



Title: Supplementation of the Diet with High-Viscosity Beta-Glucan Results in Enrichment for Lactobacilli in the Rat Cecum

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Abstract

BBn (BioBreeding) rats were fed casein-based diets supplemented with barley flour, oatmeal flour, cellulose, or barley β -glucans of high [HV] or low viscosity [LV] in order to measure the prebiotic effects of these different sources of dietary fiber. The dietary impact on the composition of the cecal microbiota was determined by the generation of denaturing gradient gel electrophoresis (DGGE) profiles of PCR-amplified 16S rRNA gene sequences. The DGGE profiles produced from the cecal microbiota of rats within each dietary group were similar, but consensus profiles generated from pooled bacterial DNAs showed differences between rat groups. Animals fed HV glucans (HV-fed rats) had DGGE consensus profiles that were 30% dissimilar from those of the other rat groups. A 16S rRNA gene fragment that was more conspicuous in the profiles of HV-fed animals than in those of cellulose-fed rats had sequence identity with *Lactobacillus acidophilus*. Measurements of *L. acidophilus* rRNA abundance (DNA-RNA hybridization), the preparation of cloned 16S rRNA gene libraries, and the enumeration of *Lactobacillus* cells (fluorescent in situ hybridization) showed that lactobacilli formed a greater proportion of the cecal microbiota in HV-fed rats. In vitro experiments confirmed that some lactobacilli utilize oligosaccharides (degree of polymerization, 3 or 4) present in β -glucan hydrolysates. The results of this study have relevance to the use of purified β -glucan products as dietary supplements for human consumption.