



Tropentag, September 20-22, 2023, hybrid conference
“Competing pathways for equitable food systems transformation:
Trade-offs and synergies”

Assessing the mitigation potential of nutrient blocks made of tropical tree and legumes

JOHANNA MAZABEL PARRA¹, ISABEL CRISTINA MOLINA¹, JACOBO ARANGO¹, ALEXANDER HINCAPIE¹, JOSE IGOR HLEAP ZAPATA²

¹*International Center for Tropical Agriculture (CIAT), Colombia*

²*Universidad Nacional De Colombia, Sede Palmira, Colombia*

Abstract

Fruits and leaves of tropical trees and legumes are highly nutritious and serve as a valuable source of essential nutrients for animal feed. Additionally, since trees and legumes are native to many tropical regions, they can be grown and maintained with fewer resources and lower costs than other feed options. Nutrient blocks are important for providing supplemental nutrition to ruminants when grazing on low-quality forage or during feed scarcity, promoting growth, and maintaining rumen health. This study aimed to evaluate the *in vitro* gas production and methane (CH₄) concentration emitted from grass-based diets and nutrient blocks made from tropical tree fruits, legume leaves and pods. The nutrient blocks were prepared using fruits from *Enterolobium cyclocarpum* (Ec), leaves of *Tithonia diversifolia* (Td), and leaves (Ll) and pods (Lp) of *Leucaena leucophela*. The experiment involved measuring fermentation parameters at two-time intervals (24 h and 48 h) using a grass diet (75 %) and nutrient blocks (25 %), with *Urochloa brizantha* cv. Toledo (Ub) serving as the basal pasture. A total of nine treatments were evaluated, including T1: Ub+BC (commercial nutritional block used as control); T2: Ub+BM (mixed block with equal proportions of all tropical tree fruits, legume leaves and pods tested); T3: Ub+Ll; T4: Ub+Lp; T5: B.Control (100 % commercial nutritional block); T6: B.Mixed (100 % mixed block); T7: B.Ll (100 % block made from Ll); T8: B.Lp (block made of 100 % Lp), and T9: GT (100 % Ub used as comparator). The nutritional blocks, prepared with tropical tree fruits, legume leaves and pods, contained in average 3.9 times more crude protein than the control block and the grass alone (314, 83.2 and 78.1 g CP kg⁻¹DM, respectively), and the average of neutral detergent fiber content was lower in all blocks than in the pasture alone (366 vs. 664 g NDF kg⁻¹DM). The results of the experiment revealed that the treatments had a significant impact on ruminal degradation and gas production when the pasture was incubated with the nutrient blocks. Specifically, the inclusion of tree and forage products in the blocks led to an average reduction in net CH₄ concentration of 13 % and 21 % per degraded dry matter at 24 h and 48 h of fermentation, respectively.

Keywords: Animal feed, methane, native fruits, rumen fermentation