

Bioenergy Production from Waste Palm Oil Industries

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Abstract. The transport and energy sectors are currently facing some major challenges. Between climate crisis, price fluctuations, and shortages, solutions must be found for a more sustainable future. Biodiesel can be part of the solution and is already being used in many countries. In Indonesia, for example, it is commonly blended with petrol in a proportion of 30%. This study aims to investigate the production of biodiesel from used palm cooking oil. At present, around 80% of the raw material are crude oils which are a more expensive material and can create land conflicts. It was estimated that used palm cooking oil could theoretically account for 25% of biodiesel production in Indonesia. This is even more interesting given that 55 to 80% of the cost of producing biodiesel is oil. Using used cooking oil would therefore drastically reduce production costs. To achieve this, six biodiesel samples were produced by transesterification. The catalyst used was NaOH with methanol as the alcohol at a ratio of 5:1. Reaction temperature (60,70,80°C) and reaction time (60-120 minutes) were the two independent variables studied. The six samples were then analysed to verify compliance with the various Vigor standards. The best yield found was for a reaction at 80°C and 120 minutes with results of 58%. Other parameters such as density and the level of free fatty acid in the biodiesel were also analysed.

Keywords: Alkaline catalysis, Biodiesel, Palm oil, Transesterification