

Quantifying Rumen Enteric Methane Production in Extensive Production Systems

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Abstract : Ruminant animals contribute a considerable amount of methane to the atmosphere, which is a cause of concern for global warming. Two studies were conducted in beef and goats where the studies aimed to determine the enteric CH₄ levels from a herd of beef cows raised on semi-arid rangelands and to evaluate the effect of supplementing goats with forage legumes: *Vigna unguiculata* and *Lablab purpureus* on enteric methane production. A total of 24 cows were selected from Boran and Nguni cows (n = 12 per breed) from two different farms; parity (P1 - P4) and season (dry vs. wet) were considered predictor variables in the first experiment. Eighteen goats (weaners, 9 males, 9 females) were used, in which sex and forage species were predictor variables in the second experiment. Three treatment diets were used in goats. Methane was measured using a Laser methane detector [LMD] for six consecutive days and repeated once after every three months in beef cows and once every week for 6 weeks in goats during the post-adaptation period. Parity and breed had no effects on CH₄ production in beef cows; however, season significantly influenced CH₄ outputs. Methane production was higher (P<0.05) in the dry compared to the wet season, 31.1CH₄/DMI(g/kg) and 28.8 CH₄/DMI(g/kg) for the dry and wet seasons, respectively. In goats, forage species and sex of the animal affected enteric methane production (P<0.05). Animals produce more gas when ruminating than feeding or just standing for all treatments. The control treatment exhibited higher (P<0.05) methane emissions per kg of DMI. Male goats produced more methane compared to females (17.40L/day; 12.46 g/kg DMI and 0.126g/day) versus (15.47L/day, 12.28 g/kg DMI, 0.0109g/day) respectively. It was concluded that cows produce more CH₄/DMI during the dry season, while forage legumes reduce enteric methane production in goats, and male goats produce more gas compared to females. It is recommended to introduce forage legumes, particularly during the dry season, to reduce the amount of gas produced.

Keywords : beef cows, extensive grazing system, forage legumes, greenhouse gases, goats Laser methane detector.

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