VALORIZATION OF LIGNOCELLULOSIC INDUSTRIAL RESIDUES FOR XYLANASE PRODUCTION BY AN ANTARCTIC YEAST

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ABSTRACT

Eucalyptus pinchips, a residual product from pulp industries, presents an opportunity as a raw material for the production of high-value bioproducts such as enzymes. Among these enzymes, xylanases hold significant potential for applications in the food, agro-fiber and paper and pulp industries. A prevalent need within these industries aims to reduce process temperatures, prompting an ongoing search for novel microorganisms capable of secreting cold-active xylanases. In this study, we investigated the ability of an Antarctic isolated yeast, *Trichosporon pullulans*, to grow and produce xylanases from xylose and xylo-oligomers rich hemicellulosic hydrolysates. Autohydrolysis, an eco-friendly pretreatment, was applied to pinchips to obtain the hemicellulose hydrolysate, subsequently used as a cost-effective carbon source for xylanase production. Two detoxification resin methods (XAD-4 and WA-30) were assessed to remove potential inhibitors for microorganisms (organic acid, soluble lignin, phenolic compounds, furfural and HMF). Additionally, two nitrogen sources: corn steep liquor (CSL) and yeast extract (YE), were studied for media supplementation. *T. pullulans* is an interesting candidate for xylanase production for applications that require high enzyme activity (7.6 ± 0.4 IU/mL) at low temperatures when cultivated in non-detoxified hemicellulosic hydrolysates supplemented with YE.