SULASTRI PANGGABEAN. Analysis of Kinetic Transesterification Reaction in Catalytic Biodiesel Production with Static Mixing Reactor. Under supervision of LEOPOLD O. NELWAN and ARMANSYAH H TAMBUNAN

Catalytic process of biodiesel production requires rigorous mixing and a certain amount of catalyst itself in order to obtain the proper result of the process. Hypotetically, a good mixing can reduce the amount of required catalyst for a certain results. In this study, a static mixing reactor with KOH as catalyst was used to produce biodiesel. The objective of the study were (1) to evaluate the effect of decreasing the amount of KOH required as catalyst for the biodiesel production in the static mixing reactor (2) to study the kinetics of the reaction. The result showed that the percentage of catalyst greatly affected the reaction conversion, yield and kinetics of the transesterification reaction at the beginning of the reaction and declined afterward, because its ability nearly reached its maximum capacity. The model of reaction order that most appropriate to describe the condition of transesterification in this study was a pseudo third-order model. The activation energy was 71.83 kJ mol\(^{-1}\), and the influence of static mixers in the reactor was indicated by the value of the collision frequency factor (1.95 x 10\(^8\) min\(^{-1}\)). In other words, the presence of static mixer has a significant influence in accelerating the reaction.

Keywords: activation energy, biodiesel, catalytic reaction, reaction order, static mixer, transesterification