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Tanniferous native species from Pampa biome can minimize sheep methane emissions

Teresa Cristina M. Genro^{*1}, Jusiane Rossetto², Alessandro P. Minho¹, Patrício A. dos Santos³, Cimélio Bayer², Paulo C. de F. Carvalho²

¹Embrapa Southeast Livestock, Bagé/RS, ²Federal University of Rio Grande do Sul, Porto Alegre/RS, ³University of the Campaign Region, Bagé/RS

Researcher A: cristina.genro@embrapa.br

The development of feeding strategies to minimize the methane enteric emissions is a tool to mitigate greenhouse gases emissions to the atmosphere. The use of plants with secondary compounds can minimize methane emissions. Tannins may be found in the plant in soluble or insoluble form and can reduce enteric methane emissions when ingested in significant amounts. This study aimed to evaluate the effect of increasing levels of *Acanthostyles buniifolius* leaves (Chirca) and *Eugenia uniflora* leaves (Pitanga) on the dry matter intake, digestibility and methane emissions in sheep. These plants contain in their leaves secondary compounds mainly condensed tannins. The experiment was carried out at Embrapa South Livestock, Bagé, RS, Brazil. Two metabolic assays were performed for each species tested and it were used 20 castrated male sheep, five animals per treatment, with an average initial weight of 42 ± 7 kg. The basic diet for all treatments was composed by chopped alfalfa hay offered in order to allow 10% of leftovers plus 300 grams of a commercial concentrated for sheep containing 14% crude protein (CP). The treatments were four levels of Chirca and Pitanga leaves inclusion in the diet: 0, 50, 100 and 150 grams. The animals were kept in metabolic cages. The adjustment period was eight days followed by five days of collection. The leftovers were weighed every day to calculate the individual sheep intake. It was used the hexafluoride sulfur technique (SF₆) as a tracer to quantify the methane emissions. It was performed regression analysis to the daily dry matter intake (DMI), DMI as percentage of live weight (DMI_%BW), the dry matter digestibility (DMD), and the emissions of enteric methane (CH₄, g.day⁻¹) by levels of specie leaves inclusion in the diet. When the regression analysis was no significance, we submitted the data to analysis of variance. The Chirca and the Pitanga leaves have 95.2 and 135 g.kg⁻¹ of total tannin (TT), 115.3 and 153.5 g.kg⁻¹ of total phenols and 11.4 and 7.8 g/kg DM of condensed tannins (CT), respectively. The amount of secondary compounds present in the Chirca and Pitanga leaves used here did not affected DMI, DMI_%BW, neither DMD. DMI and DMI_%BW were 1388.51 g and 3,2% e 1332.14 and 3,3% to Pitanga and Chirca, respectively. DMD was 60.2 and 61.4 to Pitanga and Chirca, respectively. The inclusion of Chirca in the diet did not affect the methane emissions and the average of CH₄ emissions was 28.966 g.d⁻¹ by animal. There was a reduction on CH₄ emissions using Pitanga leaves ($r^2 = 0.90$). The inclusion up to 150 grams of Pitanga leaves in the diet reduces the methane emissions in sheep without affect dry matter intake and the digestibility. The Chirca leaves did not mitigate methane emissions up to 150 g level.

Keywords: *Acanthostyles buniifolius*, *Eugenia uniflora*, condensed tannins, total phenols, total tannin