

Enhanced production of reducing sugars from paragrass using microwave-assisted alkaline pretreatment

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ABSTRACT

The main aims of this study were to examine the effectiveness of pretreatment methods for enhancing the conversion of *Brachiara mutica* (paragrass) lignocellulose into valuable reducing sugars by enzymatic hydrolysis. The pretreatments studied included alkali alone, microwave-assisted alkali, acid alone, and microwave-assisted acid. It was found that the application of microwave irradiation during alkaline pretreatment with an alkali-to-biomass ratio of 5% ($w w^{-1}$) for 30 min at 120 °C markedly increased the total reducing sugar (TRS) yield after enzymatic hydrolysis from 316 mg g⁻¹ dry pretreated paragrass without microwave irradiation to 750 mg g⁻¹ dry pretreated paragrass with microwave irradiation. In particular, the microwave-assisted alkaline pretreatment markedly increased xylose production and enhanced the enzymatic digestibility of cellulose. The concentrations of 5-hydroxymethylfurfural (HMF) and furfural after the microwave-assisted pretreatment were well below 1.0 kg m⁻³, the suggested threshold concentration of furfurals where yeast inhibition may begin.

KEYWORDS

Alkali; *Brachiara mutica*; Microwave; Paragrass; Pretreatment; Reducing sugar

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