present experiment the feed conversion rate (consumed dry matter/milk yield) was 1.76, 1.38 and 1.36 with control treatment, 0.5 and 1 kg of the polyherbal blend per ton of feed, respectively ($p > 0.05$).

CONCLUSION

It could be concluded that supplementing the lactating Sannen goat's concentrate with a polyherbal blend has little effect on productivity and digestion.

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REFERENCES

- Abo El-Nor, S.A.H., H.M. Khattab, H.A. Al-Alamy, F.A. Salem and M.M. Abdou, 2007. Effect of medicinal plant seeds in the rations on the productive performance of lactating buffaloes. *Int. J. Dairy Sci.*, 2: 348-355.
- Allam, S.M., Hoda, M. El Hosseiny, A.M. Abdel Gawad, S.A. Elsaadany and A.M.M. Zeid, 1999. Medicinal herb's and plants as feed additives for ruminant. 1. Effect of using some medicinal herbs and plants as feed additives on zaraibi goat performance. *Egypt. J. Nutr. Feeds*, 1: 349-365.
- Bhatt, N., M. Singh and A. Ali, 2009. Effect of feeding herbal preparations on milk yield and rumen parameters in lactating crossbred cows. *Int. J. Agric. Biol.*, 118: 721-726.
- Bunglavan, S.J., C. Valli, M. Ramachandran and V. Balakrishnan, 2010. Effect of supplementation of herbal extracts on methanogenesis in ruminants. *Livest. Res. Rural Devel.*, Vol. 22.
- Garcia, I.J.R., J.R.O. Hernandez, J.N.H. Ibarra, E.P.O. Munoz, G.C. Garcia and J.A.O. Sanchez, 2011. Effect of a herbal growth enhancer feed additive on lamb performance. *J. Anim. Vet. Adv.*, 10: 332-333.
- Haenlein, G.F.W., 2004. Goat milk in human nutrition. *Small Ruminant Res.*, 51: 155-163.
- Hogberg, M.G., S.L. Fales, F.L. Kirschenmann, M. Honeyman, J. Miranowski and P. Lasley, 2005. Interrelationships of animal agriculture, the environment and rural communities. *J. Anim. Sci.*, 83: 13-17.
- Kamel, C., 2006. Natural plant extracts: Classical remedies bring modern animal production solutions. <http://ressources.ciheam.org/om/pdf/c54/01600008.pdf>.
- Kamra, D.N., A.K. Patra, P.N. Chatterjee, K. Ravindra, A. Neeta and L.C. Chaudhary, 2008. Effect of plant extract on methanogenesis and microbial profile of the rumen of buffalo: A brief overview. *Aust. J. Exp. Agric.*, 48: 175-178.
- Kraszewski, J., J.A. Strzetelski and B. Niwinska, 2004. Effects of dietary herb supplements for cows on milk yield and technological quality of milk. Proceedings of the 55th European Federation of Animal Production Annual meeting, September 5-9, 2004, Bled, Slovenia.
- Kraszewski, J., J.A. Strzetelski and B. Niwinska, 2007. Effects of dietary herb supplements for cows on milk yield and technological quality of milk. *Ann. Anim. Sci.*, 7: 113-122.
- Lebbie, S.H.B., 2004. Goats under household conditions. *Small Rumin. Res.*, 51: 131-136.
- Mirzaei, F., S. Prasad and T.R. Preston, 2011. Influence of a dietary phytoadditive on the performance of does and respective litters in cross bred dairy goats. *J. Anim. Plant Sci.*, 10: 1259-1267.
- Nurdin, E., T. Amelia and M. Makin, 2011. The effect of herbs on milk yield and milk quality of mastitis dairy cows. *J. Indonesian Trop. Anim. Agric.*, 36: 104-108.
- Olmedo-Sanchez, J.A., A. Curiel Flores and J.R. Orozco Hernandez, 2009. The effect of a herbal growth promoter feed additive on shrimp performance. *Res. J. Biol. Sci.*, 4: 1022-1024.
- Pankaj, J., M. Madhu, K.K. Singhal and A.K. Tyagi, 2011. Effect of herbal mixture supplementation on methane emission and milk production in cattle. *Indian J. Anim. Nutr.*, 28: 377-384.
- Patra, A.K. and J. Saxena, 2009. Dietary phytochemicals as rumen modifiers: A review of the effects on microbial populations. *Antonie Van Leeuwenhoek*, 96: 363-375.

- Preciado, A.T., J.R.O. Hernandez, A.C. Carranza, V.C. de la Mora and G.R. Chavez, 2011. Use of an herbal galactagogue on milk quality and yield. *Asian J. Anim. Vet. Adv.*, 6: 297-300.
- Ringdorfer, F., 2011. Effect of phytogenic feed additives on performance parameters of fattening lambs. Proceedings of the 62nd European Federation of Animal Production Annual Meeting, August 29-September 3, 2011, Stavanger, Norway.
- SAS, 2006. SAS User's Guide: Statistics. Version 8, SAS Institute Inc., Cary, North Carolina.
- Sallam, S.M.A., I.C.S. Bueno, P. Brigide, P.B. Godoy, D.M.S.S. Vittiand and A.L. Abdalla, 2009. Investigation of potential new opportunities for plant extracts on rumen microbial fermentation *in vitro*. *Options Mediterraneennes. Serie A, Seminaires Mediterraneens*, 85: 255-260.
- Sudarwanto, M., H. Latif and M. Noordin, 2006. The relationship of the somatic cell counting to sub-clinical mastitis and to improve milk quality. Proceedings of the 1st International AAVS Scientific Conference, July 12-13, 2006, Jakarta.