

Effect of Herbage Intake on Methane Emission by grazing Sheep

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The level of dry matter intake (DMI) by animals, the quality of diet and food processing, among other factors, can influence the CH₄ emission by ruminants. We hypothesized that combinations of stocking methods and grazing intensities provokes differences in the quantity and quality of herbage ingested, thus altering methane (CH₄) emissions by sheep grazing Italian ryegrass (*Lolium multiflorum Lam.*).

The experiment was conducted at the Federal University of Rio Grande do Sul, Rio Grande do Sul State, Brazil. Experiments were carried out in 2011 (lambs, n=36) (Experiment 1) and 2012 (lactating ewes (n=72), all with a single lamb) (Experiment 2). Two stocking methods (continuous or rotational) and two grazing intensities (herbage allowance: moderate and low, 2.5 and 5 times the potential daily DMI, respectively) in a randomized complete block design with three replicates were studied. To determine daily DMI (n-alkanes technique) and CH₄ emission (SF6 tracer technique) by sheep, three tester animals from each experimental unit were utilized. Linear regressions were tested, the best model being defined by the highest coefficient of determination (R²) significant at 5% level (P<0.05). The statistical package SAS version 9.3 was used.

Positive linear relationship between DMI (g animal⁻¹ day⁻¹) and CH₄ emission (g animal⁻¹ day⁻¹) by sheep grazing Italian ryegrass was observed (Experiment 1: $y=0.007x+14.6$; $R^2=0.18$; $P=0.026$ and Experiment 2: $y=0.008x+25.2$; $R^2=0.23$; $P<0.001$). Negative linear relationship between DMI (g animal⁻¹ day⁻¹) and CH₄ emission (g CH₄ kg DMI⁻¹) by sheep grazing Italian ryegrass was observed (Experiment 1: $y=-0.011x+32.7$; $R^2=0.33$; $P=0.001$ and Experiment 2: $y=-0.010x+41.8$; $R^2=0.59$; $P<0.001$).

Thus, we conclude that the CH₄ emission by sheep grazing Italian ryegrass increased with herbage intake increasing. If herbage intake by animals is greater, CH₄ emission per kg of herbage ingested is lower.