

Effect of lauric acid and coconut oil on ruminal fermentation, digestion, ammonia losses from manure, and milk fatty acid composition in lactating cows

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Abstract: This experiment (replicated 3 × 3 Latin square design) was conducted to investigate the effects of lauric acid (LA) or coconut oil (CO) on ruminal fermentation, nutrient digestibility, ammonia losses from manure, and milk fatty acid (FA) composition in lactating cows. Treatments consisted of intraruminal doses of 240 g of stearic acid/d (SA; control), 240 g of LA/d, or 530 g of CO/d administered once daily, before feeding. Between periods, cows were inoculated with ruminal contents from donor cows and allowed a 7-d recovery period. Treatment did not affect dry matter intake, milk yield, or milk composition. Ruminal pH was slightly increased by CO compared with the other treatments, whereas LA and CO decreased ruminal ammonia concentration compared with SA. Both LA and CO decreased protozoal counts by 80% or more compared with SA. Methane production rate in the rumen was reduced by CO compared with LA and SA, with no differences between LA and SA. Treatments had no effect on total tract apparent dry matter, organic matter, N, and neutral detergent fiber digestibility coefficients or on cumulative (15 d) *in vitro* ammonia losses from manure. Compared with SA, LA and CO increased milk fat 12:0, *cis*-9 12:1, and *trans*-9 12:1 content and decreased 6:0, 8:0, 10:0, *cis*-9 10:1, 16:0, 18:0, *cis* 18:1, total 18:2, 18:3 n-3 and total polyunsaturated FA concentrations. Administration of LA and 14:0 (as CO) in the rumen were apparently transferred into milk fat with a mean efficiency of 18 and 15%, respectively. In conclusion, current data confirmed that LA and CO exhibit strong antiprotozoal activity when dosed intraruminally, an effect that is accompanied by decreases in ammonia concentration and, for CO, lowered methane production. Administration of LA and CO in the rumen also altered milk FA composition.

Key words: lauric acid, myristic acid, coconut oil, protozoa