

Fuel ethanol production from papaya waste using immobilized *saccharomyces cerevisiae*

Abstract

Liquid biofuels such as bioethanol is gaining much interest as it can be produced from various biomass feedstocks. Papaya peels, one of the major agricultural waste in Malaysia has immense potential to be used as a promising bioethanol feedstock. Thus, the main objective of this research is to optimize the production of bioethanol from *Carica papaya* peels using immobilized yeast cells. At first, the papaya skin was dried and powdered prior to hydrolysis at 120°C for 15 minutes using 0.2 M H₂SO₄. Then *Saccharomyces cerevisiae* Type II strain was immobilized using 12% polyvinyl alcohol and 1% sodium alginate using entrapment technique. These immobilized beads were later employed for the production of bioethanol from dried papaya peels. Most significant parameters such as temperature, agitation speed, pH and fermentation time were optimized by employing batch fermentation and bioethanol produced was quantified using Gas Chromatography-Mass Spectrometry. A bioethanol yield of 0.514 g/L was obtained from papaya peels at the optimized conditions of 30°C, 200 rpm, pH 5 and 48 h of fermentation. In short, since the sugars can be easily released from papaya skin, this can be considered as a potential feedstock for bioethanol.