Produksi biodiesel berbahan campuran minyak sawit dan minyak mikroalga menggunakan Katalis KOH = Biodiesel production made of a mixture of palm oil and microalgae oil using KOH Catalyst

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Abstrak

Pemanfaatan biodiesel sawit diselidiki memiliki masalah dengan sifat aliran dingin terutama di daerah dataran tinggi yaitu titik kabut tinggi karena tingginya kadar asam lemak jenuh. Di sisi lain, minyak mikroalga memiliki titik kabut yang rendah karena tingginya tingkat asam lemak tak jenuh. Sementara itu, densitas dan kadar air biodiesel yang terlalu tinggi akan mempengaruhi kinerja mesin. Oleh karena itu, kombinasi sifat tak jenuh tunggal dan jenuh, maupun perbedaan densitas antara minyak kelapa sawit dan minyak mikroalga membuatnya lebih disukai sebagai campuran bahan baku untuk meningkatkan kualitas Biodiesel. Penelitian ini memformulasikan pencampuran minyak mikroalga Nannochloropsis sp (MO1) dan/atau minyak mikroalga Chlorella vulgaris (MO2) terhadap minyak sawit (PO). Skema pencampuran minyak dilakukan dengan 4 variasi yaitu perbandingan massa 0:30 (MO:PO); 1:30 (MO1:PO); 1:30 (MO2:PO); 1:1:30 (MO1:MO2:PO).Transesterifikasi terjadi pada 65°C dengan penambahan katalis KOH dengan perbandingan minyak : metanol (1 : 15) : @250 mL selama 1,5 jam. FAME dianalisis berdasarkan SNI 7182:2015 dengan tiga parameter utama diantaranya kadar air (ASTM D6304), densitas (ASTM D1298), dan titik kabut (ASTM D2500). Berdasarkan penelitian yang dilakukan dari semua variasi menunjukkan bahwa hasil terbaik yang direkomendasikan adalah komposisi campuran minyak mikroalga Chlorella vulgaris terhadap minyak sawit dengan parameter densitas dan titik kabut masing – masing sebesar 859,3 kg/m3 dan 11,7°C (sesuai SNI), meskipun parameter kadar air masih tinggi sebesar 973,4 mg/kg (tidak sesuai SNI).

.....Utilization of palm biodiesel is investigated having problems with the cold flow properties particularly in the high-altitude areas. A common problem of biodiesel is the high cloud point due to high levels of saturated fatty acids. On the other hand, microalgae oil has a low cloud point due to high levels of unsaturated fatty acids. Meanwhile, the density and moisture content of biodiesel that is too high will also affect engine performance. Therefore, the combination of monounsaturated and saturated properties, as well as differences in density between palm oil and microalgae oil make it preferred as a mixture of raw materials to improve the quality of Biodiesel. This research formulated the mixing of Nannochloropsis sp (MO1) microalgae oil and/or Chlorella vulgaris (MO2) microalgae oil to palm oil (PO). The oil mixing scheme is carried out with 4 variations namely mass ratio 0:30 (MO: PO); 1:30 (MO1: PO); 1:30 (MO2: PO); 1: 1: 30 (MO1: MO2: PO). The transesterification occurred at 65°C with the addition of KOH catalyst with oil : methanol (1 : 15) : @250 mL during 1,5 hours. The FAMEs were analysis according to SNI 7182:2015 with three main parameters including water content (ASTM D 6304), density (ASTM D1298), and cloud point (ASTM D 2500). Based on research conducted from all variations shows that the best results recommended are the composition of a mixture of Chlorella vulgaris microalgae oil to palm oil with the density and fog point parameters respectively 859.3 kg/m3 and 11.7 °C (according SNI), although the water content parameter is still high at 973.4 mg/kg (not according SNI).