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Estimation of continuous alkali pretreated sweet sorghum bagasse using single screw reactor for bioethanol production

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Sweet sorghum is one of the promising energy crops that can provide both sugar juice and bagasse to conversion for bioethanol. Ethanol from the extracted sweet sorghum juice can be easily produced by fermentation process. But the lignocellulosic biomass such as sweet sorghum bagasse has many barriers for ethanol production. For commercial production of bioethanol, effective pretreatments of lignocellulosic materials need to be developed for the reduction of processing costs. In this study, continuous pretreatment system with single screw reactor was applied for the effective hydrolysis of sweet sorghum bagasse. Conditions of hydrolysis were different concentrations of sodium hydroxide (0.2~1.0 M) at 140°C, 1.2 kg/min of biomass loading rate and 7.2L/h of aqueous sodium hydroxide. In case of 0.4 M sodium hydroxide for pretreatment of sweet sorghum bagasse, solid phase was recovered, 49.9% from dry matter sweet sorghum bagasse and its compositions were 59.2% of cellulose, 31.7% of hemicellulose, 6.9% of lignin and 0.9% of ash. Saccharifications of pretreated bagasse were performed with different concentrations of enzyme (between 5 and 15 FPU/g-cellulose from Novozymes) in 72 h, 150 rpm at 50°C. The optimum enzyme loading was 10 FPU/g-cellulose and at this optimum condition the maximum yield of glucose conversion was 88.0% after 72 h. It was produced 25.1 g/L ethanol from pretreated sweet sorghum bagasse (60 g/L glucan) and maximum ethanol yield was 91% by *Saccharomyces cerevisiae* CHY1011.

Biography

Young-Lok Cha is a Doctorate at the University of Hannover, Germany. He is working as a Senior Researcher at the National Institute of Crop Science, Rural Development Administration, Korea. He has done his major in the development of lignocellulosic biomass conversion technology and biofuels production at pilot scale.

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