Vimonvan Chobset 2010: Synthesis of Wax Esters from Palm Fatty Acid Distillate and Oleyl Alcohol over Amberlyst 15. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Vittaya Punsuvon, Ph.D. 135 pages.

Wax esters are long chain ester that were derived from long chain fatty acids and long chain alcohols with chain lengths of 12 carbons or more on each compound. Wax esters have high potential for various applications used as important ingredients in cosmetic formulations, pharmaceuticals, plasticizers, polishes, fruit coating, and lubricants. The present works focused on the synthesis wax esters through esterification reaction of palm fatty acid distillate (PFAD) with oleyl alcohol using Amberlyst 15 as a catalyst. The purpose of this work was to study effect of several of reaction parameters such as reaction time, reaction temperature, amount of catalyst, molar ratios of oleyl alcohol to PFAD, and stirring speed on percentage conversion of free fatty acid(FFA), and study the physicochemical properties of wax ester products. The results from experiment showed that the optimum reaction conditions were at 60ºC for 1 hour of reaction time, 30% wt of catalyst, 2:1 molar ratios of oleyl alcohol to PFAD, and stirring speed at 250 rpm. The percentage conversion of FFA under the optimum conditions was 98%. The gas chromatography (GC) analysis showed that about 60% of wax esters were produced at this condition. In addition, FT-IR analysis was used to confirm wax ester products. The absorption band at 1699 $cm^{-1}$ was assigned to C=O stretching of the starting material and the band slightly shifted to 1738 $cm^{-1}$ after the formation of esterification wax esters. The physicochemical properties of synthesized wax esters showed the acid value of 4 mg KOH/g of sample, the refractive index of 1.460 (at 25ºC), the iodine value of 83.18 g $I_2$/100 g sample, the water content of 0.05 % wt, the flash point of 228 ºC, the saponification value of 69.36 mg KOH/g of sample, and the kinematic viscosity of 16.49cSt (at 40ºC).

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