

Production of high quality biodiesel by hydrotreating of soybean oil and used cooking oil in the batch reactor system

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The increasing petroleum prices, commitments to reduce greenhouse gas and governments regulations have made biodiesel more attractive in recent times. Transesterification of vegetable oils is currently the primary route for production of biodiesel (fatty acid methyl ester, FAME) from vegetables oils. However, the issues association with FAME usage, such as poor stability and high solvency, leading to filter plugging problems, has hinder the application for transportation fuels. Hydrotreating of vegetable oils is a potential process to produce high-quality biodiesel that is fully compatible with petroleum-derived diesel fuel. In this work, the applicability and feasibility of hydrotreating process for high quality biodiesel production is investigated by using soybean oil and used cooking oil as feed-stocks in the batch reactor system. The effect of temperature, hydrogen pressure, catalyst type and catalyst to oil ratio are examined to optimize the reaction conditions. The results showed that the high quality biodiesel with ~90 wt% n-alkanes can be produced by hydrotreating of vegetable oil and used cooking oil with commercial Ni/SiO₂-Al₂O₃ catalysts at reaction temperature of 400oC.