

EFFECT OF CUMIN AND OREGANO ESSENTIAL OILS AT THREE DIFFERENT CONCENTRATIONS ON IN VITRO GAS PRODUCTION PARAMETERS OF CORN SILAGE

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INTRODUCTION

Essential oils may have applications in ruminant nutrition because fermentations in the silo and rumen are dependent on microbial activities that may be affected by their use. The objective of this study was to examine the impact of Cumin and Oregano essential oils at three different concentrations on corn silage using gas production technique.

MATERIALS AND METHODS

Corn forage was harvested at 30 to 31% of dry matter (DM) content and chopped with a forage harvester to a theoretical length of 1–2 cm. Essential oil (EO), Cumin (CUM), Oregano (ORE) was dissolved in 0.5 v/v aqueous ethanol and sprayed onto the forage at a rate of 5.56 mL kg⁻¹ silage. The oils were applied to the forage to achieve final concentrations of 50, 100 and 150 mgEOkg⁻¹ DM. The control silage was treated with an equivalent amount of aqueous ethanol. Samples of silage were ground through a 1 mm screen and dried in an oven at 66°C for 48 h. In vitro gas production parameters of the samples were determined using the Menke and Steingass (1988) procedure. The volume of gas produced was determined at 2, 4, 8, 12, 24, 36, 72 and 96 h after the incubation. The gas production data were fitted using an exponential equation of $P = b(1 - e^{-ct})$, where b is the volume of gas produced, c is the fractional rate constant of gas production (/h), t is the incubation time (h) and P is the volume of gas produced at time t.

RESULTS AND DISCUSSION

The results of this study showed that the potential gas production (b) hasn't significantly difference between treatments. However the highest and lowest of potential gas production were related to treat CUM150 and treat CUM50 (65.139 and 53.03 ml, respectively). Experimental treatments significantly affected constant rate of gas production (c) (P<0.05) where in ORE100 was highest and was lowest for CUM100 (0.043 vs. 0.026 ml/h respectively). The results of this study confirmed the findings of Sadjadian et.al (2010) who reported that treatment of alfalfa hay with Cumin leads to significantly decrease in constant rate of gas production.

Keywords: corn silage, essential oil, gas production

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