

**SAKARIFIKASI SERAT TANDAN KOSONG DAN PELEPAH KELAPA SAWIT SETELAH *PRETREATMENT* MENGGUNAKAN KULTUR CAMPURAN JAMUR PELAPUK PUTIH *Phanerochaete chrysosporium* DAN *Trametes versicolor***  
*(Saccharification on Oil Palm Empty Fruit Bunch and Frond Fibers Pretreated with co-Culture of White-rot Fungi Phanerochaete chrysosporium and Trametes versicolor)*

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**ABSTRACT**

*There are only a few studies conducted on the use of co-culture of white-rot fungi for pretreatment of lignocellulosic biomass. The aim of this research is to study the effects of biological pretreatment of oil palm empty fruit bunch (OPEFB) and oil palm frond (OPF) fiber using co-culture of two white-rot fungi, namely Phanerochaete chrysosporium and Trametes versicolor, on the results of the enzymatic saccharification of such biomass. The representative samples of OPEFB and OPF fibers (40-60 mesh in sizes) after being sterilized, each as much as 5% (w/v), were inoculated with the co-cultures of the two fungi and incubated at  $\pm 27^{\circ}\text{C}$  for 4 weeks. The samples were taken partially and then examined after 1, 2, 3, and 4 weeks of incubation. Saccharification process using cellulase and  $\beta$ -glucosidase was performed in a water bath shaker at  $50^{\circ}\text{C}$  for 48 hours. Reducing sugar, glucose and xylose content were analyzed. The highest reducing sugar yield, glucose and xylose concentrations from the saccharification on OPEFB, as much as consecutively 13.08%, 0.86 mg/g and 0.13 mg/g, were obtained after pretreatment for 4 weeks; while likewise those for OPF corresponding to 8.98%, 0.92 mg/g and 0.23 mg/g, respectively, were obtained after 2-week pretreatment.*

*Keywords: Saccharification, oil palm empty fruit bunch, oil palm frond, pretreatment, white-rot fungi*

**ABSTRAK**

Penggunaan kultur campuran jamur pelapuk putih pada proses *pretreatment* bahan lignoselulosa belum banyak diteliti. Penelitian ini bertujuan untuk mempelajari pengaruh penggunaan kultur campuran dua jenis jamur pelapuk putih, yaitu *Phanerochaete chrysosporium* dan *Trametes versicolor* pada proses *pretreatment* serat tandan kosong dan pelepah kelapa sawit terhadap hasil sakarifikasinya. Inokulum *P. chrysosporium* dan *T. versicolor* dituangkan ke dalam sampel substrat serat tandan kosong dan pelepah kelapa sawit (40-60 mesh) yang telah disterilkan, masing-masing sebanyak 5% (w/v), sehingga total inokulum yang ditambahkan ke dalam kedua macam substrat masing-masing 10% (w/v). Sampel diinkubasikan pada suhu  $\pm 27^{\circ}\text{C}$  selama 4 minggu. Sebagian dari contoh diambil dan lalu diperiksa setelah masa inkubasi 1, 2, 3, dan 4 minggu. Sakarifikasi dilakukan menggunakan enzim selulase sebanyak 20 FPU per g biomassa dan  $\beta$ -glukosidase dalam *shaking waterbath* pada suhu  $50^{\circ}\text{C}$  selama 48 jam. Analisis gula pereduksi, glukosa dan xilosa dilakukan terhadap hasil sakarifikasi. Rendemen gula pereduksi, konsentrasi glukosa dan xilosa tertinggi dari tandan kosong kelapa sawit

diperoleh dari sakarifikasi serat dengan *pretreatment* selama 4 minggu, yaitu masing-masing 13,08%, 0,86 mg/g dan 0,13 mg/g, sedangkan rendemen gula pereduksi, konsentrasi glukosa dan xilosa tertinggi dari pelepah kelapa sawit didapatkan dari sakarifikasi substrat dengan *pretreatment* selama 2 minggu, yaitu masing-masing 8,98%, 0,92 mg/g dan 0,23 mg/g.

Kata kunci: Sakarifikasi, tandan kosong kelapa sawit, pelepah kelapa sawit, *pretreatment*, jamur pelapuk putih