Effect of a Novel Biochemical Approach on Methane Production and Animal Performance

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Ruminants lose 2-12% of their ingested gross energy as enteric methane formed in the rumen. Methane mitigation can be achieved by feeding high grain diets, feeding ionophores or other compounds produced by recent biotechnologies that modify the rumen microbial population. The objective of this study was to determine the effect of feeding a biochemical compound, designed to reduce methane production, on animal performance.

Twelve ruminally-cannulated lactating Holstein cows were used in a crossover design study with 28-d periods. Cows were fed a 38%-forage diet and received either the novel biochemical compound (NOP; 10% 3-nitrooxypropanol on SiO_2, DSM Nutritional Products Ltd., Switzerland) or silicone dioxide (SiO_2), as a control, at 25 g/d. The NOP or SiO_2 was hand-mixed into the TMR after feeding so that it was consumed continually. After a 21-d adaptation period, data and samples were collected for 7 d. Feeding NOP reduced methane production (7.5 vs. 18.8 g/kg DMI) and methane-producing microbial population (1.29 vs. 2.43 × 10^8/g). Dry matter intake, milk yield, and milk component yields did not change significantly by feeding the NOP. Cows fed the NOP had increased body weight gain (1.07 and 0.30 kg/d) and tended to increase feed efficiency (1.79 vs. 1.60 kg 4% fat-corrected milk yield / kg DMI) compared to control cows.

Implications: Feeding the NOP reduced methane production by 60% without negative impacts on milk yield or milk component yields. Methane mitigation from ruminants is becoming more important in modern agriculture and may not only reduce greenhouse gas emissions, but also increase energy availability for production and improve feed efficiency.