

Defatted coconut residue crude polysaccharides as potential prebiotics: study of their effects on proliferation and acidifying activity of probiotics in vitro

ABSTRACT

This paper reports on the extraction, partial characterization and the potential application of crude polysaccharides from defatted coconut residue as a prebiotic. The coconut residue was defatted and extracted to obtain the crude polysaccharides and its physicochemical properties were determined. The crude polysaccharides were assessed for monosaccharide composition, total carbohydrate content, reducing sugar concentration and protein content determination. The functional group and structural elucidation of crude polysaccharides was also done using Fourier transform infrared spectra analysis. The product was then subjected to artificial human gastric juice treatment to determine digestibility. Finally, an in vitro proliferation and acid production by two probiotic bacteria namely *Lactobacillus casei* Shirota and *Lactobacillus bulgaricus* were included in this study. It was found that the defatted coconut residue contained ash (0.54%), moisture (55.42%), protein (1.69%), crude fat (17.26%) and carbohydrate (25.73%). The percentage of crude polysaccharides extracted was 0.73 ± 0.04 . The two fractions of monosaccharides obtained were glucose and fructose. Total carbohydrate content of DCR was 13.35% (w/v). The quantitative value of the reducing sugars obtained was 20.71%. Protein content in the crude polysaccharides was 0.009% and the peaks which indicated the presence of protein were observed at around 1640 cm^{-1} (amide I) and 1530 cm^{-1} (amide II). DCR crude polysaccharides were highly resistant (88%) to hydrolysis when subjected to artificial human gastric juice. The product was found to markedly stimulate two tested probiotics to proliferate and produce organic acids. All the above findings are supportive of the fact that polysaccharides extracted from DCR, an industrial waste, have a vast potential to be exploited as novel prebiotics.

Keyword: Coconut residue; Polysaccharides; Prebiotic potential; Probiotic proliferation