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Emir Cabrera, María J. Muñoz, Ricardo Martín, Ildefonso Caro, Caridad Curbelo, Ana B. Díaz

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Alkaline and alkaline peroxide pretreatments at mild temperature
to enhance enzymatic hydrolysis of rice hulls and straw

Emir Cabrera^a, María J. Muñoz^b, Ricardo Martín^b, Ildefonso Caro^b, Caridad Curbelo^a,
Ana B. Díaz^b

^a Departamento de Ingeniería Química, Instituto Superior Politécnico José Antonio Echeverría, Cujae, Ave. 114 No. 11901, Marianao 19390, Cuba.

^b Departamento de Ingeniería Química y Tecnología de Alimentos, Universidad de Cádiz, Campus Río San Pedro, s/n, Puerto Real, 11510 - Cádiz, Spain.

ABSTRACT

The current study explores alkaline and alkaline peroxide pretreatments in order to achieve a method to improve saccharification of agricultural residues for ethanol production. The effects of reagent concentration and pretreatment time at 30°C and atmospheric pressure on biomass dissolution after the pretreatment and enzymatic hydrolysis of the pretreated biomass were investigated. In fact, although all pretreatments tested improved enzymatic hydrolysis of native residues, the best results were not achieved for the highest biomass loss. The maximum conversions to reducing sugars in the hydrolysis stage of 77.5% and 92.6% were obtained for rice hulls and straw pretreated by alkaline peroxide (4%, 24 h) and alkaline (1%, 48 h) methods, respectively. For both pretreated residues, the reduction to more than half the recommended enzyme loading allowed obtaining more than 94% the reducing sugars attained with the recommended dose.

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