

Production of biodiesel from waste cooking oil via deoxygenation using ni-mo/ac catalyst

ABSTRACT

Waste cooking oil (WCO) from palm oil is one of the most prospective biodiesel feedstock when compared to other oil seeds. Thus, WCO has great potential as a green source of diesel fuel for engines in motor vehicles and machinery. This project aimed to study the potential of three randomly selected types of WCO, namely; sample A (used 1× once to fry an egg), sample B (used 3 – 5× to fry salted fish), and sample C (used repeatedly to fry banana fritter) for the production of green diesel fuel over Ni-Mo/AC (nickel and molybdenum oxides incorporated with activated carbon) catalyst through the deoxygenation (DO) process. The prepared catalyst was characterized through X-ray diffraction (XRD), thermogravimetric analysis (TGA), and field emission scanning electron microscopy (FESEM). The DO process was performed at 350 °C to remove oxygen from the WCO samples. The liquid products were analysed by gas chromatography-mass spectrometer (GC-MS) and gas chromatography-flame ionization detector (GC-FID), to measure the yields of straight-chain hydrocarbons and fractions in the range C₈ - C₂₀. Results showed that the highest n-(C₈ - C₂₀) hydrocarbon fractions were produced in the order of sample B (89.93%) > C (88.84%) > A (82.81%).