Pumarin Sukavast 2010: The Study for Using of Fish Oil from Wastewater Treatment Plant to Produce Biodiesel by Transesterification Process. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Mongkol Damrongsri, Dr.Ing. 150 pages.

This research work is aiming to find the suitable condition of transesterification process by using fish oil from wastewater treatment plant, composed of free fatty acid as 5.79% to produce biodiesel (methyl ester). The first step was esterification process for reducing the free fatty acid in fish oil until less than 2% by using concentrated sulfuric acid of 1% by weight of fish oil as catalyse and molar ratio between methanol and fish oil is 6:1, performed the reaction at 50±2°C for 60 minutes of reaction times. The second step was to find the suitable condition of transesterification process by using potassium hydroxide (KOH) as the catalyst. In this research, we studied 4 variables, molar ratio between methanol and fish oil in esterification process, amount of potassium hydroxide, temperature and time of reaction. The result found that when using molar ratio of methanol and fish oil at 6:1 in esterification process, potassium hydroxide 1.25% by weight of fish oil in esterification process as catalyse and performed the reaction at 50±2 °C for 120 minutes resulted in 86.30% of percentage methylester and 83.70% of product as of 72.49 gram%biodiesel. From the concerning data, the flow rate of wastewater treatment plant 172 m^3/day that obtained grease and oil 26.44 liters per day. That should produce the biodiesel of 22.21 liters per day or 6,552 liters per year. According to the production of biodiesel, 1 liter of fish oil resulted from the transesterification process could produce 0.84 liters of biodiesel. By this process the estimating cost of expense 11.76 baht per liter of biodiesel produced. Comparing to the cost of palm oil biodiesel is 31.75 baht/liter. Therefor, the profit of fish oil biodiesel production from wastewater treatment plant of 22.21 liters per day will be 444 baht/day or 130,974 baht/year.

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