



[Back](#)

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Production of a cellulosic substrate susceptible to enzymatic hydrolysis from prehydrolyzed barley husks

Keywords barley husks, hydrolysis, alkali treatment, cellulose, xylitol,

Abstract

An effective process for the chemical-biotechnological utilization of barley husks is reported. A first treatment with sulfuric acid (prehydrolysis) allowed the solubilization of hemicelluloses to give xylose-containing liquors (suitable to make fermentation or xylitol production) and a solid phase containing cellulose and lignin. The solid residues from prehydrolysis were treated with NaOH to increase their cellulase digestibility. In the alkaline treatments, the effects of temperature (in the range, 50-130°C), reaction time (30-60 min) and NaOH concentration (3-10 weight percent of solution) on the composition of solid residues were assessed by means of an experimental plan with factorial structure. The cellulose content increased with temperature and NaOH concentration, whereas the lignin content was not influential within the range tested. The treated samples showed high susceptibility toward the enzymatic hydrolysis by cellulases, leading to almost quantitative glucose yields under selected operational conditions.

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