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Enteric Methane Production from Cattle Fed on Three Tropical Grasses in East Africa

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Abstract

Tropical planted grasses are an important feed resource in many East African mixed crop-livestock systems. There is, however, inconclusive information on the nutritive value of these grasses and the consequences of feeding these grasses on enteric methane emission from cattle, primarily caused by a lack of in-situ measurements. A feeding experiment was conducted with growing Boran steers (n=18, live weight (LW): 216 ± 6 kg) fed on either *Pennisetum purpureum* (Napier), *Chloris gayana* (Rhodes) or *Brachiaria brizantha* (Brachiaria) for 65 days on ad libitum basis. Voluntary nutrient intake, apparent total tract digestibility, LW gain and enteric methane production (using cattle respiration chambers) were measured in a 3×3 crossover Latin square design.

Crude protein (CP) content (g kg⁻¹ dry matter (DM)) of the fodder fed to the animals were 89 ± 16.2, 77 ± 12.6 and 83 ± 9.9 (Mean ± SD) for Napier, Rhodes and *Brachiaria* grass respectively, while NDF (g kg⁻¹ DM) content ranged from 648 ± 22.7 (Napier) to 686 ± 24.9 (Rhodes). There were no differences ($p > 0.05$) in voluntary DM intake and average daily LW gain (441 ± 107.5 g) across the three treatments. Animals fed on Napier grass had higher ($p < 0.05$) total tract DM and organic matter (OM), CP and fibre digestibility compared to animals fed on Rhodes, but not different from animals fed on *Brachiaria*. Napier grass (35 ± 2.5 g/kg) and *Brachiaria* (32 ± 2.2 g/kg) had higher ($p < 0.01$) methane yield per OM intake than Rhodes grass (31 ± 3.6 g/kg) but the differences were not observed when expressed per digestible OM intake ($p = 0.59$).

We conclude that utilisation and enteric methane yield per OM intake of grasses grown and fed to cattle in East Africa, at animal level, differ from grass to grass. Accounting for the differences in methane yields for the grasses grown in the different agro-ecological zones in the region can improve the Accuracy of the emission factors used for East African countries. More data on a wider range of grasses is needed to validate the findings of the present study.

Keywords: Digestibility, weight gain, yield