

Optimization of Biomass Components from Rice Husk Treated with Trichophyton Soudanense and Trichophyton Mentagrophyte and Effect of Yeast on the Bio-Ethanol Yield

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Abstract : Trichophyton soudanense and Trichophyton mentagrophyte were isolated from the rice mill environment, cultured and used singly and as di-culture in the treatment of measure quantities of preheated rice husk. Optimized conditions studied showed that carboxymethylcellulase (CMCellulase) activity of 57.61 $\mu\text{g/ml/min}$ was optimum for Trichophyton mentagrophyte heat pretreated rice husk crude enzymes at 50oC and 80oC respectively. Duration of 120 hours (5 days) gave the highest CMcellulase activity of 75.84 $\mu\text{g/ml/min}$ for crude enzyme of Trichophyton mentagrophyte heat pretreated rice husk. However, 96 hours (4 days) duration gave maximum activity of 58.21 $\mu\text{g/ml/min}$ for crude enzyme of Trichophyton soudanense heat pretreated rice husk. Highest CMCellulase activities of 67.02 $\mu\text{g/ml/min}$ and 69.02 $\mu\text{g/ml/min}$ at pH of 5 were recorded for crude enzymes of monocultures of Trichophyton soudanense (TS) and Trichophyton mentagrophyte (TM) heat pretreated rice husk respectively. Biomass components showed that rice husk cooled after heating followed by treatment with Trichophyton mentagrophyte gave 44.50 ± 10.90 (% \pm Standard Error of Mean) cellulose as the highest yield. Maximum total lignin value of 28.90 ± 1.80 (% \pm SEM) was obtained from pre-heated rice husk treated with di-culture of Trichophyton soudanense and Trichophyton mentagrophyte (TS+TM). The hemicellulose content of 30.50 ± 2.12 (% \pm SEM) from pre-heated rice husk treated with Trichophyton soudanense (TS); lignin value of 28.90 ± 1.80 from pre-heated rice husk treated with di-culture of Trichophyton soudanense and Trichophyton mentagrophyte (TS+TM); also carbohydrate content of 16.79 ± 9.14 (% \pm SEM) , reducing and non-reducing sugar values of 2.66 ± 0.45 and 14.13 ± 8.69 (% \pm SEM) were all obtained from for pre- heated rice husk treated with Trichophyton mentagrophyte (TM). All the values listed above were the highest values obtained from each rice husk treatment. The pre-heated rice husk treated with Trichophyton mentagrophyte (TM) fermented with palmwine yeast gave bio-ethanol value of 11.11 ± 0.21 (% \pm Standard Deviation) as the highest yield.

Keywords : Trichophyton soudanense, Trichophyton mentagrophyte, biomass, bioethanol, rice husk

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