

## **Papaya (*Carica papaya*) leaf methanolic extract modulates in vitro rumen methanogenesis and rumen biohydrogenation**

### **ABSTRACT**

Papaya leaf methanolic extract (PLE) at concentrations of 0 (CON), 5 (LLE), 10 (MLE) and 15 (HLE) mg/250 mg dry matter (DM) with 30 mL buffered rumen fluid were incubated for 24 h to identify its effect on in vitro ruminal methanogenesis and ruminal biohydrogenation (BH). Total gas production was not affected ( $P > 0.05$ ) by addition of PLE compared to the CON at 24 h of incubation. Methane (CH<sub>4</sub>) production (mL/250 mg DM) decreased ( $P < 0.05$ ) with increasing levels of PLE. Acetate to propionate ratio was lower ( $P < 0.05$ ) in MLE (2.02) and HLE (1.93) compared to the CON (2.28). Supplementation of the diet with PLE significantly ( $P < 0.05$ ) decreased the rate of BH of C18:1n-9 (oleic acid; OA), C18:2n-6 (linoleic acid; LA), C18:3n-3 (linolenic acid; LNA) and C18 polyunsaturated fatty acids (PUFA) compared to CON after 24 h incubation, which resulted in higher concentrations of BH intermediates such as C18:1 t11 (vaccenic acid; VA), c9t11 conjugated LA (CLA) (rumenic acid; RA) and t10c12 CLA. Real-time PCR analysis indicated that the total bacteria, total protozoa, *Butyrivibrio fibrisolvens* and methanogen population in HLE decreased ( $P < 0.05$ ) compared to CON, but the total bacteria and *B. fibrisolvens* population were higher ( $P < 0.05$ ) in CON compared to the PLE treatment groups.

**Keyword:** Biohydrogenation; In vitro gas production; Methanogenesis; Papaya leaf extract; Rumen fermentation