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Effect of Supplementing a Tanniniferous Shrub Legume on Milk Yield and Composition of Dual Purpose Cattle Grazing *Paspalum notatum*

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Abstract

Low availability and poor quality of forages for livestock are major constraints faced by tropical smallholders. This is particularly relevant in regions with low-fertility soils and extended dry seasons. Shrub legumes have been suggested as promising feeds in the dry season, and CIAT has selected some accessions of species with good agronomic performance on low-fertility soils and under drought. Many of these species are characterised by high contents of condensed tannins (CT). Particularly one accession of *Calliandra calothyrsus* showed auspicious potential regarding ruminal fermentation dynamics in vitro and was therefore tested for its suitability as supplement to grazing cattle. In a duplicated 4 × 4 Latin Square design, 8 dual purpose cows (Holstein × Zebu) kept on a *Paspalum notatum* pasture, were supplemented with *Vigna unguiculata*, a more difficult to grow high quality herbaceous legume, and *C. calothyrsus* (CIAT 22310) alone or in mixtures at proportions 1:2 and 2:1. Allowance for supplementation was set to 1 kg of dry matter per 100 kg of body weight. Cows were allowed to adapt for 7 days, followed by 7 days of measurement. Milk yield and composition were measured daily. Consumption of the legumes was 87% of the amount offered with *Vigna* and only 29% with *Calliandra*. The mixture with low *Calliandra* proportion did not differ in consumption from the *Vigna*-only supplement, while that with the high *Calliandra* proportion was intermediate with 59% of the amount offered ($P < 0.05$). Milk yield linearly decreased with increasing proportion of *Calliandra* in the supplement. Accordingly, milk yield was highest ($P < 0.001$) with *Vigna*-only (5.3 kg d^{-1}), and declined to 4.7, 4.4 and 3.6 kg d^{-1} with increasing *Calliandra* level. There were no treatment effects on contents of fat, solids-non-fat and total solids. Milk urea N declined ($P < 0.05$) with increasing *Calliandra* proportion from 6.3 to 3.7 mg dl^{-1} as expected from the protein-binding properties of the *Calliandra* CT. In conclusion, *C. calothyrsus* had a low suitability as sole protein supplement, but it may be added at low proportions if availability of *Vigna* is limited. When supplemented, a major limitation seems to be the low palatability apart from the high CT content.

Keywords: Calliandra, legumes, milk production, supplementation, tannins, vigna