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“Filling gaps and removing traps
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Evaluation of Undigested and Potential Digestible Fiber in Tropical Grasses and Tropical Legumes

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Abstract

Dietary fiber is one of the main determinants for voluntary feed intake (FI) in ruminants, particularly because of its effects on rumen fill. Recently, the undigested neutral detergent fiber (i.e. remaining neutral detergent fiber (NDF) after an infinite period of time under degradation by rumen microorganisms; uNDF) has been presented as the most likely indicator of filling capacity by a forage. Tropical legume forages (TLF) decrease FI when included in large proportions in ruminant diets (i.e. >400 g kg^{-1} dry matter; DM; and the reasons for this may be related to the NDF concentration and its characteristics. Plenty of information is available on the NDF concentration of TLF, which could be as high as that of tropical grasses (TG), but no information is available on the uNDF fraction of TLF. Thus, the objective was to evaluate the uNDF after 240-h *in vitro* incubation (uNDF240) and the potentially digestible NDF (pdNDF) concentrations of TLF as compared with TG. Seven samples of TG and 14 samples of TLF were collected from Indonesia, El Salvador, Peru, and Brazil. The amylase-treated ash-corrected NDF (aNDFom) was measured using an ANKOM200 fiber analyser with addition of sodium sulfite. The uNDF240 was analysed using the modified Tilley and Terry technique after 240-h *in vitro* incubation. The pdNDF was determined by subtracting the uNDF240 fraction from total aNDFom. The results were analysed using descriptive analysis. Values of aNDFom, uNDF240 and pdNDF concentrations varied among different forages and within the same type. TLF had a lower aNDFom concentration than TG (373.9 ± 88.9 and 591.6 ± 31.3 g kg^{-1} DM, respectively), but a higher uNDF240 than TG (239.3 ± 75.4 and 231.3 ± 71.2 g kg^{-1} DM, respectively). Therefore, the proportion of pdNDF was lower in TLF than TG (134.5 ± 53.5 and 360.4 ± 63.2 g kg^{-1} DM, respectively). Furthermore, compared to TG, uNDF240 as a proportion of aNDFom was much higher in TLF (637.6 ± 135.7 vs. 389.5 ± 110.6 g kg^{-1} aNDFom). In conclusion, TLF had high uNDF240 concentrations which could explain the lower FI when grasses are substituted by TLF at high rates in the diet of ruminants.

Keywords: Potential digestible fiber, tropical grasses, tropical legumes, uNDF