

**BIOETHANOL PRODUCTION USING PALMYRAH WASTES**

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by  
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## ABSTRACT

Ethanol is now the most important renewable fuel in terms of market value. Nowadays it is produced from sugar and starch based materials such as sugarcane and corn. However, the second generation of alcohol production also derived from lignocellulosic materials is now being tested in some plants. In this study palmyrah waste material such as molasses, expired pulp and coir dust was selected. Among them molasses and expired pulp used for the primary alcohol production and coir dust used for the secondary alcohol production. Pretreatment of coir dust was carried out with different alkaline and acid solution at  $121^{\circ}\text{C}$  for 15 min and  $\text{H}_2\text{SO}_4$  was selected as best hydrolysis agent and used for further study. For the  $\text{H}_2\text{SO}_4$  pretreatment two factors such as concentration (3%, 5% and 7%) and times (15min, 30min and 45min) were optimized. Among the nine treatments 3% of concentration and 45min were selected as optimum condition for hydrolysis. Coir dust hydrolyzed solution; molasses ( $^{\circ}15$  initial brix) and expired palmyrah fruit pulp ( $^{\circ}15$  initial brix) were used for the fermentation. Fermentation was carried out with bakery yeast inoculated with Peptone, yeast extract and nutrient (PYN) medium at room temperature and pH 5.0. The highest significant alcohol production was observed for coir dust  $\text{H}_2\text{SO}_4$  hydrolyzed medium (0.4%), molasses (8.6%) and pulp (5.5%) at 4, 6 and 4<sup>th</sup> day of fermentation respectively. During the fermentation there were significant differences in acidity, pH, reducing sugar and total sugar between tested days. Total sugar content was significantly decreased during the fermentation for all waste materials. Bioethanol production could be enhanced by developing enzymatic pretreatment technologies for coir dust and optimization of fermentation medium

Keywords: bioethanol, Fermentation, palmyrah, Acid hydrolysis