

Reference 8

Kim, H; Le, HG; Beek, YC; Lee, S; Seo, J 2020 The effects of dietary supplementation with 3-nitrooxypropanol on enteric methane emissions, rumen fermentation, and production performance in ruminants: a meta-analysis *Journal of Animal Science and Technology*, 62(1):31-42. 10.5187/jast.2020.62.1.31

Background and objective

3-Nitrooxypropanol (NOP) is a chemical compound, designed by Duval and Kindermann, which reduces CH₄ emissions produced by the rumen from microbial fermentation. The aim of this study was to investigate the effects of NOP on enteric gas production, rumen fermentation, and animal performances depending on animal type using a meta-analysis approach.

Search strategy and selection criteria

All studies used in the meta-analysis were collected from the Google Scholar database using NOP, CH₄, and ruminants as keywords. Not clearly defined.

Data and analysis

All statistical analyses were carried out using the PROC UNIVARIATE, PROC MIXED and PROC REG procedures of the SAS ver. 9.4. Outliers in the dataset were screened using an absolute studentized residual value (> 2) before conducting the statistical analysis.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
14	Ruminant (Dairy cattle, beef cattle, sheep)	3-nitrooxypropanol	No feed additive	Metric: CH ₄ emissions; Effect size: not applicable	31.25

Results

- 3-NOP supplementation linearly decreased CH₄ production (g/kg DMI) of total ruminant ($p < .0001$, $R^2 = 0.744$)
- The CH₄ emissions in both beef and dairy cattle significantly decreased with increasing NOP supplementation ($p < 0.0001$, $R^2 = 0.797$ and $p = 0.0003$, $R^2 = 0.916$, respectively), however, the slope value in the linear regression for dairy is smaller than that for beef.
- The significant linear decrease in CH₄, with increasing levels of NOP supplementation, was also observed in the long-term in vivo studies ($p < 0.0001$, $R^2 = 0.910$).
- NULL
- NULL

Factors influencing effect sizes

- No factors influencing effect sizes to report

Conclusion

The study showed that supplementation of 3NOP was effective to a significant linear decrease in CH₄ yield (g/kg DMI), regardless of animal type compared with those fed a diet without 3NOP.