Biotechnologycal production of xylitol from whole slurry corn cob: optimization of ssf process

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Abstract

Aim and approach used: The aim of this study was the development of a biotechnological strategy for the bioconversion of xylose into xylitol by simultaneous saccharification and fermentation (SSF) process. For this purpose, corn cob was hydrothermally pretreated at high solid loadings (25%). The whole slurry obtained from the pretreatment was used as substrate for the bioconversion of xylose into xylitol using a geneticallyengineered *Saccharomyces cerevisiae* strain [1]. The independent variables (percentage of pretreated corn cob and enzyme loading) was evaluated using a factorial complete experimental design.
Scientific innovation and relevance: Xylitol has been included in the 12-top of value added compounds to be obtained from biomass. Xylitol is used as natural sweetener in pharmaceutical and food industries and as an intermediate for the synthesis of polymers in the chemical industry. Xylitol production by biotechnological processes emerges as interesting and sustainable altemative to chemical industrial processes. Nevertheless, this biotechnological process requires further development and optimization.
Results or plenary results and conclusions: The results revealed that the percentage of substrate had significant influence on xylitol production achieving a maximal concentration of 47 g/L with 6.7 % of pretreated biomass and 24 FPU/g, using partial detoxification of hydrolysate. Under optimal conditions, SSF was carried out with a complete detoxification of hydrolysate, which improved 1.55 and 1.42 fold-higher the xylitol concentration and productivity, respectively. This work shows an integrated strategy for the biotechnological production of xylitol by environmentally friendly processes.

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