

Preparation and analysis of prebiotic nutraceutical produced from sugarcane bagasse using *Bacillus Subtilis* KCX006

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Sugarcane bagasse (SB) is an abundant agricultural by product in India. Recently there is a tremendous interest in the utilization of bagasse for the production of fuels ethanol, butanol and chemicals. Other than these products value added prebiotic nutraceuticals like xylooligosacharides (XOS) can be produced from its hemicellulose part. XOS are considered as soluble micro fiber food or prebiotics and proliferate the probiotic *bifidobacteria* which prevent the growth of putrefactive bacteria thereby maintaining the healthy gut pH and micro flora. Prebiotics as health food supplements play a vital role in the gastro intestinal cancer prevention, innate immunity, diabetes and absorption of micro, macro nutrients. A comparative analysis of XOS production from hemicellulose fraction of bagasse was made using a purified endo-xylanase and a crude enzyme mixture containing multi-carbohydrases produced from a novel strain of *Bacillus subtilis* KCX006. The analysis of XOS for substituents was carried out by ^1H NMR and MALDI-TOF. Characteristic chemical shifts in the regions of δ 3.00 to 5.00ppm and strong signals at δ 4.4–4.6 ppm

indicated β -linked xylopyranoside residues and α -linked arabinofuranoside. The signals at δ 5.2–5.4 ppm showed the anomeric region of substituted arabinose and methyl glucuronic acid residues in X4 and X2. Molecular weights obtained from the MALDI-TOF analysis are in good agreement with the NMR observations. Hydrolysis of hemicellulose with pure endo-xylanase yielded mixture of arabinose, glucuronic acid substituted XOS and trace amounts pure unsubstituted XOS ranging from DP2 to DP4. Hemicellulose conversion to XOS was found to be 27%. The multi enzyme mixture hydrolysed hemicellulose to high levels of arabinose substituted XOS and unsubstituted XOS with traces of glucurono xylobiose. Hemicellulose conversion to XOS was found to be 51.09%. Crude enzyme mix with multiple carbohydrases is found to be the best for high level production of pure XOS and biomass conversion. We can conclude that the crude enzyme mix produced by the strain KCX006 is better than purified xylanase to produce high levels of XOS.

Biography

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