Saccharification and alcohol fermentation in starch solution of steam-exploded potato

Author(s)

Fumihisa Kobayashi,
Tatsuro Sawada,
Yoshitoshi Nakamura,
Makoto Ohnaga,
Mutui Godliving,
Tomoo Ushiyama

Abstract

Steam explosion pretreatment of potato for the efficient production of alcohol was experimentally studied. The amount of water-soluble starch increased with the increase of steam pressure, but the amounts of methanol-soluble material and Klason lignin remained insignificant, regardless of steam pressure. The potatoes exploded at high pressure were hydrolyzed into a low molecular liquid starch, and then easily converted into ethanol by simultaneous saccharification and fermentation using mixed microorganisms: an amylolytic microorganism,*Aspergillus awamori*, and a fermentation microorganism,*Saccharomyces cerevisiae*. The maximal ethanol concentration was 4.2 g/L in a batch culture at 15 g/L starch concentration, and 3.6 g/L in a continuous culture fed the same starch concentration. In the fed-batch culture, the maximal ethanol concentration increased more than twofold, compared to the batch culture.