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## Effect of Sweet Potato Vine Silage and Urea-Molasses Blocks on Nutrient Intake, Nitrogen Balance and Rumen Microbial Protein Synthesis of Crossbred Heifers on a Poor Quality Diet

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### Abstract

Supplementation of low-quality roughages with sweet potato vine silage (SPVS) or urea-molasses blocks (UMB) is considered to improve livestock production by enhancing microbial fermentation in the rumen and thereby nutrient and energy supply to the host.

A 3×2 Youden square design was used to test the effects of SPVS or UMB supplementation on nutrient intake, nitrogen (N) balance, and ruminal synthesized microbial N during two experimental periods with each 21 d of adaptation and 7 d of total urine and feces collection. Six Holstein Friesian-Boran crossbred heifers with a body weight (BW) of 153 kg (standard deviation [SD] 16.9) were allotted to three groups of two animals each. Animals were fed individually with a basal diet alone or supplemented with SPVS (basal diet + SPVS [2.5% BW, as-fed basis]) or UMB (basal diet + UMB [*ad libitum*]). The basal diet consisted of 61.4% wheat straw and 38.6% Boma Rhodes hay (on dry matter [DM] basis) and was offered at 2% of BW (as-fed basis).

Daily DM intake and digestibility of DM did not differ between diets ( $P > 0.05$ ). Mean daily DM intake and digestibility of DM were 3.1 kg d<sup>-1</sup> (SD 0.6) and 50.3 g/100 g DM (SD 3.1), respectively. Similarly, there were no differences ( $P > 0.05$ ) in daily N intake (41.4 g d<sup>-1</sup> [SD 8.9]) or daily urine N (19.8 g d<sup>-1</sup> [SD 4.4]) and fecal N (26.7 g d<sup>-1</sup> [SD 5.1]) excretions of heifers fed the three diets. Nitrogen balances were negative for all diets, but higher in heifers consuming SPVS (-2.7 g d<sup>-1</sup>) compared with those receiving the basal diet alone (-6.2 g d<sup>-1</sup>;  $P = 0.02$ ) or supplemented with UMB (-7.2 g d<sup>-1</sup>;  $P = 0.01$ ). Urinary purine derivatives excretion and estimated ruminal synthesized microbial N were not affected by diet ( $P > 0.05$ ). Urinary purine derivatives excretion and estimated duodenal microbial N flow were 42.6 mmol d<sup>-1</sup> (SD 11.7) and 22.2 g d<sup>-1</sup> (SD 9.4), respectively.

The increased N balance in heifers consuming SPVS clearly indicates that supplementation of a low-quality roughage diet with SPVS can improve nutrient utilisation and thus ruminant production in the Tropics.

**Keywords:** Nitrogen, supplementation, sweet potato vines, tropical cattle, urea blocks