



Research article

Nutritional assessment of *Ziziphus mucronata* leaves as protein supplements in grass (*Eragrostis spp.*) hay basal diets

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Abstract

The study investigated the effect of supplementing a grass (*Eragrostis spp.*) hay basal diet with *Ziziphus mucronata* leaf meal (ZLM) on chemical composition and *in vitro* ruminal fermentation with or without the aid of polyethylene glycol (PEG). The grass hay was supplemented with ZLM at a rate of 0 (ZM0), 5 (ZM5), 10 (ZM10), 15 (ZM15), 20 (ZM20) and 25% w/w (ZM25). Positive linear trends ($P < 0.05$) were observed for dry matter (DM), crude protein (CP), soluble phenolics (SCT) and total soluble phenolics (TSPH), except for organic matter (OM) that linearly declined as ZLM levels increased. Neutral detergent fibre quadratically ($P < 0.05$) responded to ZLM levels, but no significant trends were observed for acid detergent fibre and lignin. Treatment ZM25 had higher ($P < 0.05$) CP, SCT and TSPH contents than the control treatment. The inclusion of PEG increased ($P > 0.05$) cumulative gas production at 12, 24, 36 and 48 h post-inoculation. Supplementing the grass hay with ZLM had significant ($P < 0.05$) influence on fermentation kinetics. The inoculation with PEG resulted in a negative quadratic trend for the partitioning factor at 96 h post-incubation [$y = 326.0(\pm 39.49) - 20.01(\pm 6.962)x + 0.785(\pm 0.262)x^2$], from which an optimum ZLM supplementation rate was calculated to be 13%. It was concluded that ZLM can be used as a protein source, and with the aid of PEG, it can maximize ruminal fermentation efficiency of grass hay when included at 130 g/kg.

Keywords: Browse leaves, Forage, *In vitro* fermentation, Polyethylene glycol, Protein source, Tannins