Inclusion of CaO2 on sheep diet to inhibit methane under Norwegian conditions

Shelemia Nyamuryekung'e[1], Nolwenn Tulâne[1,2], Grete Jørgensen[1], Vincent O'Flaherty[3], Vibeke Lind[1]

[1]NIBIO, Norway

[2]Institut Agro Rennes-Angers, France

[3]University of Galway, Ireland

Calcium peroxide (CaO_2) has been shown to be an effective methane (CH_4) inhibitor. Testing in Ireland showed a 16-29% reduction in CH_4 emission from dairy-beef bulls fed CaO_2 compared to the control. In Norway, CaO_2 was used in an experiment with 24 Norwegian White sheep from February to April 2025. Ewes were blocked according to live weight and within block randomly assigned to one of two diets: a control diet of grass silage and pellet RoeBygg (RB), and a CaO_2 diet aiming for a 1.5% inclusion of CaO_2 based on dry matter intake, delivered in a mixture with the Roebygg pellets. In a staggered order, blocks were adapted to their respective diets over 20 days, followed by 48 hours of CH_4 measurements (g/day) in open-circuit respiration chambers as Period 1. After the initial measurement, sheep were fed their assigned diets for 27 days, then underwent another 48 hour CH_4 measurement as Period 2. Variables analysed included total dry matter intake (TDMI: kg/day), the ratio of RoeBygg pellets to silage consumption (RB:SIL), and CH_4 yield, measured as g CH_4/kg TDMI. A mixed model analysis evaluated the effects of diet, period, and their interaction on TDMI, RB:SIL, and CH_4 production and yield. Results indicated no significant difference in either the main effect or the interaction on TDMI (2.01 vs. 2.04 kg/day, $P = 0.74$; for control and CaO_2, respectively) nor RB:SIL ratio (0.22 vs. 0.22, $P = 0.65$). However, CH_4 production exhibited significant main effects; the ewes fed the control diet emitted more CH_4 than ewes fed CaO_2 diet (39.52 vs. 32.72 g/day, $P < 0.01$), and the first period had lower CH_4 measurements than the second (34.18 vs. 38.05 g/day, $P < 0.01$). Ewes fed the control diet had higher CH_4 yield than the ewes fed the CaO_2 diet (19.05 vs. 15.53 g/kg, $P = 0.02$). In conclusion, the sheep fed CaO_2 showed a 17% reduction in CH_4 production and 18% in yield compared to the control, confirming its role as a methane inhibitor. The period effect observed in CH_4 production requires further investigation, as factors like dietary quality and rumen microbial adaptation are of interest. This study is part of ongoing long-term testing of CaO_2 fed to ewes to verify the product's effectiveness.