

**Effects of postbiotic supplementation on growth performance, ruminal fermentation and microbial profile, blood metabolite and GHR, IGF-1 and MCT-1 gene expression in post-weaning lambs**

**ABSTRACT**

Background: Postbiotics have been established as potential feed additive to be used in monogastric such as poultry and swine to enhance health and growth performance. However, information on the postbiotics as feed additive in ruminants is very limited. The aim of this study was to elucidate the effects of supplementation of postbiotics in newly-weaned lambs on growth performance, digestibility, rumen fermentation characteristics and microbial population, blood metabolite and expression of genes related to growth and volatile fatty acid transport across the rumen epithelium. Results: Postbiotic supplementation increased weight gain, feed intake, nutrient intake and nutrient digestibility of the lambs. No effect on ruminal pH and total VFA, whereas butyrate and ruminal ammonia-N concentration were improved. The lambs fed with postbiotics had higher blood total protein, urea nitrogen and glucose. However, no difference was observed in blood triglycerides and cholesterol levels. Postbiotics increased the population of fibre degrading bacteria but decreased total protozoa and methanogens in rumen. Postbiotics increased the mRNA expression of hepatic IGF-1 and ruminal MCT-1. Conclusions: The inclusion of postbiotics from *L. plantarum* RG14 in newly-weaned lambs improved growth performance, nutrient intake and nutrient digestibility reflected from better rumen fermentation and microbial parameters, blood metabolites and upregulation of growth and nutrient intake genes in the post-weaning lambs.

**Keyword:** Blood metabolite; Gene expression; Growth performance; *Lactobacillus plantarum*; Nutrient uptake; Post-weaning lambs; Postbiotics; Rumen fermentation