PRODUCTION OF BIODIESEL USING WASTE COOKING OIL VIA TRANSESTERIFICATION PROCESS

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ABSTRACT

PRODUCTION OF BIODIESEL FROM WASTE COOKING OIL VIA TRANSESTERIFICATION PROCESS

Biodiesel is a non-toxic; biodegradable diesel fuel made from vegetable oils, animal fats, and used or recycled oils and fats. Waste cooking oil is an example of raw material that meets the requirement to make biodiesel. In this study, biodiesel is produced via transesterification process. Methanol is used as the reactant. Catalysts used are Sodium Hydroxide and Potassium Hydroxide. Transesterification process converts triacylcerols to methyl ester. The major components of vegetable oils and animal fats are triacylglycerols (TAG often also called triglycerides). Chemically, TAG is esters of fatty acids (FA) with glycerol. The TAG of vegetable oils and animal fats typically contain several different fatty acids. Thus, different fatty acids can be attached to one glycerol backbone. Parameter such as temperature, the type of reactant, amount and type catalyst used in this study is carefully manipulated. All the parameter is dependent on each other and efficiency of transesterification process is based on these parameters. The yield of biodiesel obtained from this study is 32.85 % for biodiesel produced using Sodium Hydroxide as catalyst and 36.1 % for biodiesel produced using Potassium Hydroxide as catalyst. Qualitative analysis of biodiesel is determined by using gas chromatography. It is done by comparing the retention time of individual standard with the retention time of the sample. The standard of fatty acid used in this study is Lauric, Myristic, Palmitic, Stearic and Oleic. The GC had detected fatty acid Palmitic, Stearic and Oleic from biodiesel produced using Sodium Hydroxide as catalyst and fatty acid Lauric, Palmitic, Stearic and Oleic from biodiesel using Potassium Hydroxide as catalyst. Energy content is an important aspect in determining the combustion properties of fuel. Energy content of biodiesel and conventional diesel is determined by using bomb calorimeter. In this study the amount of energy content of biodiesel produced using Potassium Hydroxide is 39738 J/g and 39096 from biodiesel produced using NaOH as catalyst. One of the most important fuel properties of biodiesel and conventional diesel fuel derived from petroleum is viscosity. Viscosity of biodiesel is higher than petroleum diesel. The biodiesel viscosity measured in this study is 16 cP for both biodiesel produced using Potassium Hydroxide and Sodium Hyroxide.