

# Field measurements of ruminal methane of cattle grazing tropical grasses

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**Introduction** Ruminal methane production represents energy losses from ingested feed that should be utilised to maintain body weight or to generate products. Quantitatively, daily methane production varies according to amount and quality of ingested dry matter (DM), as well as physiological status of the animal.

**Material and methods** Holstein and Zebu cross-bred heifers, and dry and lactating cows, grazing fertilised *Panicum maximum* cv. Tanzania and *Brachiaria decumbens*, as well as unfertilised *B. decumbens* during summer and autumn were used in this study. Measurements of methane emissions were taken directly, using the sulphur hexafluoride tracer gas method, as described by Johnson & Johnson (1995).

**Results** Methane production, in g/animal/day (Table 1), was greater from cows than heifers, from lactating cows than dry cows, and greater from Holstein heifers and lactating cows than Zebu-bred cattle of the same categories. Also, matching findings of Holter & Young (1992), who reported that different methane emission rates occurred among breeds and animal categories, mainly as function of the size of the gastric compartments, and of animal nutritional requirements. Heifers did not present variations in methane production as a function of the forages used. Methane production (g/kg of LW<sup>0.75</sup>) was different for contrasts VC vs. NV, VL vs. VS and NH vs. NM, as well as for the contrasts VLH vs. VLM, VSH vs. VSM and heifers of both breeds and on both pastures. The same behaviour was observed with methane when expressed as g/kg of DM intake.

Table 1. Contrasts among categories, breeds and pastures for mean methane production by dairy cattle

Contrasts	Methane production		
	g/d	g/kg of LW <sup>0.75</sup>	g/kg of DM intake
VC vs. NV	311.3 vs. 200.9*	2.83 vs. 2.1*	21.3 vs. 17.5*
VL vs. VS	353.8 vs. 268.8*	3.3 vs. 2.3*	23.2 vs. 19.3*
VLH vs. VLM	393.2 vs. 314.5*	3.36 vs. 3.2	21.5 vs. 24.9
VSH vs. VSM	271.1 vs. 266.4	2.17 vs. 2.5	17.8 vs. 20.8
NH vs. NM	205.7 vs. 196.1*	2.0 vs. 2.2*	16.4 vs. 18.6*
NHe vs. NHe	233.6 vs. 177.8	2.18 vs. 1.8	18.0 vs. 14.8
NMi vs. NMe	211.6 vs. 180.6	2.44 vs. 2.1	20.1 vs. 17.2

\*Significant by Student test ( $P < 0.05$ ). Contrasts – cows and heifers (VC vs. NV), lactating cows and dry cows (VL vs. VS), Holstein and Zebu-bred lactating cows (VLH vs. VLM), Holstein and Zebu-bred dry cows (VSH vs. VSM), Holstein and Zebu-bred heifers (NH vs. NM), Holstein heifers on Panicum + concentrate and Brachiaria (NHe vs. NHe) and Zebu-bred heifers on Panicum + concentrate and Brachiaria (NMi vs. NMe).

**Conclusions** Methane production varied as a function of physiologic stage of animals and breed. Methane production by heifers grazing forages with different qualities supplemented or not with grain concentrate did not vary.

## References

- Johnson, K.A. & D.E. Johnson (1995). Methane emissions from cattle. *Journal of Animal Science*, 73, 2483-2492.
- Holter, J.B. & A.J. Young (1992). Nutrition, feeding and calves: methane prediction in dry and lactating Holstein cows. *Journal of Dairy Science*, 75, 2165-2175.