

Potential evaluation of oil palm frond juice for the production of bioethanol

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Abstract – Fossil fuels degrade abundantly since the 21st century. The usages of fossil fuels tend to emit the greenhouse gaseous that effect to global warming as well as human health. In order to overcome these problems, bioethanol was introduced by researchers to substitute the fossil fuels. Bioethanol is a bioenergy produced by yeast fermentation at several conditions and can be classified as renewable fuels. However, the production of bioethanol at industrial scale involved high production cost due to the usage of food based raw material such as sugar from sugarcane and corn starch. Thus, this research was conducted to evaluate the potential of oil palm frond (OPF) juice as a renewable and sustainable raw material for bioethanol fermentation. Effects of initial medium pH, agitation speed, and OPF juice concentration on the production of bioethanol were investigated in shake flasks experiments using *Saccharomyces cerevisiae* Kyokai No. 7. The highest bioethanol yield was recorded at pH 7.0, agitation speed of 150 rpm and supplemented with a hundred percent (100%) of OPF juice concentration. By culturing the *S. cerevisiae* Kyokai No. 7 under the aforementioned conditions, the bioethanol yield obtained were 0.45 g/g, 0.47 g/g and 0.51 g/g, respectively. This value is comparable to that of ethanol produced from oil palm trunk (OPT) sap and other renewable resources as reported previously by other researchers. The promising yield obtained in this study suggests that OPF juice can be used as fermentation feedstock for bioethanol production.

Key words: Bioethanol; Oil Palm Frond Juice; *Saccharomyces cerevisiae*; Fermentation Feedstock