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Case Study

Effect of Oregano Oil on Rumen Fermentation and Methane Production in Dairy Cows

Overview

Methane emissions from dairy cows represent an energy loss for the animal and pose a significant environmental problem. As effective long-term mitigation strategies are limited, there has been increased interest in the potential of essential oils to reduce rumen methane production thanks to their antimicrobial activity.

A study, conducted by Stellenbosch University in South Africa, evaluated the effects of oregano essential oil on total gas and methane production in vitro. Rumen fluid was collected from two rumen-cannulated Dexter cows and incubated with a standardised substrate mixture in 200 ml glass digesters. Oregano essential oil was applied at concentrations of 0, 50, 100 and 200 µL per 100 mL of the incubation medium during the 48-hour incubation period. Three runs per cow and two replicates per treatment resulted in six replicates per treatment. The data were analysed using ANOVA (Statistica 14) with Fisher's LSD post hoc test at $P \leq 0.05$.

Impact

In this in vitro study, the oregano essential oil inhibited methane production at all tested concentrations within 16 hours of incubation. The most effective doses were 100 µL (19% reduction) and 200 µL (16% reduction) per 100 mL of

the incubation medium ($P < 0.01$). Total gas production increased with rising levels of oregano essential up to 100 µL/100 mL and remained significantly higher than the control at 200 µL/100 mL, despite a slight decrease ($P < 0.01$). These results suggest that rumen fermentation improves at doses of up to 200 µL OEO/100 mL. Overall, the oregano essential oil solution at concentrations of 50–200 µL/100 mL effectively reduced methane production without impairing fermentation.

Supporting Materials:

- Abstract ADSA 2025 – effects of oregano oil on ruminal in vitro total gas and methane production
- Poster EAAP 2025 - the effect of oregano oil on in vitro methane emissions
- Flyer – DOSTO® Ruminant bi-active

*This sustainability-related case study was provided by **DOSTOFARM**.*

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