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Alkaline pretreatment with recycled process wastewater using twin-screw system for bioethanol production

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Various thermochemical pretreatments have been studied for the bioethanol production from cellulosic biomass. Normally pretreatment of biomass was performed by acid or alkaline hydrolysis at high temperature and pressure. In the case of herbaceous biomass, alkaline hydrolysis is advantageous to dissolve lignin. However, in alkali pretreatment process, wastewater is one of the critical problems for reducing operational costs. In this study, the feasibility of recycling pretreatment-generated wastewater was investigated. The pretreatment was conducted with a twin-screw extrusion reactor under conditions: screw speed 40 rpm, 0.5 M NaOH 27 L/h, biomass feeding 4.5 kg/h at 99°C. Solid fraction of pretreated biomass was recovered 67% using wastewater adjusted with 0.5 M NaOH. Cellulose recovery of pretreated biomass was 94%. Finally using wastewater recycling in the pilot plant, 25% of NaOH could be saved and 35% of process wastewater was decreased.

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 and his major is the development of lignocellulosic biomass conversion technology and biofuels production at pilot scale.

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