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"Filling gaps and removing traps
for sustainable resource management"

Not all Legumes are Created Equal: Different Nutritional Value of Tree, Herb and Shrub Legumes

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Abstract

Legume forages are seen as means to improve the nutritional status of ruminants in tropical regions, where low crude protein (CP) and energy of grasses limit their production. Nevertheless, despite several positive attributes of legumes, their incorporation into the production systems is still limited. The diversity of these forages in the tropics contributes to the difficulty to use them as feed, as their nutritional value strongly varies across species and ways of use. Therefore, the objective of this study was to highlight the differences in the nutritional composition of 743 tropical legumes across 399 in-vivo trials with ruminants depending on their growth habit (tree, herb, shrub) and the form they are fed to the animal (fresh, hay, silage), as well as their comparison with tropical grasses.

Legumes from 107 species representing 53 genera were found in those studies. Tree legumes had higher CP (206 g kg^{-1} dry matter (DM)) than herbs and shrubs (159 g kg^{-1} DM), as leaves and young stems are fed from trees, while herbs and shrubs are fed as whole plants. This reflects in the fiber content, which was lower in trees and higher in shrubs. Lignin concentration was higher for legumes compared with grasses (73 g kg^{-1} DM), particularly for trees and shrubs (101 and 106 g kg^{-1} DM, respectively) a factor that could limit intake of legumes. Accordingly, *in–vitro* DM digestibility and metabolisable energy was higher for herbs, and lowest for shrubs, with those of shrubs and trees being lower than for grasses. Hay and sole-legume-silage CP averaged g kg^{-1} DM less than the fresh legume, highlighting losses when legumes are processed for conservation. Calcium, phosphorus and magnesium were highest in trees and lowest in herbs, but all greater than in grasses. Finally, fiber-bound nitrogen was greater in shrubs and trees than in grasses, particularly legume hays, indicating the need for adjustments in the CP of diets when legumes are included.

The nutritional value of legumes strongly varies with their growth habit, and whether they are fed fresh or as hay/silage. Recognizing and understanding these differences is a step closer to successfully incorporate these forages in ruminants feeding.

Keywords: Legume forages, nutritional value, ruminants, tropics

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