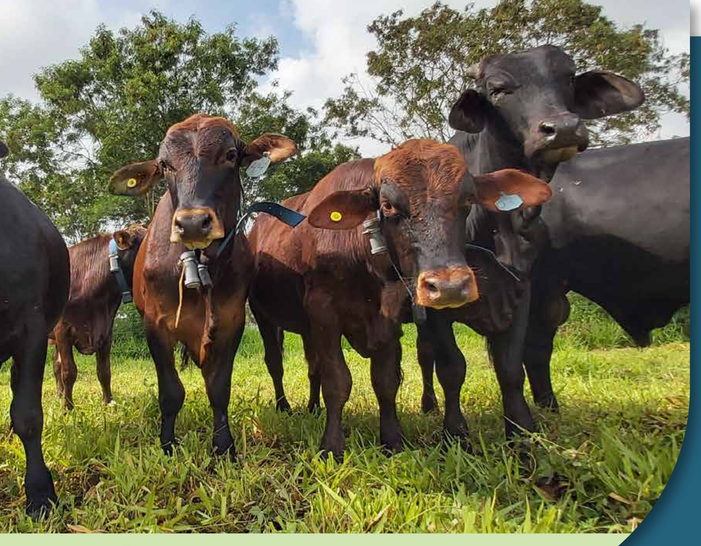

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Benefits of *Leucaena diversifolia* in grazing steer's diet: performance, methane and fatty acids

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Introduction

Livestock production contributes significantly to global greenhouse gas emissions (UNEP and ACC, 2021). Some strategies to reduce enteric methane (CH_4) emissions propose modulating ruminal fermentation by providing legumes rich in secondary compounds.

Leucaena diversifolia is a legume species that has received little attention in terms of its nutritive value, CH_4 emissions, and impact on meat quality. To address this gap, a study was conducted to compare the performance, CH_4 emissions, and fatty acid content of steers grazing on a monoculture of tropical grass *Urochloa* hybrid cv. Cayman versus a combination of Cayman and *L. diversifolia*.

Methodology

Location: The experiment was conducted at the International Center for Tropical Agriculture (CIAT) located in Valle del Cauca, Colombia.

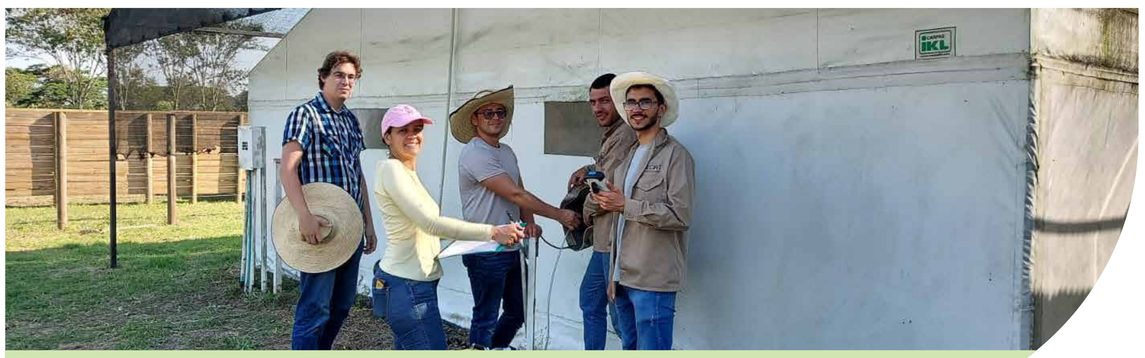
Animals and diets: Over a period of 15 months, 14 Angus crossbred steers were used in the study, with half of them grazing only Cayman grass (**CG**, *Urochloa* hybrid cv. Cayman-CIAT BR02/1752) and the other half grazing on a combination of Cayman and *L. diversifolia* ILRI 15551 (**SPS**) at a ratio of 74:26.

Table 1. Mean (+/- SD) nutritional composition of the diets offered to the steers during the experiment.

Variable	DM g/kg	CP g/kg DM	IVDMD g/kg DM	Total phenols g/kg DM	Tannins g/kg DM
CG	242±1.6	64±1.4	467±2.5	3.30	0.10
SPS	232±3.4	135±0.6	639±2.9	17.42	12.40

SPS: 74% *Urochloa brizantha* cv. Toledo and 26% *Leucaena diversifolia*; **CG:** Cayman grass; **DM:** dry matter; **CP:** crude protein; **IVDMD:** *in vitro* DM digestibility.

Evaluations: The animals were weighed every 4 months throughout the experiment. At the end of the trial, enteric CH_4 emissions were measured for one month using the polytunnel technique (Murray et al., 2001). Subsequently, the animals were slaughtered to extract a subsample of the *longuissimus dorsi* muscle to quantify fatty acid esters (Mojica-Rodriguez et al., 2017).



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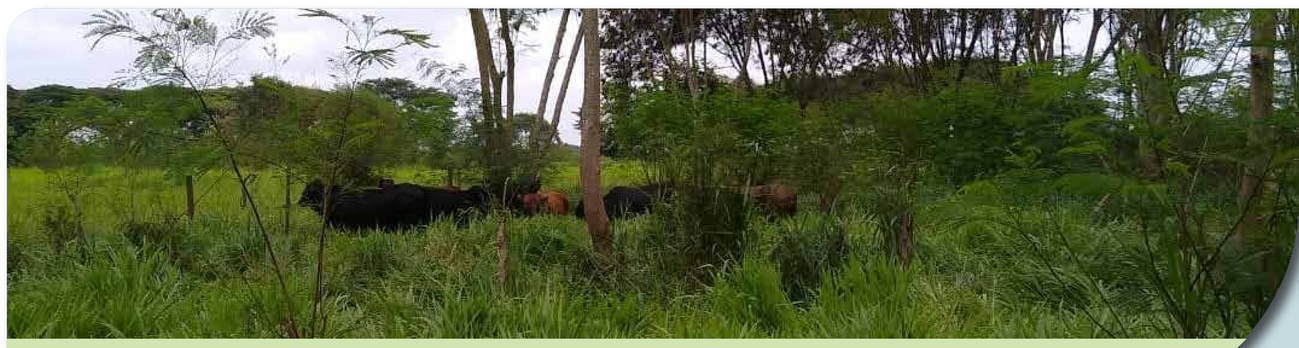
Results

Animals grazing Cayman grass plus *L. diversifolia* consumed 1.22 times more dry matter than animals ingesting grass alone *(P≤0.05)*. This difference was doubled when calculating daily crude protein intake *(P≤0.05)*. At the end of the experiment, animals consuming the **SPS** diet weighed 63 kg more than animals consuming **GC** *(P≤0.05)*. On the other hand, steers consuming *L. diversifolia* emitted 15% less net enteric CH_4 than animals on **GC** *(P≤0.05)*. Likewise, in our study the omega 6: omega 3 ratio was lower in animals consuming this legume *(P≤0.05)*.

Table 2. Forage intake, animal productivity, methane emissions and meat quality of steers fed with and without *L. diversifolia*

Variable	Treatment SPS	Treatment CG	SEM	P-value
Intake				
DM (kg/d)	8.571	6.995	0.514	0.0082
CP (g/d)	847.0	396.9	27.63	0.0001
Animal productivity and emissions				
Final LW (kg)	535.3	472.3	10.22	0.0410
Net methane emissions (g/d)	142.4	167.6	5.425	0.0069
Fatty acids				
Omega-6: omega-3 ratio	2.59	2.91	0.223	0.0173

SPS: 74% *U. brizantha* cv. Toledo or *U.* hybrid cv. Cayman and 26% *L. diversifolia*; **CG:** 100% *U.* hybrid cv. Cayman or *U. brizantha* cv. Toledo; **SEM:** standard error of mean. **DM:** dry matter; **CP:** crude protein; **LW:** live weight.



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Conclusions

- The results of this study suggest that the inclusion of *L. diversifolia* improves nutrient intake, increases animal productivity, reduces daily enteric methane emission, and omega-6: omega-3 ratio in meat is reduced.

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