

Enteric methane emissions of Canchim steers in five crop-livestock-forest integrated system

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Introduction The adoption of integrated systems has increased in recent years, as the economic and environmental benefits are obtained by the best use of the area throughout the year and recovery of degraded areas. Moreover, these systems ensure animal welfare and provide better quality food, thus a differentiated feed efficiency. It is important to evaluate the effect of forage quality on enteric methane emissions. The objective of this study was to measure the enteric methane emission of Canchim cattle (synthetic breed 5/8th Charolaise) in crop-livestock-forest integrated systems.

Material and Methods

The study was conducted at Embrapa Southeast Livestock Centre, Canchim Farm, located in São Carlos, SP. A total of 30 castrated males of Canchim breed, with an average age of 18 months and average weight of 335 kg distributed in 5 grazing systems: intensive grazing (IGS), silvopastoral (SPS), integrated crop-livestock (ICL), integrated crop-livestock-forest (ICLF) and extensive grazing (EXT) systems. The systems were conducted with two experimental areas of approximately 3 hectares each, divided into 6 paddocks in which respect a period of occupation of six days and rest for 28 days, except extensive grazing in the pasture was continuous. The measurement of enteric methane occurred in February 2015, using the SF₆ tracer technique. This assessment was carried out for 5 consecutive days for 24 hours each. The concentrations of CH₄ and SF₆ were determined by gas chromatography to estimate CH₄ flow. Data was analysed using the PROC MIXED procedure of SAS (Statistical Analysis System, version 9.3) and averages were compared using Tukey's test with significant differences at P <0.05.

Results and Conclusions

Table 1. Enteric methane emissions in the different systems.

Variable	Treatments*					Mean	P
	IGS	SPS	ICL	ICLF	EXT		
Live weight (kg)	333.2	333.0	342.7	343.7	327.2	336.0	0.9290
CH ₄ (g/d)	198.1	202.1	198.4	180.3	190.1	198.83	0.8760
CH ₄ (kg/yr)	72.3	73.8	72.4	65.8	69.4	72.58	0.8762
CH ₄ LW (gCH ₄ /kgLW)	0.596	0.610	0.579	0.527	0.586	0.593	0.7417

*IGS: intensive grazing; SPS: silvopastoral; ICL: integrated crop-livestock; ICLF: integrated crop-livestock-forest; EXT: extensive grazing

There were no significant differences in animal live weight and daily methane emissions between the evaluated systems in the summer season. Further analysis should correlate emissions and stocking rates, daily weight gain, forage quality and dry matter intake.

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