

BENELAC and RUMEN CALM

Introduction

Yeast culture is widely recognized and documented as having rumen modifying and production enhancing effects. Though the exact mechanisms have never been fully explained, it is presumed that the nucleotides and amino acids provide readily available nutrient sources for rumen microbes. The extent to which the growth media of yeast culture is of benefit is not known. Benelac is a 100% *Saccharomyces cerevisiae* yeast product, formulated with inactive dried yeast, hydrolyzed yeast and yeast cell wall. These components may have similar stimulatory effects on ruminal fermentation. Rumen Calm is comprised of similar yeast components, plus sarsaponin for its VFA sparing, methane-reducing and anti-protozoal activity, plus an algal beta glucan source for its prebiotic and immune-modulating activity. Neither product has any carrier, so they form highly concentrated sources of these beneficial constituents. Formulated products of this type have not been extensively studied for their effects on ruminal fermentation. Consequently, we sought to compare their performance in a rumen fermenter system to a well-documented yeast culture as a positive control, and a negative control of no additives.

Methods

In this study, we utilized the Fermentrics™ system (www.fermentrics.com) to evaluate Benelac and Rumen Calm in comparison to a negative control (no additive), and a positive control (Diamond V XPC). Fermentrics is a batch-culture, rumen-fluid, gas-fermentation system which allows for the differentiation of rapid and slow-fermenting carbohydrate pools, and the quantification of organic matter digestion (OMD) and microbial biomass production (MBP). Rumen fluid collected from a high-producing Holstein cow is divided into the batch culture vessels. Four hundred mg of a TMR (analysis below) is added to the bottles, which are then sealed and placed in a shaking water bath at 39.5° C. Treatments were added (4 replicates/treatment and time point), along with the TMR, to each bottle at the following relative feeding rates: Negative Control, 0 g/d; Positive Control, 14 g/d; Benelac , 3 g/d; and Rumen Calm at 5g/d. At 12, 24 and 48 hours of incubation, a set of bottles were pulled and the fluid analyzed for: OMD, MBP, Acetate, Butyrate, Isobutyrate, Lactate, Propionate and Valerate. Data were analyzed using ANOVA in JASP.

TMR Nutrient Analysis

CP - 15.89% RUP - 5.35% DM RDP - 10.6% DM Sol. CP - 36.3% CP MP Supply - 2445 g
ADF - 20.2% DM peNDF - 23.5% DM Lignin - 3.1% DM NFC - 40.8% Sugar - 3.0% DM
Starch - 29.1% DM Sol. Fib. - 5.8% DM Ferm. CHO - 43.9% DM Fat - 3.8% DM ME -
2.51 Mcal/kg

Results

Microbial Biomass Production and Organic Matter Digestion - For MBP, Negative had the highest growth of microbial biomass. Benelac was significantly lower than Negative, but higher than both Positive and Rumen Calm. Because Rumen Calm contains sarsaponins, which are anti-protozoal, we would expect a suppression of total microbial mass. Conversely, Rumen Calm had the highest OMD, though it was not significantly different than Positive. Negative and Benelac had significantly lower OMD than Rumen Calm, though they were not different from Positive.

VFA Production - For Acetate, Positive was significantly lower than all other treatments ($P=.03$). There was a tendency for Benelac and Rumen Calm to stimulate higher production of Butyrate than Positive or Negative ($P=.095$). Benelac and Rumen Calm both significantly increased the production of Propionate in comparison to Negative and Positive ($P=.04$). Isobutyrate, lactate and valerate production did not differ by treatment ($P>.05$).

Implications

In general, Rumen Calm had the lowest MBP, but stimulated the highest OMD and VFA production. Similarly, Benelac stimulated higher levels of VFAs while having the lowest OMD and intermediate effects on MBP. Benelac and Rumen Calm can be cost-effective, low-inclusion rate options to support lactation performance in dairy herds.