

Theerawat Autcharerk 2013: The Study of Potassium Ion Removal Efficiency from Crude Biodiesel by Using Resin and Silica from Rice Husk Ash. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Kanita Tungkananuruk, M.Sc. 114 pages.

The aims of this research was to study the reduction conditions of potassium ion in crude biodiesel which was obtained from transesterification reaction. High amount of potassium ion residue will be reduced by cation resin exchanger and silica from rice husk ash. This method is easier and more convenient than using rinse water that will generate large amount of wastewater. Batch experiment were conducted to find optimum conditions such as mixing speed (0-150 rpm), mixing time (0-120 min), contact time (0-120 min) and dosage (1-5 g). The results were found that resin 3 g, silica from rice husk ash 4 g were suitable to remove potassium ion from 25 and 50 mL of biodiesel at mixing speed 100 rpm, mixing time 90 min and contact time 60 min. The removal efficiency of 91.00 % and 85.73 % were achieved respectively. Also, adsorption model of silica from rice husk ash was confirmed to Freundlich isotherm. By continuous flow experiments, it was found that 85.04 % of potassium ion was removed by 150 g of resin from 50 mL biodiesel at flow rate of 13.88 mL/min. After the regeneration of resin using hydrochloric acid, the maximum removal efficiency of potassium ion was found at 62.91 %. In addition, analysis of potassium ion using ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometer), it was found that removal efficiency of potassium ion by resin and silica from rice husk ash in the batch process were achieved at 99.34 % and 99.39 % respectively. In continuous experiment, potassium ion in 1000 mL of biodiesel can be removed by resin with efficiency range of 95 to 99 %.

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