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Use of an Herbal Galactogogue on Milk Quality and Yield

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ABSTRACT

The objective of the present trial was to assess a galactogogue plant extract on low producing cows. Twelve 450 kg of body weight multiparous Holstein cows in middle lactation with 16 L day^{-1} of milk yield were used for that purpose, half received 200 mg day^{-1} of the extract and the rest were used as control. Data showed an increase in milk production with the plant extract ($p<0.05$) however nutrient daily production was slightly reduced ($p<0.05$).

Key words: Herbal secretogogue supplementation, lactating cow, performance

INTRODUCTION

Animal production depends on the feed supplied, but some ingredients alter normal metabolism in the dairy cow (Calsamiglia *et al*., 2007). Some products increase production and generate residuals that are of health concern (Kamel, 2006; Sharma, 2007). The organic production aims to produce a harmless and drug free product, as with the use of plant extracts (Tassoul and Shaver, 2009). Plants produce metabolites that seem to have anti-bacteria activity (Kamel, 2006; Neelesh, 2007). Among these are essential oils which are composed of more than 100 individual products (ICBS, 2004; Tessoul and Shaver, 2009), but their main component (95%) is essential fatty acids, with traces of eugenol, thymol and carvacrol which have antibacterial properties. Furthermore, plant extracts can affect ruminal fermentation (Benchaar *et al*., 2007, 2008; Castillejos *et al*., 2005, 2006; Soltan *et al*., 2009; Newbold *et al*., 2004; Spanghero *et al*., 2008, 2009) and may served as milk secretogogues as shown by some (Benchaar *et al*., 2006; Kung *et al*., 2008; Olivo *et al*., 2005).

Nevertheless, the use of herbal extracts (mainly sterols and essential oils) to improve animal production has received little acceptance, but have been successfully used in pigs, poultry, small ruminant and some dairy (Olivo *et al*., 2005). But no published evidence was found on the use of sterols + essential oils (galactogogue) in the feed of low production cows. Therefore the objective of the present trial was to assess the effect of a galactogogue plant extract on yield and milk quality of low producing cows.

MATERIALS AND METHODS

The experiment was carried out during the month of August 2007 and January 2008. The present trial was undertaken to assess the utilization of an herbal galactogogue (Table 1) on milk

Table 1: Herbal galactogogue mixture composition

Compounds	Percent of dry matter
Sterols	
Campesterol	0.01-0.1
Stigmasterol	0.01-0.1
ß-sitosterol	0.1-0.4
Total	≥0.15
Fatty acids	
Caprilic	0.5-3.0
Capric	0.5-3.0
Lauric	18.0-32.0
Miristic	10.0-15.0
Palmitic	7.0-11.0
Estearic	1.0-2.0
Oleic	26.0-35.0
cis-linoleic	3.0-5.0
Linolenic	0.5-1.5
Arachidonic	0.01-0.04
Total	≥85-95
Humidity	≤1.0
Peroxides	≤2.0
Ethanol	≤1.0

yield and quality of low production cows. Multiparous (n = 12, average 4.5 years of age and 450 kg of weight) producing a mean of 15.5 L day^{-1} were selected. Cows were mechanically milked at 500 and 1500 h daily. The feed consisted in a commercial compound with 17% crude protein and 2,800 Kcal of EM kg^{-1} and was offered at a rate of 1 kg per 5 L of liquid milk. The fiber was obtained from corn stalk with no grain, supplied for *ad libitum* intake. Clean and fresh water was always available for consumption from an automatic waterer. Two hundred milligrams of the herbal galactogogue mixture (Table 1) was administered via the feed.

Milk yield was recorded for five months and was proportionately sampled to test for quality (density, total solids, pH, fat and protein) using ultrasound (Milk analyzer; SACCO®). The milk samples were assessed in duplicate. Data were statistically analyzed using the SAS package.

RESULTS

Milk yield with the herbal galactogogue was increased 8.5% ($p<0.05$; 16.94 vs. 15.62 L, respectively), these values are quite similar to those observed in Los Altos de Jalisco México for Holstein cows. On the other hand, total solids in milk presented a 5% reduction ($p<0.05$; 10.99 vs. 11.55%, respectively). Total casein averaged 2.5% and was similar among treatments ($p>0.05$; 2.53 vs. 2.56%, herbal extract and control, respectively), hence the daily production was not changed ($p>0.05$; 47.5 vs. 46.99 g day^{-1}, respectively). The annual casein production (305 days) was 14.45 kg in average. Milk protein percent was 3.18 and 3.30 for the herbal galactogogue and control ($p>0.05$) with similar statistical value. Furthermore, the daily yield was similar ($p>0.05$; 59.9 vs. 59.81 g day^{-1}, respectively. Same tendency was observed in the present trial on protein percent.

Milk density was slightly higher with the galactogogue ($p<0.05$; 1.0321 vs. 1.0309 g cm^{-3}). A 12% reduction on the milk pH was observed with the product tested ($p<0.05$; 6.31 and 7.17). Total fat in milk averaged 2.37% and reduced 21% with the use of the herbal galactogogue ($p<0.05$; 2.24

vs. 2.83%, respectively). The fat yield was dimished in 15% ($p>0.05$; 44.43 vs. 52.01 g day^{-1}, respectively). The free fatty acid content in the milk was increased in 52% with the herbal extract ($p<0.05$; 0.34 vs. 0.16%, respectively). Lactose was increased with the herbal extract ($p<0.05$; 4.63 vs. 4.87%, respectively). Also, the somatic cell count was reduced. Base on the results of the present study, it is concluded that there is a small positive effect of a mixture of sterols and essential oils on the production and quality of low producing cows.

DISCUSSION

With the use of the herbal galactogogue the milk production was augmented 1.32 kg day^{-1}. Olivo *et al.* (2005) in agro-forestry production systems reported an increase of 9 to 11.5 kg of milk with the utilization of plant extract herbals. This may be related to the essential oils present in the herbal mixture used. Soltan *et al.* (2009) using four levels of essential oils in the drinking water, did not affected milk yield.

Furthermore, in the present trial the daily yield of milk protein was similar among treatments and averaged 59.85 g. Olivo *et al.* (2005) observed a decrease on the protein content with an herbal galactogogue in the cow feed. In the other hand, Olivo *et al.* (2005) observed a reduction on the milk fat (from 3.29 to 3.18%), but lactose percent was increased with the herbal extract, similar observation was reported by Olivo *et al.* (2005). Kung *et al.* (2008) using high producing cows fed corn silage in the diet and two essential oil mixture produced 2.7 kg more milk. Spanghero *et al.* (2009) adding encapsulated essential oil (0, 320, 640 and 960 mg day^{-1}) to fresh cows observed no effect on milk and milk component yields. Tassoul and Shaver (2009) with the supplementation of 1200 mg of essential oils mixture/cow per day reported no effect on milk yield or composition. The results of the authors are in accordance with the observations of the present study where milk production or composition was substantially unaffected.

Benchaar *et al.* (2006, 2007) using a mixture of essential oil, reported no effect on milk production or composition in cows fed either corn or alfalfa silage. Furthermore, Kung *et al.* (2008) with two mixtures and a corn silage based diet, observed that the percentages of milk fat and protein, as well as the somatic cell count were not affected. Soltan *et al.* (2009) adding the essential oils in the drinking water reported varying effect on milk composition and yield. The previous results showed that the small doses of essential oils obtained from herbals have small insignificant effect on milk yield or composition. These findings are similar to the observation of the present trial, where no change was detected in nutrients or production of milk.

Base on the results of the present study, it is concluded that there is a small positive effect of a mixture of sterols and essential oils on the production and quality of low producing cows.

REFERENCES

Benchaar, C., H.V. Petit, R. Berthiaume, T.D. Whyte and P.Y. Chouinaed, 2006. Effects of dietary addition of essential oils and monensin premix on digestion, ruminal fermentation characteristics, milk production and milk composition in dairy cows. J. Dairy Sci., 89: 4352-4364.

Benchaar, C., H.V. Petit, R. Berthiaume, D.R. Ouellet, J. Chiquette and P.V. Chouinard, 2007. Effects of essential oils on digestion, ruminal fermentation, ruminal microbial populations, milk production and milk composition in dairy cows fed alfalfa silage or corn silage. J. Dairy Sci., 90: 886-897.

Benchaar, C., S. Calsamiglia, A.V. Chaves, G.R. Fraser, D. Colombatto, T.A. McAllister and K.A. Beauchemin, 2008. A review of plant-derived essential oils in ruminant nutrition and production. Anim. Feed. Sci. Technol., 145: 209-228.

Castillejos, L., S. Calsamiglia, A. Ferret and R. Losa, 2005. Effects of a specific blend of essential oil compounds and the type of diet on rumen microbial fermentation and nutrient flow from a continuous culture system. Anim. Feed. Sci. Technol., 119: 29-41.

Castillejos, L., S. Calsamigha and A. Ferret, 2006. Effect of essential oil active compounds on rumen microbial fermentation and nutrient flow in *in vitro* systems. J. Dairy Sci., 89: 2649-2658.

Calsamiglia, S., M. Busquet, P.W. Cardozo, L. Castillejos and A. Ferret, 2007. Invited review: Essential oils as modifiers of rumen microbial fermentation. J. Dairy Sci., 90: 2580-2595.

ICBS, 2004. Herb information. http://www.holistic-online.com/Herbal-med/Herbs/h118.htm.

Kamel, C., 2006. Natural plant extracts: Classical remedies bring modern animal production solutions. http://ressources.ciheam.org/om/pdf/c54/01600008.pdf.

Kung, Jr. L., P. Williams, R.J. Schmidt and W. Hu, 2008. A blend of essential plant oils used as an additive to alter silage fermentation or used as a feed additive for lactating dairy cows. J. Dairy Sci., 91: 4793-4800.

Neelesh, S., 2007. Alternative approach to control intramammary infection in dairy cows: A review. AJAVA., 2: 50-62.

Newbold, C.J., F.M. McInotch, P. Williams, R. Losa and R.J. Wallace, 2004. Effects of a specific blend of essential oil compounds on rumen fermentation. Anim. Feed Sci. Technol., 114: 105-112.

Olivo, C.J., L.I. Beck, A.M. Gabbi, P.S. Charao and M.F. Sobczak *et al.*, 2005. Composition and somatic cell count of milk in conventional and agro-ecological farms: A comparative study in Depressao Central, Rio Grande do Sul state, Brazil. Livest. Res. Rural Dev. Vol. 17.

Soltan, M.A.K., R.S. Shewita and S.I. Al-Sultan, 2009. Influence of essential oils supplementation on digestion, rumen fermentation, rumen microbial populations and productive performance of dairy cows. Asian J. Anim. Sci., 3: 1-12.

Spanghero, M., C. Zanfi, E. Fabbro, N. Scicutella and C. Camellini, 2008. Effects of a blend of essential oils on some end products of *in vitro* rumen fermentation. Anim. Feed. Sci. Technol., 145: 364-374.

Spanghero, M., P.H. Robinson, C. Zanfi and E. Fabbro, 2009. Effect of increasing doses of a microencapsulated blend of essential oils on performance of lactating primiparous dairy cows. Anim. Feed. Sci. Technol., 153: 153-157.

Tassoul, M.D. and R.D. Shaver, 2009. Effect of a mixture of supplemental dietary plant essential oils on performance of periparturient and early lactation dairy cows. J. Dairy Sci., 92: 1734-1740.