
Abstract
Certain indigestible oligosaccharides may benefit gastrointestinal tract health via fermentation and proliferation of desirable bacterial species. The purpose of this study was to elucidate effects of selected oligosaccharides on cecal and fecal short-chain fatty acid (SCFA) concentration, pH, total large bowel wet weight and wall weight, and gut microbiota levels in rats. Fifty male Sprague-Dawley rats were randomly assigned to one of five treatments: 1) control diet; 2) control diet + 5% microcrystalline cellulose (5% CC); 3) control diet + 5% CC + 6% fructooligosaccharides; 4) control diet + 5% CC + 6% oligofructose; or 5) control diet + 5% CC + 6% xylooligosaccharides. The control diet consisted of (dry matter basis) 20% protein, 65% carbohydrate, 10.5% fat, vitamin and mineral mixes. The duration of the study was 14 d.

The oligofructose- and fructooligosaccharide-containing diets resulted in higher cecal butyrate concentrations compared with the control, cellulose and xylooligosaccharide diets. Generally, total cecal SCFA pools were higher while pH was lower from ingesting oligosaccharide-containing diets compared with control or cellulose diets. Cecal total weight and wall weight were higher from oligosaccharide consumption, whereas colonic total wet weight was higher for rats consuming xylooligosaccharides compared with other treatments; colon wall weight was unaffected by treatments. Cecal bifidobacteria and total anaerobes were higher whereas total aerobes were lower in rats fed oligosaccharide diets compared with those fed the control diet. Cecal lactobacilli levels were unaffected by treatment. Dietary incorporation of fermentable, indigestible oligosaccharides, by providing SCFA, lowering pH, and increasing bifidobacteria, may be beneficial in improving gastrointestinal health.