Apichat Yamsub 2012: Biodiesel Synthesis by Used Lard Oil in a Micro-channel Reactor. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Attasak Jaree, Ph.D. 102 pages.

Biodiesel synthesis from pork lard via transesterification was performed using a microchannel reactor. In order to investigate the effects of operating parameters including reaction temperature (55 – 65^{0}C), residence time (5 – 20 s), methanol – to – oil molar ratio (4.5:1 to 9:1), and catalyst concentration (0.7 – 1.3 wt.%), a series of full factorial experiments with a complete replicate was conducted. Results were statistically analyzed using MINITAB with the significance level of 95%. A quadratic model was proposed for the prediction of %FAME from the specified operating conditions. High %FAME was obtained at low residence time due to the small size of droplets in the microchannel reactor. Evidence of droplets supported the presence of mass transfer limitation in this system. The optimal operating conditions provided %FAME of 95.41% were as follows: methanol – to – oil ratio of 6:1, temperature of 65^{0}C, residence time of 5 s, and KOH concentration of 1.3%w/w.

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