

Methane Emission by Beef Steers on natural Grassland in Southern Brazil

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Natural grasslands are the main basis for beef cattle production systems in South Brazil, North Argentina and Uruguay. The data about methane emission in this environment are few and not available yet. This work aimed evaluating methane emission (CH₄) per animal and per kilogram of meat produced by finishing beef steers on natural grasslands with different levels of intensification. The experiment was carried out at Embrapa Southern Region Animal Husbandry, Bagé (lat 31°19'51S, long 54°06'25W and 212 m a.s.l.), Rio Grande do Sul, Southern Brazil. Three plots of 7 ha natural grasslands were assigned to each of the three treatments: (i) natural grassland (NG); (ii) NG plus fertilization (NGF) ie 70 kg ha⁻¹ P2O5 in 2007 and 100 kg N ha⁻¹ in 2008; and (iii) NGF plus overseeding of annual ryegrass (*Lolium multiflorum*) and red clover (*Trifolium pretense*) (NGFS). Each treatment was three replications paddock and each paddock had three animals testers (nine animals testers per treatment), and variable stocking rate in order to maintain 12% of herbage allowance. The animals were 27 Hereford steers with 1-2 years. Methane emissions were measured using the sulfur hexafluoride (SF6) technique by stainless collecting tubes connected to the animals' nostrils during five days in each evaluation. Evaluations were made during the summer (January, 21-26), autumn (June, 5-10), winter (July, 22-27), and spring (October, 28 - November, 2) in 2013. The CH₄ concentration in the tube was measured with gas chromatograph. The animals were weighed in the beginning of experiment and every 28 days to determine live weight gain (LWG).

No difference was observed ($P>0.05$) in the amount of kg of CH₄ emission per kg of live weight gain per hectare per year ($\text{g CH}_4.\text{kg}^{-1}\text{ LWG}$). Means values were 183 ± 0.78 , 199 ± 0.78 e 320 ± 0.74 $\text{kg CH}_4.\text{kg LWG}^{-1}.\text{ha}^{-1}.\text{year}^{-1}$ to NG, NGF and NGFS treatments, respectively. No difference was observed ($P>0.05$) in $\text{kg CH}_4.\text{animal}^{-1}.\text{year}^{-1}$, with means values of 31.60 ± 7.31 , 42.87 ± 6.93 e 46.33 ± 7.31 to NGF, NGFS and NG treatments, respectively. It is important highlight that the average values to methane emissions per animal are below the proposed values by IPCC for this animal category. Natural grasslands when well managed present potential to produce quality meat with low values of methane emission, reducing the impact to the environment.