Synthesis of Renewable Diesel Through catalytic Deoxygenation of Beef Tallow Using Calcium Oxide (CaO) Catalyst = Sintesis Renewable Diesel melalui Deoksigenasi Katalitik Lemak Sapi Menggunakan Katalis Kalsium Oksida (CaO)

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Abstrak

Deoxygenation is a thermal process that produces alkanes by removing hydrogen, oxygen, and carbon atoms from fatty biomass by releasing CO2 , CO, and H2O. This process converts directly from fatty acids preserving the number of carbon atoms while removing oxygenated species. In this study, the catalytic deoxygenation process will be implemented with beef tallow to produce renewable diesel. Beef tallow has a low sulfur content and has the potential to be used as a cheap feedstock for biofuels based on its chemical composition. The catalytic deoxygenation process will utilize temperatures of 300°C, 350°C, and 375°C and catalyst weight ratios of 4%. The experiment will take about 1.5 hours with an average reaction pressure depending on the temperature. The results of the synthesis of renewable diesel in the form of liquid products will be adjusted to the Decree of the Director General of Oil and Gas Number 146.K/10/DJM/2020 so that it can be useful for the development of renewable diesel to be marketed in Indonesia. The results of the beef tallow synthesis that have been carried out show that the most optimum results are using a temperature of 350 ° C and 4%wt catalyst. This is indicated by the large percentage of alkane area of renewable diesel (C11-C20) produced which is 31.29%.

.....Deoksigenasi adalah proses termal yang mengubah asam lemak menjadi alkana dengan menghilangkan hidrogen, oksigen, dan karbon dari biomassa lemak, menghasilkan CO, CO, dan HO. Dalam penelitian ini, deoksigenasi katalitik diterapkan pada lemak sapi, yang memiliki kandungan sulfur rendah dan potensial sebagai bahan baku murah untuk renewable diesel. Lemak sapi memiliki kandungan sulfur yang rendah dan berpotensi untuk digunakan sebagai bahan baku yang murah untuk bahan bakar nabati berdasarkan komposisi kimianya. Proses dilakukan pada suhu 300°C, 350°C, dan 375°C dengan rasio katalis 4% selama 1,5 jam. Hasil sintesis renewable diesel diuji sesuai Keputusan Dirjen Migas No. 146.K/10/DJM/2020. Temperatur 350°C dan 4% katalis menghasilkan hasil optimal dengan 31,29% area alkana (C11-C20) pada produk cair.