

Influence of exogenous enzymes ensiled with orange pulp on digestion and growth performance in lambs

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Abstract

Twenty-four Ossimi male lambs were used to evaluate effects of inclusion of ensiled orange pulp (EOP) in lamb diets either with or without addition of exogenous enzymes (ENZ) of ZADO[®] on digestion and growth performance. Lambs (21.1 ± 1.01 kg body weight (BW)) were assigned to one of three groups of 8 animals/group in a randomized complete block design being: Control (basal diet with 0 g/kg EOP), EOP (Control with 150 g/kg EOP) or EOP + ENZ (EOP with 5 g/kg of ZADO[®]) in a 90-day experiment. Ensiling the orange pulp increased the crude protein, ether extract and metabolizable energy of the silage by 29, 46 and 8%, respectively, and reduced the secondary metabolites, such as total phenolics, saponins and alkaloids. Silage lactic acid and ethanol were increased by 35% and 54%, respectively for EOP and EOP with ENZ, but all silage quality parameters were in the normal range. Concentration of NH₃-N before feeding was decreased ($P < 0.05$) by 11 and 13% in EOP and EOP + ENZ, respectively, whereas at 3 and 6 h after feeding ruminal VFA concentration was increased ($P < 0.05$) by 23 and 9% respectively, only in EOP + ENZ lambs. NDFom intake was increased ($P = 0.036$) by 52 and 59%, whereas the ADFom increased ($P = 0.032$) by 8 and 11% in EOP and EOP + ENZ lambs, respectively. Nutrients digestion were higher ($P < 0.05$) in EOP + ENZ than EOP lambs. Digestible DM was increased by 18%, whereas the fiber fractions (NDFom and ADFom) were increased by 93 and 47% with similar EOP + ENZ. DM intake among groups, whereas feed efficiency was higher ($P = 0.042$) by 19 and 31% in EOP and EOP + ENZ lambs compared to control diet. Live weight gain increased ($P = 0.038$) by 92% in EOP + ENZ lambs whereas it increased by 54% in EOP lambs. Addition of EOP to the diet improved feed efficiency and live weight gain suggesting a good quality feed, which could probably be used to replace a part of the concentrate in ruminant diets.