

## INTISARI

Penelitian bertujuan untuk mengetahui pengaruh konsentrasi dan lama waktu reaksi serta perlakuan terbaik terhadap mutu biodiesel dari minyak jeroan tuna sirip kuning. Pengolahan biodiesel menggunakan 2 tahap reaksi yaitu esterifikasi dan transesterifikasi bertingkat menggunakan katalis KOH pada perlakuan konsentrasi katalis masing-masing 1%, 1,5%, dan 2% dengan lama reaksi 90 dan 120 menit. Analisis mutu biodiesel menggunakan metode FT-IR (gugus fungsi ester),  $^1\text{H-NMR}$  (konversi metil ester), GC-MS (komposisi asam lemak), dan kualitas fisik. Berdasarkan analisis statistik diketahui bahwa perlakuan konsentrasi maupun lama reaksi tidak memberikan pengaruh signifikan terhadap mutu biodiesel yang dihasilkan. Kadar FFA ekstrak minyak jeroan tuna sirip kuning sebesar 4,415%. Perlakuan KOH 2% dengan lama reaksi 90 menit menghasilkan biodiesel terbaik dengan rendemen metil ester (biodiesel) hasil esterifikasi sebesar 89,5% dan pada tahap transesterifikasi sebesar 84,71 % ; memiliki senyawa bergugus fungsi alkana, alkohol serta ester jenuh dan tidak jenuh. Komposisi kimia asam lemak biodiesel dengan kandungan 3 senyawa terbesar berturut-turut: metil palmitat 19,45%, metil oleat 17,37% serta metil eicosa 7,56%. Berdasarkan analisis sifat fisik, hanya titik tuang yang mampu memenuhi standar mutu biodiesel ( $9^\circ\text{C}$ ) dengan titik nyala  $64^\circ\text{C}$  yang memenuhi standar *diesel oil 48*. Untuk kerapatan spesifik dan viskositas kinematik belum memenuhi standar mutu.

Kata kunci: KOH, lama reaksi, esterifikasi, transesterifikasi, jeroan tuna, biodiesel

## **ABSTRACT**

This study aims to determine the effect of concentration and reaction time, best treatment, and quality of biodiesel from yellow fin tuna oil. Biodiesel were processed using 2 stages (esterification and transesterification) with KOH as catalyst in 1%, 1,5% and 2% catalyst concentration and 90 and 120 minutes reaction times. The quality of biodiesel were analyzed using FT-IR (ester functional group),  $^1\text{H-NMR}$  (conversion of methyl ester), GC-MS (fatty acid composition), and physical quality. Statistical analysis showed that the treatment concentration and reaction has no significant effect on the quality of biodiesel. FFA content from yellowfin tuna oil is 4,415%. Biodiesel with 2% KOH and 90 minutes reaction time produced the best product with 89,5% yield of esterification and 84,71% yield of transesterification. It has functional groups such as: alkane, alcohol, and saturated and unsaturated ester. The methyl ester was converted perfectly and has the main content of 19,45% methyl palmitate, 17,37% methyl oleate and 7,56% methyl eicosa. Analysis of physical properties showed that the pour point meet the quality requirements of biodiesel ( $9^\circ\text{C}$ ), while the flash point ( $64^\circ\text{C}$ ) only able to meet the diesel oil 48 standard. Specific density and kinematic viscosity has not meet quality standards.

**Keywords:** KOH, reaction time, esterification, transesterification, tuna viscera, biodiesel