Tropentag, September 20-22, 2017, Bonn

"Future Agriculture:
Socio-ecological transitions and bio-cultural shifts"

Effect of Sweet Potato Vine Silage and Urea Molasses Supplementation on Feed Intake, Diet Digestibility and Methane Emissions of Heifers on a Poor Quality Tropical Diet

Asep Indra Munawar Ali[1], Shimels Wassie[2], Daniel Korir[3], John Goopy[3], Lutz Merbold[3], Klaus Butterbach-Bahl[3], Uta Dickhoefer[2], Eva Schlecht[1]

[1] *University of Kassel / Georg-August Universität Göttingen, Animal Husbandry in the Tropics and Subtropics, Germany*

[2] *University of Hohenheim, Inst. of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), Germany*

[3] *International Livestock Research Institute (ILRI), Kenya*

Abstract

Given their high nitrogen concentration and low costs under smallholder conditions, sweet potato vine silage (SPVS) and urea-molasses blocks (UMB) are recommended as alternative supplementation for ruminants in tropical regions.

This study used a 3×2 Youden square design to investigate SPVS and UMB supplementation using 6 crossbred Holstein-Friesian × Boran heifers of 153 ±16.9 kg body weight (BW). Animals were stratified by BW and allocated to 3 diets, with the basal diet (BD) being offered *ad libitum* (at 2 % of BW) and consisting of 61.4 % wheat straw and 38.6 % Rhodes grass hay (on dry matter basis - DM). Diet SPVS contained 80.4 % of BD plus 19.6 % of SPVS and diet UMB was identical to diet BD but animals had *ad libitum* access to licking blocks containing molasses (35 %), $CaHPO_4$ (19 %), urea (10 %), NaCl (10 %) and cottonseed meal (5 %). Quantitative and qualitative data on feed intake and fecal excretion was collected during two 7-day experimental periods; methane emission was determined during 3 days of respiration chamber measurements. Both experimental periods were preceded by 21 days of adaptation to the diets. Samples of feed offered, refused and of feces were analysed for proximate composition following standard protocols. Data was tested for normality and subjected to the mixed model procedure of SAS with diet as fixed and animal as a random factor.

Heifers on SPVS had a higher ($p < 0.05$) intake (g $kg^{-0.75}$ BW d^{-1}) of crude protein (5.1) than those offered UMB (3.3) and BD (3.8). There was no treatment difference ($p > 0.05$) in feed intake. Heifers on SPVS diet had higher ($p < 0.05$) DM digestibility (510 g kg^{-1}) than those offered BD (474 g kg^{-1}). Daily CH_4 emissions were not different ($p > 0.05$) between diets when expressed per animal or per kg DM intake. However, when expressed per unit of digested feed (DDM), CH_4 emissions were lower ($p < 0.05$) in group SPVS (105 l kg^{-1} DDM) than in BD (123 l kg^{-1} DDM) but no difference ($p > 0.05$) with UMB group (121 l kg^{-1} DDM).

It can be concluded that a supplementation with about 20 % SPVS in the diet has the potential to improve diet digestibility and decrease enteric methane emission in cattle on poor quality roughage feeds.

Keywords: Cattle, greenhouse gas emission, low-quality roughage, supplementation

Contact Address: Eva Schlecht, University of Kassel / Georg-August-Universität Göttingen, Animal Husbandry in the Tropics and Subtropics, Steinstraße 19, 37213 Witzenhausen, Germany, e-mail: tropanimals@uni-kassel.de