Effect of lipids sources in diets with crude glycerin on methane emission of Nellore young bulls finished in feedlot

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Introduction The inclusion of lipids in the diets reduces methane emissions (Johnson and Johnson, 1994). The association of crude glycerin (increase production of propionate in the rumen) and lipid sources has great potential for further impacts on methane production. The trial aimed to evaluate the effects of feeding crude glycerin (CG) - 80% glycerol - included on 10% of DM diet with lipids sources on enteric methane (CH_4) production of young bulls finished in feedlot.

Material and Methods Twenty four young bulls (Nellore), with 426.00 ± 30.20 initial BW, were randomly assigned to four treatments, with six replicates. The diets (30% of corn silage and 70% concentrate) were: with 10% of CG being control diet (Cn); with 10% of CG plus soybean oil (SO), with 10% of CG plus whole soybean grain (SG) or with 10% of CG plus bypass fat (BF). Animals were assigned in individuals pens and after 97 days of feeding, the animals were slaughtered with average of 521.30 ± 44.27 kg BW. The average daily gain (ADG) was obtained at the beginning and end of the experimental period. Ruminal CH_4 was yielded using a sulphur hexafluoride (SF_6) gas tracer every 24 h during five consecutive days in one experimental period with 15 prior adaptation days according to the method described by Johnson and Johnson (1995). CH_4 flux produced by animals was calculated in relation to the SF_6 tracer gas flux from a permeation capsule lodged in the rumen minus the basal CH_4 concentration in the air (Westberg *et al*. 1998). Following equation was used: $Q_{CH4} = Q_{SF6} \times ([CH_4]_y - [CH_4]_b) / [SF_6]$, where Q_{CH4} = CH_4 emission rate by animal; Q_{SF6} = know SF_6 emission rate from capsule in rumen; $[CH_4]_y$ = CH_4 concentrations in collection apparatus; $[CH_4]_b$ = basal CH_4 concentration; and $[SF_6]$ = SF_6 concentration in collection apparatus. Methane outputs (g/d) proportional to dry matter intake (DMI, kg/d), organic matter intake (OMI, kg/d) and percentage of gross energy intake (%GEI) were calculated by dividing the daily methane output of each animal by their daily DMI, OMI, GEI (during methane sampling) and ADG, MBW (throughout the entire experimental period). The experiment was conducted according to a completely randomized. Data were analyzed by the GLM procedure of SAS, and the Tukey test used considering 5% probability.

Results There was no effect ($P > 0.05$) of crude glycerin plus lipids sources on CH_4 emitted per day (CH_4, g/d), CH_4 per kilogram of ADG (CH_4, g/kg ADG), CH_4 per kilogram of MBW (CH_4, g/kg MBW), CH_4 per kilogram of dry matter intake (CH_4, g/kg DMI), CH_4 per kilogram of organic matter intake (CH_4, g/kg OMI) and % of gross energy intake converted into methane (%GEI).

Table 1 Methane emission of Nellore young bulls finished in feedlot with one of four diets

Item[1]	Diets[2]				s.e.m.	P[3]
	Cn	SO	SG	BF		
CH_4, g/d	133	137	136	109	17.86	0.698
CH_4, g/kg MBW	1.23	1.23	1.27	0.98	0.142	0.536
CH_4, g/kg ADG	157	110	184	151	21.28	0.131
CH_4, g/kg DMI	20.8	16.0	18.3	18.2	1.933	0.398
CH_4, g/kg OMI	22.2	17.1	19.6	19.5	2.251	0.398
CH_4, %GEI	11.5	8.07	9.02	9.39	1.214	0.255

[1/] MBW = metabolic body weight; ADG = average daily gain; DMI = dry matter intake; OMI = organic matter intake and %GEI = % of gross energy intake converted into methane
[2/]Cn = without additional fat; SO = addition of soybean oil; SG = addition of whole soybean grain; BF = addition of bypass fat
[3/]Probability ($P < 0.05$)

Conclusion The inclusion of soybean oil, whole soybean grain or bypass fat in Nellore young bulls diets containing 10% crude glycerin (DM basis) did not alter the enteric methane production.

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References

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