



## PREBIOTIC POTENTIAL OF HYDROLYSATES CONTAINING XYLOOLIGOSACCHARIDES PRODUCED BY DIFFERENT APPROACHES

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**Abstract:** Xylooligosaccharides (XOS) are considered emergent prebiotics with potential for several industrial applications. Here, we investigated the prebiotic activity of XOS-containing hydrolysates produced by different processes: direct fermentation of beechwood xylan (BXL) and enzymatic treatment of beechwood (XLH) or rice husk (RHH) xylans. BXL was obtained by fermentation of beechwood xylan (2.5 g/L increased up to 5.0 g/L after 3 h) using a cloned *Bacillus subtilis* 3610 containing the xylanase gene *xyn2*. XLH and RHH were obtained by enzymatic hydrolysis (40 °C, 180 rpm, 24 h) of xylans using a crude xylanase extract from *Aureobasidium pullulans* CCT 1261 as follows: RHH – 3% (w/v) rice husk xylan in pH 5.3 and enzyme load of 200 U/g<sub>xylan</sub>; XLH – 6% (w/v) beechwood xylan in pH 6.0 and enzyme load of 260 U/g<sub>xylan</sub>. The hydrolysates obtained from each strategy were lyophilized and further used as substrates (10 g/L) in anaerobic fermentation (37 °C, 48h) with fecal inoculum (11%, v/v) to evaluate the prebiotic activity. During the *in vitro* fermentation, liquid and gas samples were taken periodically for further analysis, as biomass samples for DNA extraction and sequencing analysis. The reduction of both the pH and the ammonia concentration together with the production of short-chain fatty acids, lactate (BLX: 80.4±2.2 mM; RHH: 104.7±4.9 mM; XLH 107.9±5.9 mM) and CO<sub>2</sub> (BLX: 12.3±0.5 mmol/L; RHH: 18.1±0.3 mmol/L; XLH: 18.8±1.2 mmol/L) suggested the prebiotic potential of the XOS-containing hydrolysates. Additionally, the fermentation of these hydrolysates decreased the relative abundance of *Clostridium*, *Desulfovibrionales*, and *Methanobacteriaceae* and stimulated the growth of *Bacteroides*, *Megamonas funiformis*, and *Lactobacillus reuteri*. Based on these results, we concluded that the non-purified XOS-containing hydrolysates have promising prebiotic activities for further applications in food and cosmetic areas.

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