

Effects of exogenous enzymes on *in vitro* gas production kinetics and ruminal fermentation of four fibrous feeds

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Abstract

This study was conducted to investigate effects of increasing doses: 0 (control), 6 (low), 12 (medium) and 24 (high) mg/g DM of ZADO[®] enzyme preparation mixture (ENZ) on *in vitro* gas production (GP) and some ruminal fermentation parameters of the fibrous feeds *Saccharum officinarum* (leaves), *Andropogon gayanus* (leaves), *Pennisetum purpureum* (leaves) and *Sorghum vulgare* (straw). Rumen liquor was obtained from two Brown Swiss cows fitted with permanent rumen cannulae fed a total mixed ration of a 500:500 commercial concentrate and alfalfa hay *ad libitum*. The GP was recorded at 2, 4, 6, 8, 10, 12, 24, 48, 72 and 96 h of incubation. After 96 h, the incubation was stopped and the pH of the mixture was determined and filtrate used to determine dry matter degradability (DMD), partitioning factor (PF₉₆), gas yield (GY₂₄), *in vitro* organic matter digestibility (OMD), metabolizable energy (ME), short chain fatty acids (SCFA), and microbial crude protein production (MCP). In general, the crude protein (CP) content of the fibrous feeds was low and ranged from 23 g/kg DM (*S. officinarum*) to 44 (*A. gayanus*). The fibre contents (*i.e.*, NDFom and ADFom) were highest (P<0.05) in *S. officinarum*. Increasing ENZ dose linearly increased (P<0.05) GP of all fibrous feeds and had a quadratically increased (P<0.05) asymptotic gas production in *P. purpureum* and *S. vulgare* and rate of gas production in *S. officinarum* and *S. vulgare*. Addition of ENZ also quadratically increased (P<0.05) GP at all incubation times in *S. officinarum* and *S. vulgare*, and *A. gayanus*, but only at 72 h in *A. gayanus*. The parameters of ruminal fermentation of OMD, ME, GY₂₄ and SCFA linearly increased (P<0.05) and MCP linearly decreased (P<0.05) with the ENZ addition. Addition of enzyme affected ruminal fermentation of our feeds differently, mainly dependent on their fibre content, although dosage of enzyme was also important as impacts generally increased at higher dosages of ENZ.