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Dilute sulfuric acid pretreatment of sunflower stalks for sugar production

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Abstract

In this work the pretreatment of sunflower stalks by dilute sulfuric acid is studied. Pretreatment temperature and the concentration of acid solution were selected as operation variables and modified according to a central rotatable composite experimental design. Based on previous studies pretreatment time was kept constant (5 min) while the variation range for temperature and acid concentration was centered at 175ºC and 1.25% (w/v) respectively. Following pretreatment the insoluble solids were separated by filtration and further submitted to enzymatic hydrolysis, while liquid fractions were analyzed for sugars and inhibitors. Response surface methodology was applied to analyze results based on the combined severity of pretreatment experiments. Optimized results show that up to 33 g of glucose and xylose per 100 g raw material (65% of the glucose and xylose present in the raw material) may be available for fermentation after pretreatment at 167ºC and 1.3% sulfuric acid concentration.