

**Production of bio-ethanol using pretreated lignocellulosic materials
(rice husk, water hyacinth)**

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Production from food sources such as corn, sugarcane etc. is the most predominant way of producing ethanol. This has led to a shortage in food, imbalance in food chain, increased food price and indirect land use. This study thus explores the use of alternative nonfood materials for the production of ethanol from cellulose. Rice husk and water hyacinth were selected as raw material in this study. The powdered rice husk and water hyacinth were subjected to physical pretreatment by washing with distilled water to remove all the soluble impurities in the materials followed by air-drying, cutting (water hyacinths), oven drying for 6 hours at 60 °C and finely powdered samples were stored inside a container at room temperature. Chemical pretreatment (acid pretreatment) was performed by physically soaking each lignocellulosic substrate in 1 M H₂SO₄ for 24 hours and shaking (150 rpm) at room temperature. Each solid sample was recovered by filtration and washing repeatedly with distilled water until the water pH was 7.0. Subsequently each sample was dried at 80 °C to a constant weight in oven prior to enzymatic hydrolysis. Both pretreatments were used to optimize the conditions for maximum ethanol productivity from rice husk and water hyacinth. Enzymatic hydrolysis of pretreated rice husk and water hyacinth gave the highest yield of reducing sugar. As a result of qualitative test, pretreatment methods had been applied on rice husk and water hyacinth in order to increase the available cellulose content and thus improve the enzymatic hydrolysis efficiency. The result of FTIR characterization of pretreated rice husk and water hyacinth implies that both samples contain bio-ethanol.

Keywords: Chemical pretreatment, Enzymatic hydrolysis, Physical pretreatment, Rice husk, Water hyacinth