Influence of yeast culture on blood metabolites and acute phase response in beef heifers

Y. Z. Shen1,2, H. R. Wang2, T. Ran1, I. Yoon3, A. M. Saleem4, W. Z. Yang1

1Agriculture and Agri-Food Canada, Lethbridge Research and Development Centre, Lethbridge, AB; 2College of Animal Science and Technology, Yangzhou University, Yangzhou, 225009, China; 3Diamond V, 2525 60th Ave SW, Cedar Rapids, Iowa, 52404

Introduction

• Saccharomyces cerevisiae fermentation product (SCFP) is a product of yeast fermentation, as oppose to live yeast
• The SCFP are used widely by the dairy industry, but the use is much less widespread in beef cattle.
• Most studies using SCFP have focussed on rumen fermentation: stabilizing rumen pH, improving fiber digestion or increasing microbial protein synthesis (Vohra et al. 2016)
• However, little data is available in the area of lower gut microbial digestibility

Objectives

• To investigate the effects of sites of delivering SCFP on feed digestion, fecal IgA, blood metabolites and acute phase response in beef heifers fed high-grain diets
• To examine the use of SCFP as a potential alternative for current industry standard antibiotics used in beef cattle feeds.

Materials and methods

• Animal: 5 rumen and duodenal cannulated Angus heifers (BW: 561 kg)
• Design: a 5 × 5 Latin square design (28 d/period)
• Treatments:
  1. Control (no SCFP, no antibiotics)
  2. 330 mg monensin + 110 mg tylosin/d (ANT)
  3. Top dressed SCFP (rSCFP; 18 g/d)
  4. Duodenally delivered YC (dSCFP; 18 g/d)
  5. Mixture of #3 & #4 (rdSCFP, 36 g/d)
• Diet: 10% barley silage, 87% barley grain and 3% vitamin and minerals.
• SCFP: NaturSafe from Diamond V (Cedar Rapids, Iowa)

Results

Intake and digestibility (Table 1)

• DMI tended (P<0.10) to be greater for heifers fed rdSCFP than control, ANT and rSCFP diets
• Ruminal digestibility of OM was highest with rSCFP and rdSCFP, intermediate with dSCFP and ANT, and lowest with control...
• Total tract digestibility of OM (P<0.07) and NDF (P<0.01) was greater with rSCFP and rdSCFP than control and ANT.

LPS concentrations and immune responses (Table 2)

• Fecal IgA concentration was highest with ANT, intermediate with dSCFP and rdSCFP, and lowest with control and rSCFP.
• No treatment effects on blood concentrations of glucose, urea N, and NEFA were observed.
• Acute phase response measured with blood serum amyloid A and LPS-binding protein did not differ among treatments.

Conclusions

• Adding SCFP benefits to alleviate ruminal acidosis and to increase fibrolytic microbial activity
• An improvement of intestinal mucosal immunity by SCFP with delivery of SCFP to the duodenum.
• The SCFP performed better or at least equal to antibiotics currently used in beef cattle rations and could be a natural alternative for beef cattle production.

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References