

In vitro study of postbiotics from *Lactobacillus plantarum* RG14 on rumen fermentation and microbial population

ABSTRACT

An in vitro study was carried out to identify the effects of different inclusion levels of postbiotics from *Lactobacillus plantarum* RG14 on rumen fermentation profiles, gas production kinetics, and microbial population in rumen fluid collected from goats. Postbiotics were added at different levels (0, 0.3, 0.6, 0.9, and 1.2%) and incubated for 72 h with 200 mg dry matter (DM) of a substrate containing 60% Guinea grass and 40% commercial concentrate. The experiment was conducted in triplicate on different days with four replications per treatment. Rumen fermentation kinetics, pH, organic matter digestibility (OMD), volatile fatty acids (VFA), and microbial populations were investigated. Net gas production and gas production from the immediate soluble fraction (a) increased linearly, and the volume of gas produced from the insoluble fraction (b) and potential gas production (a + b) quadratically increased with the increasing levels of postbiotics. A significant linear increase in OMD was observed for increasing postbiotic levels. Total and individual molarity of ruminal VFA and acetic acid to propionic ratio were also significantly increased by postbiotic inclusion. Populations of total bacteria, cellulolytic bacteria (*Fibrobacter succinogenes*, *Ruminococcus albus*, *Ruminococcus flavefaciens*), and total protozoa were significantly increased in the postbiotic treatment. Postbiotics in the ruminal fluid in vitro enhance rumen fermentation and improve digestibility and VFA production without any adverse effects on pH.

Keyword: Feed additive; Fermentation profile, *Lactobacillus*; Ruminal kinetics; Rumen microorganisms; Volatile fatty acids