

# KINETIKA REAKSI ALKOHOLISIS MINYAK JAGUNG PADA TEMPERATUR TINGGI

Heri Heriyanto

Jurusan Teknik Kimia, Fakultas Teknik  
Universitas Sultan Ageng Tirtayasa  
email : herfais@yahoo.com

## ABSTRAK

Kinetika reaksi alkoholisis dari minyak jagung sudah dipelajari pada suhu tinggi (230 – 260 °C). Proses alkoholisis dijalankan secara batch dalam labu leher tiga, yang dilengkapi dengan pengaduk merkuri, jaket pemanas, thermometer dan saluran pengambil sampel. Tahap alkoholisis diawali dengan mereaksikan minyak jagung dan gliserol dengan perbandingan molar 1:2 pada suhu 250°C. Suhu dan kecepatan pengadukan dipertahankan tetap. Setelah suhu 250°C tercapai sampel diambil untuk waktu 0 menit, selanjutnya sampel diambil pada selang waktu 30 menit selama 3 jam untuk dianalisis kadar gliserol bebasnya dengan metode iodometri (FBI-AO2-03). Peubah-ubah yang dipelajari meliputi variasi suhu dari 230°C -260°C pada perbandingan ekivalen OH/COOH 1:1. Berdasarkan hasil penelitian diambil kesimpulan bahwa minyak jagung dan gliserol dapat dialkoholisis tanpa menggunakan katalis pada kisaran suhu 230°C-260°C. Pengaruh suhu terhadap konstanta kecepatan reaksi dinyatakan dengan persamaan Arrhenius adalah sebagai berikut :

$$k_1 = 14647,135 \exp\left(-\frac{8237,7}{T}\right) \text{ (gram/mgek.menit)}$$

dengan  $k_1$  adalah kecepatan pembentukan monogliserida, dan  $T$  adalah suhu absolut reaksi (K).

**Kata kunci** : alkoholisis, kinetika, minyak jagung, gliserol, suhu

## ABSTRACT

*The kinetics of the corn oil alcoholysis process was studied at higher temperatures ( 240-260 °C). The sigmoidal kinetics of the process was explained by the mass controlled region in the initial heterogenous regime, followed by the chemical reaction controlled region in the pseudo-homogenous regime. A simple kinetics model, which did not require complex computation of the kinetics constant, was used for simulation of the triglycerides (TG) and the glycerides (G) formation in the latter regime. The alcoholysis processes was carried out in three-neck flask, equipped with a mercury stirrer, heating jacket and sampling tube. The alcoholysis was started by treating corn oil and glycerol with a molar ratio of 1:2 at 250°C. Temperature and stirring speed were kept constant. After the temperature reached 250°C, samples were taken at 0-minute, and successively at the 30-minutes interval for three hours, and its free glycerol content was then analyzed using Iodometry Method (FBI-A02-03). Variables studied was emperature (230°C-260°C) at an equivalent ratio of OH : COOH of 1:1. From results of the research, it can be concluded that corn oil and glycerol could be alcoholized without adding a catalyst at a temperature range of 230°C-260°C.*

$$k_1 = 14647,135 \exp\left(-\frac{8237,7}{T}\right) \text{ (gram/mgek.menit)}$$

where  $k_1$  is the reaction rate of monoglyceride; and  $T$  is temperature (K).

**Keywords** : alcoholysis, kinetics, corn oil, glycerol and temperatures