

## XYLOSACCHARIDES PURIFICATION FROM EUCALYPTUS RESIDUES FOR THE PRODUCTION OF LACTIC ACID

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### ABSTRACT

In this work, phosphoric acid pretreatment of eucalyptus residues was performed to recover the hemicellulosic fraction (mainly xylose) for further conversion to lactic acid by fermentation with *Bacillus coagulans* DSM 2314. Optimal pretreatment conditions were determined using a central composite design, aiming to achieve the highest recovery and concentration of xylose in the pretreatment liquor while minimizing the amount of phosphoric acid used. Under the best conditions (160°C, 0.6% H<sub>3</sub>PO<sub>4</sub>, 40 min), the composition of the liquor was (in g/L): 24.8 xylosaccharides (20.3 as xylose), 2.1 glucosaccharides, 7.8 acetic acid, 0.7 furfural, and 2.1 acid soluble lignin (ASL).

Pretreatment liquor was purified using adsorptive (Amberlite® XAD-4) or anionics (Dowex®66 and Dowex®-Marathon®11) resins. The resin to liquor ratio was analyzed to maximize xylose concentration in the eluate while retaining lignin, furfural and acetic acid in the resins. Under the best condition (Amberlite® XAD-4 and 3:1 resin:eluate ratio), furfural was completely removed and 90% of ASL was eliminated, with a retention of around 20% of the xylosaccharides. The lactic acid production yield increased from 28% (without purification) to 71% after resin treatment. Subsequently, the pretreated liquor was concentrated in a vacuum oven at 60°C, and the concentrated liquor was also purified with resins at the previous selected conditions. In the eluted from the concentrated liquor, 100% of furfural, 80% of ASL and 45% of acetic acid were removed, with a loss of 25% of the xylosaccharides. The fermentation of this eluate yielded a global lactic acid production of 72%.