

Narupa Akaphong 2009: Feasibility Study of Using Sea Fish Waste from Frozen Foods Factory to Produce Biodiesel. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Mongkol Damrongsri, Dr.Ing. 129 pages.

This research was studied a feasibility of biodiesel production from fish oil of sea fish waste scum in grease tap of frozen foods factory to have the high free fatty acids (FFA) 22.41 % with a two-step process. The first step was esterification process for reduced the FFA by used methanol and sulfuric acid catalyst, was studied the optimum factor as: the amount of sulfuric acid 3, 5, 7 and 9 %wt at the reaction times 1, 2, 3 and 4 hours and methanol/oil molar of FFA ratios 10:1, 15:1 and 20:1 at the temperature 60, 70 and 80 (± 2) $^{\circ}$ C. The second step was transesterification process for converted the product of the first step into methylester (biodiesel) and glycerol by used sodium hydroxide catalyst was studied the optimum factor as : methanol/oil molar ratios 3:1, 6:1, 9:1, 12:1 and 15:1. the amount of sodium hydroxide 0.25, 0.5, 0.75, 1, 1.25 and 1.5%wt. the temperature 50, 55, 60, 65, 70 and 75(± 2) $^{\circ}$ C and the reaction times 15, 30, 45 and 60 minute. The result of esterification process was found to be the optimum when used sulfuric acid 7%wt, methanol/oil molar of FFA ratio 10:1, the temperature 70 ± 2 $^{\circ}$ C and the reaction times 2 hours to reduce the FFA less than 2 %.

Transesterification process used methanol/oil molar ratio 6:1, sodium hydroxide 0.5%wt, the temperature 60 ± 2 $^{\circ}$ C and the reaction times 30 minute obtained the maximum yield of biodiesel, the percentage methylester and heating value was 85.84 %, 72.21 % and 39.77 MJ/Kg respective. However, it was found that the viscosity, density, flash point, cloud point, pour point, acid value, iodine value, monoglycerides, diglycerides, triglycerides, free glycerine and totalglycerine of the produced biodiesel were in the acceptable ranges according to the department of energy Thailand standards for community biodiesel and using are renewable energy for diesel fuel.

Student's signature

Thesis Advisor's signature