



## Effect of Brown Iranian Propolis Extracts on *in vitro* Rumen Gas Production

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### ABSTRACT

Nutritional strategies to improve the production of ruminants have attracted the attention of nutritionists for several years. Making use of some additives such as antibiotics and probiotics in the diet signifies a remarkable reduction of methane production in the ruminants. Because of the use chemical substances the risk of residue transmission into milk and meat on the one hand and the prohibition of utilizing antibiotics by European Union in 2006 on the other hand made the researchers exploit natural products to manipulate rumen fermentation. The goal of this study was effect of brown Iranian propolis (BIP) extracts on *in vitro* rumen gas production. Rumen fluid was collected from two ruminally fistulated dairy cow ( $580 \pm 4.5$  kg, body weight) prior to offering the morning feed. Animals were fed 10.4 kg DM, a diet containing alfalfa hay (50%), wheat straw (20%), barley grain (15%), soybean meal (14%) and mineral-vitamin premix. Effect of BIP on gas production was assessed by incubating approximately 200 mg experimental sample (2 mg BIP 25%, 50% and 75%) with 30 ml of rumen buffer mixture in 100 ml glass syringes based on Menke and Steingass (1988) procedure. Gas production (ml) was recorded at 2, 4, 6, 8, 12, 16, 24, 36, 48, 72 and 96 h. Total gas values were corrected for blank with a known gas production. After subtraction of gas production from blank bottles, data was fitted to the exponential model of Ørskov and McDonald (1979). The trial was analyzed considering a completely randomized design by the GLM procedure of SAS 9.1. Means among treatment were compared by Tukey test. The values of a (the gas production from the immediately soluble fraction), b (the gas production from the insoluble fraction), a + b (potential extent of gas production), and c (gas production rate constant for the insoluble fraction b) were estimated using the nonlinear regression (NLIN) procedure of SAS. The results of this study showed that BIP led to a significant ( $p < 0.05$ ) increase in gas production in BIP 75% but no significant ( $p > 0.05$ ) difference was seen in other treatments. BIP increase rumen gas production and improves rumen fermentation *in vitro* when added to the diet of dairy cow because of flavonoids and phenolic compounds.

**Keywords:** Brown Iranian propolis, Gas production, Rumen