Sintesis Biodiesel dengan Penghilangan Kontaminan Air, Asam Lemak Bebas dan Gliserol Menggunakan Adsorben Karbon Aktif = Biodiesel Synthesis with Water, Free Fatty Acids and Gliserol Contaminants Using Carbon Active Adsorbent

Raden Muhammad Feryanda, author

Abstrak

Biodiesel sebagai bahan bakar alternatif yang melalui proses transesterifikasi sehingga dihasilkan bahan bakar terbarukan yang serupa dengan bahan bakar minyak fosil. Sintesis biodiesel yang dilakukan merupakan hasil dari proses pembuatan biodiesel konvensional dan masih mengandung kontaminan yang memiliki efek terhadap mesin pada kendaraan seperti gliserol yang menyebabkan deposit pada pembakaran, kadar air menyebabkan pertumbuhan bakteri dan asam lemak bebas bersifat korosif. Kontaminan tersebut berupa air, gliserol dan asam lemak bebas harus dihilangkan. Penggunaan metode pencucian air sebagai metode konvesional dinilai kurang efisien dan menghasilkan banyak limbah. Metode penghilangan kontaminan biodiesel berupa proses adsorpsi dilakukan untuk mengambil kontaminan tersebut dengan adsorben sehingga kontaminan dapat terjerap dan menghasilkan kualitas dari biodiesel yang memenuhi standar SNI. Dilakukan perlakuan adsorpsi terhadap biodiesel dengan variasi komposisi penggunaan adsorben karbon aktif 5% dan 10%, lama waktu selama 3 jam dan variasi suhu 30, 50 dan 70 untuk mengetahui kondisi optimal dari proses adsorpsi menggunakan adsorben karbon aktif. Biodiesel hasil adsorpsi disaring dan dilakukan pengujian terhadap karakterisasi biodiesel dengan pengukuran viskositas, densitas, uji FTIR sebagai sifat fisik dan kandungan air, kadar gliserol serta pengujian bilangan asam. Hasil penelitian menunjukan bahwa pada konsentrasi adsorben 10% dengan suhu 70 selama 1 jam pada penghilangan kontaminan air memiliki slope penurunan tertinggi. Kandungan gliserol mengalami penurunan dan bilangan asam pada adsorben 10% menurun 95,65%. Pada penelitian ini dihasilkan sintesis biodiesel dengan karakteristik kontaminan air, asam lemak bebas dan gliserol serta densitas dan viskositas yang memenuhi standar SNI 7182:2015.

.....Biodiesel as an alternative fuel through the transesterification process so that renewable fuels are produced that are similar to fossil fuel fuels. The biodiesel synthesis carried out is the result of the conventional biodiesel manufacturing process and still contains contaminants that have an effect on the engine in vehicles such as glycerol which causes deposits on combustion, water content causes the growth of bacteria and free fatty acids are corrosive. These contaminants in the form of water, glycerol and free fatty acids must be removed. The use of the water washing method as a conventional method is considered inefficient and produces a lot of waste. The method of removing biodiesel contaminants in the form of an adsorption process is carried out to take the contaminants with adsorbents so that the contaminants can be absorbed and produce quality from biodiesel that meets SNI standards. The adsorption treatment of biodiesel was carried out by varying the composition of the use of activated carbon adsorbents 5% and 10%, length of time for 3 hours and temperature variations of 30 , 50 and 70 to determine the optimal conditions of the adsorption process using activated carbon adsorbents. The biodiesel adsorption results are filtered and tested for the characterization of biodiesel by measuring viscosity, density, FTIR test as physical properties and water content, glycerol content and acid number testing. The results showed that the concentration of 10%

adsorbent with a temperature of 70 for 1 hour at the removal of water contaminants has the highest slope decline. The glycerol content has decreased and the acid number in the adsorbent 10% has decreased by 95.65%. In this research, the synthesis of biodiesel with the characteristics of water contaminants, free fatty acids and glycerol as well as the density and viscosity that meets SNI 7182: 2015 standards is produced.