

Essential Oils and Monensin Affect Ruminal Digestion and Milk Fat Yield of Dairy Cows

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Public concern over the use of feed antibiotics in livestock production has increased due to the possible development of drug resistance in human pathogenic bacteria. Essential oils (EO) are naturally occurring volatile components that can be distilled from plant tissues. It has been demonstrated that the EO have the potential to favorably alter rumen metabolism such as reduction in the rate of deamination of amino acids, and inhibition in production of methane, which is beneficial for improving feed utilization and for reducing environmental impact.

The objectives of this study were to evaluate the effects of two EO (garlic and juniper berry oils) on feed intake, digestion, milk production and composition. Four ruminally and duodenally 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).

Feed intake averaged 20.4 kg/d and was not affected by the EO and monensin. Digestibility of dry matter in the rumen was increased by 13% with supplementation of garlic or juniper berry oils compared with the control. Improvement of ruminal digestion was mainly attributed to the increase in the ruminal digestion of starch (12%) and protein (11%) by EO. However, effects of EO on the digestion in the intestine and the total tract were minimal. Monensin reduced ruminal digestibilities of protein and neutral detergent fibre by 11% and 16%, respectively; whereas, the total digestibilities were not affected due to higher intestinal digestion by monensin. Production of 4% fat-corrected milk increased by 9% for cows fed the EO (27.3 kg/day) due to higher milk fat content (3.43%) compared with the control cows (3.14%). Cows fed monensin had lower milk fat content (2.68%) and thus lower fat-corrected milk (23.3 kg/d).

Implications: Essential oils have the potential to improve feed digestibility in the rumen, and milk production and milk fat content. Supplementation of monensin is not beneficial because of lowered ruminal fibre digestion and milk fat content.