

ABSTRACT

Effect Of Different Temperature In Synthesizing Methyl Ferulate Using Ultrasound

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In previous study showed that ferulic acid has an activities as an antiplatelet. But, because of its hydrophilic structure, its activities as antiplatelet is low. To increase its activities, it needs to increase its lipophilicity to be able to penetrate the cell membrane more easily. Lipophilicity of ferulic acid can be improved through structure modification into ester. In this study, ferulic acid was reacted with methanol to synthesized methyl ferulate using ultrasound. Ultrasound is reported able to shorten the reaction time and quickly gained the energy of activation needed for reaction. This study also conducted to determine the rate of reaction of ferulic acid esterification. The process was by making methyl ferulate and analyzed the remaining content of ferulic acid using TLC-densitometer. This reaction was carried out at temperature 55 °C and 65 °C. Based on the data, the esterification reaction of ferulic acid into methyl ferulate follow the second order of reaction with the rate constant (k) at 55 °C is $4 \times 10^{-5} \text{ conc}^{-1} \text{ minute}^{-1}$ and the rate constant at 65 °C is $9 \times 10^{-5} \text{ conc}^{-1} \text{ minute}^{-1}$. With the rate constant (k) from two different temperature found, the energy of activation (E_a) for this reaction is 17,9 kcal/mole. Since this reaction follow the second order of reaction, it means if the ferulic acid increase twice, it will also increase the rate of reaction of esterification four times than before.

Keyword : ferulic acid, methanol, methyl ferulate, ultrasonic, rate of reaction.