

Optimization of Ethanol Production from Palmyra Sap by *Zymomonas mobilis* Using Response Surface Methodology

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Ethanol is believed to be one of the best alternatives to replace gasoline, because ethanol is a renewable energy source and environmentally friendly. The present study focuses on the optimization of palmyra sap as a source for ethanol production. Statistical experimental design using Box-Wilson central composite design was used to optimize the quantitative effects of sugar, urea, and inoculum concentration on ethanol production. It was found that palmyra sap could be used as a substrate for ethanol production using *Zymomonas mobilis* (NRRL B-14234). A maximum ethanol concentration of 58.97 g L⁻¹ was obtained after optimizing the parameters of fermentation. The optimum values of sugar, urea, and inoculums concentration were 206.01 g L⁻¹, 3.16 g L⁻¹, and 23.05% (v v⁻¹), respectively, with ethanol yield of 0.3039 g g⁻¹. A high similarity was observed between the predicted and experimental results, which reflected the accuracy and applicability of RSM to optimize the process for ethanol production.

Key words: ethanol, palmyra sap, *Zymomonas mobilis*, response surface methodology