

Biological pretreatment of rubberwood with *Ceriporiopsis subvermispora* for enzymatic hydrolysis and bioethanol production

ABSTRACT

Rubberwood (*Hevea brasiliensis*), a potential raw material for bioethanol production due to its high cellulose content, was used as a novel feedstock for enzymatic hydrolysis and bioethanol production using biological pretreatment. To improve ethanol production, rubberwood was pretreated with white rot fungus *Ceriporiopsis subvermispora* to increase fermentation efficiency. The effects of particle size of rubberwood (1 mm, 0.5 mm, and 0.25 mm) and pretreatment time on the biological pretreatment were first determined by chemical analysis and X-ray diffraction and their best condition obtained with 1 mm particle size and 90 days pretreatment. Further morphological study on rubberwood with 1 mm particle size pretreated by fungus was performed by FT-IR spectra analysis and SEM observation and the result indicated the ability of this fungus for pretreatment. A study on enzymatic hydrolysis resulted in an increased sugar yield of 27.67% as compared with untreated rubberwood (2.88%). The maximum ethanol concentration and yield were 17.9 g/L and 53% yield, respectively, after 120 hours. The results obtained demonstrate that rubberwood pretreated by *C. subvermispora* can be used as an alternative material for the enzymatic hydrolysis and bioethanol production.

Keyword: Rubberwood; Bioethanol production; Pretreatment; *Ceriporiopsis subvermispora*; Enzymatic hydrolysis.