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Effect of exogenous fibrolytic enzymes on ruminal fermentation and methanogenesis of Guinea 'A' grass (*Panicum maximum*)

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This study was conducted to evaluate the activity of commercial cellulase (CE) and xylanase (XY) enzymes for their potential to improve rumen fermentation and reduce methanogenesis in Guinea 'A' grass (*Panicum maximum*) at pre-bloom stage. The enzymes were applied at 50 (T1), 100 (T2), 150 (T3) and 200 (T4) µl for 0.5 g ground (1 mm) substrates including a control (without enzyme). For each treatment triplicates of buffered rumen fluid were incubated *in vitro* in a completely randomized design (CRD) followed by a pre incubation with the enzyme. Gas production at different time intervals during the *in vitro* incubation of 24 hours, *in vitro* dry matter digestibility (IVDMD), ammonia nitrogen (NH_3-N), protozoa populations in fermented liquid and methane (CH_4) %, were estimated. Supplementation of the CE and XY significantly enhanced ($p < 0.05$) IVDMD (CE: T1, 51.21%; T2, 50.29%; T3, 50.85%; T4, 50.35% and Control, 43.51; XY:T1, 51.53% ; T2, 52.96%; T3, 52.13%; T4, 53.29%; Control, 47.44%). Though the ruminal NH_3-N production was increased with both CE and XY supplementation, a significant improvement was obtained only with CE ($p < 0.05$) while the ruminal protozoa population was significantly suppressed only with CE compared to the control. Supplementation of CE has significantly ($p < 0.05$) suppressed percentage CH_4 production for Guinea 'A' grass (Control, 0.025; T4, 0.0138). It is concluded that supplementing CE and XY have the potential to improve IVDMD, ruminal NH_3-N production while suppressing protozoa population and CH_4 production.

Keywords*:* Cellulase, fibrolytic enzyme, *in vitro* gas production, methane, ruminal fermentation

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