ABSTRACT

THE EFFECT OF REACTION TIME AND THE RATIO OF REACTANTS MOL TO THE PRODUCTION OF METHYL ESTER FROM BY-PRODUCT OF ETHANOLISIS PKO (*Palm Kernel Oil*)

By

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Methyl ester is an alkyl ester compound that is produced by alcoholic (transesterification) process between triglyceride and methanol with a help of alkali catalyst to be an alkyl ester and glycerol. Methyl ester is produced from crude PKO by product (lower layer) media of PKO (*Palm Kernel Oil*) ethanolisis. The purposes of this research are to find out the effect of reaction time and methanol mol ratio to the characteristics of methyl ester, and to find out the effect of reaction time and methanol mol ratio to the yield, density, and methyl ester acid number from media of PKO ethanolisis by product. The research method was a complete randomized block design (CRBD) in factorial with 3 replications : the first factor is the reaction time (3 levels : 60 minutes, 90 minutes, and 120 minutes) and the second factor is the ratio of methanol molar to the media of PKO by product (methanol/oils) (3 levels : 10:1, 15:1, and 20:1 by stoikiometrik). The data was processed furtherly by orthogonal polynomials comparison with the real level of 1% and 5%. The results of the research showed that longer time of reaction and higher ratio of reactants mol caused the yield, density and the number

of methyl ester acid decreased. The yield of methyl ester is about 83,37%-91,03% with the density is 0,872-0,882 g/mL and the acid number is 0,3939-0,5915 mg-KOH/g. The best treatment of this research is the ratio of reactants mol 10:1 with time reaction 60 minutes that produced yield about 91,03%, density is about 0,882 g/mL, and acid number is 0,5915 mg-KOH/g. The optimum treatment produced an equation mathematics $y = -0,0009x^2 + 0,1218x + 86,8$ with the optimum point that produced the highest yield about 90,92%, it happened in time reaction 67 minutes and the ratio of reactants mol 10:1.

Key words : methyl ester, PKO ethanolisis, reaction time, ratio of reactants mol