Effect of supplementing myristic acid in dairy cow rations on ruminal methanogenesis and fatty acid profile in milk.

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Abstract

The objective of this study was to evaluate the effects of supplementing myristic acid in dairy cow rations on ruminal methanogenesis and the fatty acid profile in milk. Twelve multiparous Holstein dairy cows (710 +/- 17.3 kg of live weight; 290 +/- 41.9 d in milk) housed in a tie-stall facility were used in the study. The cows were paired by parity and days in milk and allocated to 1 of 2 treatments: 1) the regular milking cow total mixed ration (control diet), and 2) the regular milking cow total mixed ration supplemented with 5% myristic acid on a dry matter basis (MA diet). The cows were fed and milked twice daily (feeding, 0830 and 1300 h; milking, 0500 and 1500 h). The experiment was conducted as a completely randomized design and consisted of a 7-d pretrial period when cows were fed the control diet to obtain baseline measurements, a 10-d dietary adaptation period, and a 1-d, 8-h measurement period. The MA diet reduced methane (CH4) production by 36% (608.2 vs. 390.6 +/- 56.46 L/d, control vs. MA diet, respectively) and milk fat percentage by 2.4% (4.2 vs. 4.1 +/- 0.006%, control vs. MA diet, respectively). The MA diet increased 14:0 in milk by 139% and cis-9 14:1 by 195%. There was a correlation (r = -0.58) between the 14:0 content in milk and CH4 production and cis-9 14:1 and CH4 production (r = - 0.47). Myristic acid had no effect on the contents of CLA or trans-10 18:1 and trans-11 18:1 isomers in milk. These results suggest that MA could be used to inhibit the activities of methanogens in ruminant animals without altering the conjugated linoleic acid and trans-18:1 fatty acid profile in milk.