

Assessment of the bifidogenic effect of substituted xylo-oligosaccharides obtained from corn straw

Abstract

This work evaluates the bifidogenic potential of substituted xylo-oligosaccharides (XOS) obtained from a lignocellulosic feedstock (corn straw). Autohydrolysis was used to selectively hydrolyse the xylan-rich hemicellulosic fraction and the soluble oligosaccharides were purified by gel filtration chromatography. Selected oligosaccharides fractions within the target ranges of polymerization degree (4–6 and 9–21, samples S1 and S2, respectively) were characterized and their bifidogenic potential was investigated by *in vitro* fermentations using human fecal inocula. Bacterial growth was assessed by fluorescent *in situ* hybridization (FISH). XOS consumption and short-chain fatty acids (SCFA) production were evaluated and compared with commercial oligosaccharides. Under the tested conditions, all the substrates were utilized by the microbiota, and fermentation resulted in increased bifidobacteria populations. Samples S1 and S2 increased bifidobacteria populations and the production profile of SCFA was similar for XOS samples and commercial oligosaccharides although XOS samples displayed the highest concentration of SCFA on longer fermentation times.