

Sintesis Hidrokarbon Fraksi Diesel dari Minyak Jarak Kepyar melalui Reaksi Dekarboksilasi dengan Penambahan Kalsium Hidroksida = Synthesis of Hydrocarbon-diesel-like Fuel from Castor Oil using Decarboxylation Reaction with Added of Calcium Hydroxide.

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Abstrak

Reaksi dekarboksilasi minyak jarak kepyar dengan penambahan $\text{Ca}(\text{OH})_2$ berlebih untuk pembuatan hidrokarbon setara fraksi diesel telah dilakukan. Reaksi dilakukan di dalam reaktor batch yang beroperasi pada tekanan atmosferik dan temperatur antara 425 – 500 oC. Variasi yang dilakukan meliputi variasi rasio umpan, temperatur saponifikasi dan temperatur dekarboksilasi. Reaksi dengan umpan rasio umpan 1:6, temperatur saponifikasi 200 oC dan temperatur dekarboksilasi 475 oC memberikan konversi terbesar yaitu 67,46%. Analisa sifat fisik yang meliputi densitas dan viskositas menunjukkan bahwa produk yang dihasilkan telah memenuhi standar yang ditetapkan oleh SNI 8220:2017. Produk cair dianalisa analisa GC–MS menunjukkan komposisi hidrokarbon setara fraksi diesel sebesar 36,87%. Analisa menggunakan FTIR, menunjukkan masih banyaknya gugus asam karboksilat dalam produk. Upgrading dengan penambahan asam borat mampu menghilangkan gugus karboksilat, tetapi komposisi senyawa yang didapat tidak sesuai dengan fraksi diesel.

.....The decarboxylation reaction of Castor oil with the addition of excess $\text{Ca}(\text{OH})_2$ for the manufacture of hydrocarbons equivalent to the diesel fraction has been carried out. The reaction was carried out in a batch reactor operating at atmospheric pressure and temperature between 425 – 500 oC. Variations carried out include variations in feed ratio, saponification temperature and decarboxylation temperature. The reaction with feed ratio of 1:6, saponification temperature of 200 oC and decarboxylation temperature of 475 oC gave the largest conversion, namely 67.46%. Analysis of physical properties which include density and viscosity shows that the resulting product has met the standards set by SNI 8220:2017. The liquid product was analyzed by GC–MS analysis showing the hydrocarbon composition equivalent to the diesel fraction of 36.87%. Analysis using FTIR, shows that there are still many carboxylic acid groups in the product. Upgrading with the addition of boric acid was able to remove the carboxylic groups, but the composition of the compounds obtained did not match the diesel fraction.