Ethanol Production from Dilute-Acid Pretreated Cassava Peel by Fed-Batch Simultaneous Saccharification and Fermentation

Jirasak Kongkiattikajorn
Division of Biochemical Technology, School of Bioresources and Technology, King Mongkut's University of Technology, Thailand
jirasak.kon@kmutt.ac.th

Abstract - Cassava (Manihot esculenta Crantz) peel, a by-product of cassava starch factory processing, which has high starch content is a potential feedstock for a clean alternative energy bioethanol production. To obtain high concentration of ethanol from cassava peel, cassava peel was pretreated with acid to remove non-cellulose components, and then subjected to simultaneous saccharification and fermentation (SSF). An ethanol concentration as high as 7.62 g/L was achieved with 2.5% dry matter (DM) using batch SSF, resulting in an 84.34% overall ethanol yield. A fed-batch process using a high solid concentration was also investigated. Dry substrate was pretreated with stream and dilute sulfuric acid at 135°C under pressure of 15 lb/in², and then added at different amounts during the first 24 h, to yield a final dry matter content of 20% (w/v). Fed batch SSF conditions with cellulase loading of 100 FPU/g, xylanase 25 IU/g, pectinase 25 IU/g and amylase with amylglucosidase loading of 50 and 75 U/g, respectively, yeast (Saccharomyces cerevisiae) loading of 2g/L and substrate supplementation every 4 h yielded the highest ethanol concentration of 58.73 g/L after 72 h. This corresponded to a 76.47% overall ethanol yield.

Keywords - Ethanol, Pretreatment, Cassava Peel, SSF

Remark: The full paper may be found in www.inrit2012.com

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