

Effect of high-pressure steam treatment on enzymatic saccharification of oil palm empty fruit bunches.

Abstract

The effectiveness of high-pressure steam treatment (HPST) with various treatment temperatures (170, 190, 210, and 230 °C) on the enzymatic hydrolysis yield of oil palm empty fruit bunches (OPEFB) was successfully investigated. Analysis of the compositions of raw and treated OPEFB showed that significant changes occurred after the HPST was performed. Scanning electron microscopy (SEM) analysis showed that the treated OPEFB gave better results in removing the silica bodies as compared to the untreated OPEFB. This analysis was in agreement with FTIR results, which revealed a significant decrease in the content of hemicelluloses after HPST. During saccharification, the amount of sugar produced was higher for treated OPEFB than untreated OPEFB. Thus, the results suggest that HPST can be applied as an alternative treatment method for the alteration of OPEFB structure and to enhance of the digestibility of the biomass, therefore improving enzymatic hydrolysis.

Keyword: High pressure steam; Oil palm empty fruit bunches; Enzymatic hydrolysis