FARMING PRACTICE
LIVESTOCK FEEDING TECHNIQUES

IMPACT: GHG EMISSIONS

Reference 29

Eugene, M; Masse, D; Chiquette, J; Benchaar, C 2008 Meta-analysis on the effects of lipid supplementation on methane production in lactating dairy cows CANADIAN JOURNAL OF ANIMAL SCIENCE, 88(2), 331-334. 10.4141/CJAS07112

Background and objective

Nutritional strategies have been suggested to mitigate enteric methane (CH_4) production by ruminants. Supplementation of dairy cow diets with lipids is widely used to increase the energy content of the diet and to enhance energy utilization for milk production. Moreover, lipids inhibit CH_4 production, but the effects are variable due to the level of lipid supplementation, the chain length of fatty acids, and the interactions between lipids and the basal diet composition. A meta-analysis was conducted to statistically determine the effects of lipid supplementation on CH_4 production, milk production, and milk composition of lactating dairy cows. Here, results on methane production are reported.

Search strategy and selection criteria

Seven publications (reporting 25 diets) available in the literature on the effects of lipid supplementation on CH_4 production, milk production, and milk composition of dairy cow were used to build the database. 1) In each selected study, there was a control diet [i.e., lower ether extract (EE) content] consisting of a basal diet, and a lipid-supplemented diets (i.e., higher EE content) as dietary treatments; 2) In all studies, control and lipid-supplemented diets were fed for ad libitum intake.

Data and analysis

Data were analyzed using the MIXED procedure of SAS software. The linear model included lipid supplementation as a fixed, categorical effect and the study effect and its interaction effects as random components of the mixed model. The data were weighed by the square root of the number of animals using the weigh statement of SAS software.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
7	Dairy cattle	Lipids supplementation	No lipid supplementation	Metric: 1) Methane (CH_4) (g/d); 2) CH_4 (MJ/d); 3) CH_4 (% of gross energy intake, GEI); 4) CH_4 (% of digestible energy intake, DEI); 5) CH_4 (% of metabolizable energy intake, MEI); 6) CH_4 (g/kg DMI); 7) CH_4 (MJ/kg 4% fat concentrated milk, FCM); 8) CH_4 (MJ/kg milk fat); 9) CH_4 (MJ/kg milk protein); Effect size: not applicable	37.5

Results

- Lipid supplementation decreased CH_4 production by 9%, either expressed as MJ/d or as a percentage of gross energy intake (GEI), digestible energy intake (DEI), or metabolizable energy intake (MEI).
- When expressed as proportion of DMI, CH_4 production was not affected by lipid supplementation.
- CH_4 production, expressed relative to 4% FCM yield was lower for cows fed lipid-supplemented diets than for those fed control diets (0.75 vs. 0.82±0.086 MJ CH_4/kg 4% FCM, respectively). Methane production, expressed on a milk protein yield basis was lower for cows fed lipid-supplemented diets than for those fed control diets (22.9 vs. 24.7±2.68 MJ CH_4/kg milk protein, respectively).
- NULL
- NULL

Factors influencing effect sizes

- No factors influencing effect sizes to report

Conclusion

Results from this study suggest that supplementation of lactating dairy cow diets with lipids could mitigate CH_4 emission by lactating cows.