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THE PRODUCTION OF RENEWABLE DIESEL FUEL THROUGH HYDRO TREATMENT OF WASTE CHICKEN FAT: A KINETIC STUDY

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In the current study, hydro treatment of low-grade waste chicken fat was used as a cost effective renewable feedstock to produce high quality renewable green diesel fuel like hydrocarbons. The reactions were carried out on the new synthesized $NiMo/TiO_2$ (15%)-Al_2O_3 sulfide catalyst in a fixed bed down flow reactor at reaction temperatures of 400-450 °C; liquid-hourly space-velocity (LHSV) 1.0-4.0 h^{-1}, constant hydrogen pressure of 6 MPa, and H_2/oil ratio: 600 N (cm^3/cm^3), for optimizing the best conditions. The organic liquid products (OLPs) were analyzed using gas chromatography (GC) to quantify the liquid product hydrocarbon distribution. The conversion, product yield, and contribution of decarbonylation/decarboxylation (DCO/DCO_2) and hydrodeoxygenation (HDO) reactions were investigated. The results demonstrated that reaction temperature affected to OLPs composition and reaction pathways including HDO and DCO/DCO_2 while LHSV have no influence on the mentioned reaction pathways. The reaction was found to follow the second order mechanism and the estimated activation energy (E_a) was 94.6 $kJmol^{-1}$.

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