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## Ruminal Fermentation and Nutrient Digestion in West African Dwarf (WAD) Sheep Fed *Dialium guineense* Supplemental Diets

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### Abstract

Ruminant livestock production in sub-Saharan Africa is based on forage as the major feed resource, which of course is highly seasonal with low nutritive quality during dry seasons. Multipurpose trees (MPTs) which are part of the natural vegetation and accessible to farmers have always been a useful protein supplement. Studies by a number of researchers have indicated that some MPTs are less suitable as protein supplement because their soluble phenolic and condensed tannin compound limit protein digestion. It was against this background that an experiment was designed to study the fermentation profiles of dried *Dialium guineense* leaves as supplement to grass hay fed to West African Dwarf (WAD) sheep. Eight 24 months old WAD sheep (28.8 kg  $\pm$  4.2 BW), fed a basal hay diet at 2.5 % BW dry matter were used to evaluate the fermentation profiles and nutrient digestion of *Dialium guineense* leaves. Four of the sheep were fistulated ruminally and used for rumen pH, ammonia and volatile fatty acid (VFA) in the rumen fluid. Dried leaves of *D. guineense* were offered at two levels (25 % and 50 % of DMI, diets 2 and 3, respectively) as supplement to a basal hay diet. Rumen liquor was sampled one hour before and one, three and five hours after the morning feeding. Rumen pH of diet 3 was higher ( $p < 0.05$ ) compared to the controls. Diet 3 also had a lower ( $p < 0.05$ ) (14.6 mg dl<sup>-1</sup>) rumen ammonia concentration compared to the controls (30.6 mg dl<sup>-1</sup>). The total VFA of diet 3 was lower ( $p < 0.05$ ) (67.9 mmol l<sup>-1</sup>) when compared to the controls (94.1 mmol l<sup>-1</sup>). Diet 3 showed a negative N- retention (3.5 %) compared to the control diet (16.8 %). These results demonstrate that dried *D. guineense* leaves have a potential as forage during dry season feeding. Even though it showed a lower total VFA and rumen ammonia concentration, the value from this study was within the range of 5 to 23 mg dl<sup>-1</sup> recommended for optimum microbial protein synthesis.

**Keywords:** Chemical composition, *Dialium guineense*, fermentation profiles, WAD sheep