

Effect of Feeding Essential Oils and Monensin on Fatty Acid Profiles of Milk Fat

M. L. He¹, W. Z. Yang¹, C. Benchaar², A. V. Chaves¹, and T. A. McAllister¹

¹Agriculture and Agri-Food Canada, Research Centre, Box 3000, Lethbridge, AB,

²Agriculture and Agri-Food Canada, Dairy and Swine R&D Centre, Sherbrooke, QC.

Email: yangw@agr.gc.ca

There is greater interest in using plants and plant extracts as alternatives to feed antibiotics to manipulate ruminal fermentation and improve feed efficiency in ruminants. Essential oils (EO) from plant extracts have been reported to have an antibacterial activity against gram-negative and gram-positive bacteria. Several of the gram-positive bacteria are involved in ruminal biohydrogenation of fatty acids, thus suggesting that feeding EO could lower biohydrogenation of fatty acids because of a decrease in the number of bacteria involved in that process. Therefore, we hypothesized that milk fatty acids may be altered by feeding EO to dairy cows. In addition, it has been reported that cows fed monensin produced milk with greater concentration of trans-10 18:1 and trans-11 18:1. Increased concentration of trans-10 18:1 in milk has been associated with decreased milk fat concentration.

The objectives of this study were to evaluate the effects of two EO (garlic and juniper berry oils) and monensin on fatty acid profiles of milk fat. Four ruminally fistulated Holstein cows (113 days in milk) were used in a 4 x 4 Latin square experiment. Cows were fed for ad libitum intake a TMR without supplementation (control), or supplemented with monensin (330 mg/day), garlic oil (5 g/day), or juniper berry oil (2 g/day).

Cows fed monensin had lower milk fat content (2.68%) than control (3.14%), garlic (3.46%) or juniper berry oil (3.40%) supplemented cows. Milk fat content also tended ($P < 0.10$) to be higher with supplementation of garlic oil than the control. The fatty acids composition in the milk fat was generally not affected by supplementation of EO and monensin, except for conjugated linoleic acid trans 10, cis 12 (CLA t10, c12) which was higher for cows fed monensin (0.12%) or EO (0.11%) than for control cows (0.09%). Supplementation of monensin also increased C18:1 trans 6, 8 fatty acids in the milk fat compared with control.

Implications: Feeding garlic oil to dairy cows showed the potential to increase milk fat content and the proportion of CLA t10, c12 in milk fat. However, feeding monensin reduced milk fat content and increased trans fatty acids.