2ND ICBC
INTERNATIONAL CONGRESS ON BIOACTIVE COMPOUNDS
3rd International Workshop on Bioactive Compounds: Personal Nutrition, Ageing and Food Science
November 9-10th, 2022 at Unicamp

XYLOOLIGOSACHARIDES PRODUCTION BY ENZYMATIC HYDROLYSIS FROM SUGARCANE BAGASSE FOR USE IN FOOD-RELATED APPLICATIONS

ÁVILA[1], P.F.; PASCHOA[2], J.L.F.; RAMALHO[3], E.X.; GOLDBECK[4], R.

[1]Faculty of Food Engineering, Unicamp, Campinas-SP, patyfavila@gmail.com
[2] Faculty of Food Engineering, Unicamp, Campinas-SP, joaolfp13@gmail.com
[3] Faculty of Food Engineering, Unicamp, Campinas-SP, enylsonramalho@gmail.com
[4] Faculty of Food Engineering, Unicamp-, Campinas-SP, goldbeck@unicamp.br

Keywords: Xylooligosaccharides; Sugarcane bagasse; Prebiotics

Abstract: Xylooligosaccharides (XOS) are one of the classes of prebiotics obtained from lignocellulosic biomass, by hydrolysis of hemicellulose, abundant in agroindustrial wastes. As the most representative of lignocellulosic materials, sugarcane bagasse (SB) is a potential source to produce xylooligosaccharides (XOS). Owing to the high impurity content of the XOS produced by directly enzymatic hydrolysis of xylan extracted from SB, subsequent refining steps are essential to food-related applications. The present study was aimed to investigate the XOS obtaining process including the xylan extraction process, enzymatic XOS production and refining step using activated carbon in XOS adsorption for the application the rich XOS solution in the food products. The xylan extraction was evaluated with potassium hydroxide in the range concentration of 5-18%, achieving xylan extraction efficiency up to 84.54% under hydrothermal condition with 12% of hydroxide concentration for 30 min. The enzymatic hydrolysis of SB extracted xylan was performed with endo-1,4-xylanase (NS50030-Novozymes®) cocktail with SB extracted xylan enabling 213.7 mg XOS/g xylan with xylobiose and xylotriose as the major products, which are short chain oligosaccharides preferred by probiotics. The desorption was systematically investigated after evaluating of the ethanol elution concentration, providing up 48.49% of XOS recuperation in the translucent solution with a high degree of purity from 40% ethanol eluate, presenting high potential of use to food application as a functional ingredient.

Project numbers: CNPq (151215/2022-7, 403675/2021-9, 307014/2020-7), FAPESP (2019/08542-3)