

Effects of age and species on agronomic performance, chemical composition and *in vitro* gas production of some tropical multi-purpose tree species

O. M. Arigbede, Z. L. Tan, U. Y. Anele, Z. H. Sun, S. X. Tang, X. F. Han, C. S. Zhou and B. Zeng

Summary

Five tropical multi-purpose tree species (MPTS), *Enterolobium cyclocarpum*, *Moringa oleifera*, *Millettia griffoniana*, *Pterocarpus santalinoides* and *Treculia Africana*, and one exotic species (*Leucaena leucocephala*), which acted as the control, planted in a randomized complete block design, were selected to evaluate the potentials as feed supplements for herds in dry seasons of south-western Nigeria. Samples of the MPTS leaves were collected in 2005, 2006, 2007 and 2008, weighed, dried and milled for estimation of biomass production, chemical analysis and measurement of *in vitro* gas production. Results showed significant differences ($P < 0.001$) in the biomass production of the MPTS. *E. cyclocarpum* consistently recorded the highest biomass production, height and collar diameter throughout the experimental period. There were also differences ($P \leq 0.001$) in dry matter (DM), crude protein (CP), ether extract (EE) and ash contents of the MPTS across species and years after planting. *M. oleifera* recorded the highest CP content of 240 g/kg DM. Interactions were observed between species and year for neutral detergent fibre (NDFom), acid detergent fibre (ADFom) and lignin contents of the MPTS. *M. griffoniana* and *M. oleifera* had lower tannin contents, whereas *E. cyclocarpum*, *P. santalinoides*, *T. africana* and *L. leucocephala* had higher tannin contents. The values reported for mineral contents showed that their levels in the MPTS were adequate for ruminants and there were no differences in the contents of most minerals. *In vitro* gas production results showed that the potential gas production 'b' was highest in *M. griffoniana* and lowest in *P. santalinoides* and there were species and year interactions ($P \leq 0.001$) for volatile fatty acid profiles of the supernatant after 96 h incubation. The estimated organic matter digestibility (OMD) and metabolizable energy (ME) of the MPTS were generally high. The high biomass production, CP and low fibre contents, as well as *in vitro* fermentation characteristics found for the MPTS evaluated in the current study suggest that these are better alternatives in comparison with *L. leucocephala*. It can be concluded that the MPTS evaluated have potential as sources of feed supplements for ruminants in dry seasons, especially in south western Nigeria.