Tropentag, September 18-21, 2016, Vienna, Austria

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Digestibility and Metabolisable Energy Concentrations of Tropical Feeds as Estimated *in vitro* or by Prediction Equations

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Abstract

In vivo determination of digestible organic matter (dOM) and metabolisable energy (ME) concentrations of feeds is laborious and expensive, whereas analysis of their nutrient contents is routinely performed. Prediction equations based on the chemical composition of feeds can be a compromise. This study compared dOM and ME estimates of tropical feeds derived from selected equations (Yan and Agnew, 2004; Stergiadis et al., 2015a; Stergiadis et al., 2015b; AFRC, 1993) with those determined by the *in vitro* gas production method (Menke and Steingass, 1988). Samples of supplement feedstuffs (n = 12) and the herbaceous and ligneous vegetation on native pastures (n = 12) were collected in Lower Nyando, Kenya, over two seasons of one year. Samples were analysed for dry matter (DM; in % of fresh matter), crude ash, crude protein, ether extract, neutral and acid detergent fiber (NDF, ADF) (all in % of DM). Gross energy was determined by calorimetry.

Nutrient concentrations varied across all samples with 8.5 – 87.9 % DM, 5.2 – 16.8 % crude ash, 36.7 – 74.1 % NDF, 25.5 – 39.4 % ADF, 3.2 – 14.2 % crude protein, and 0.6 – 4.5 % ether extract. The gross energy, *in vitro* dOM, and ME concentrations were 14.5 – 18.8 MJ kg^{-1} DM, 26.3 – 54.5 %, and 3.8 – 8.4 MJ kg^{-1} DM, respectively. Compared with the *in vitro* method, all nutrient-based equations overestimated dOM ($p < 0.001$), whereas ME estimated from *in vitro* gas production was similar to that derived from the AFRC equation ($p > 0.5$). Nutrient-based equations do not sufficiently account for differences in nutrient availability, an aspect better simulated *in vitro*. Further development and/or validation of nutrient-based equations might be needed to more accurately predict dOM and ME of tropical feeds.

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Keywords: Digestibility, metabolisable energy, prediction, tropical feedstuff

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