

Characterization of purified waste cooking oil using supercritical carbon dioxide extraction

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Purification of acidified palm oil and waste soybean oil using supercritical carbon dioxide (scCO₂) extraction were studied. Selective removal experiments of free fatty acid (FFA) from triglyceride were carried out at pressures ranging 200 – 350 bar, temperatures ranging 40 – 100 °C, CO₂ flow rates 10 – 40 g/min, extraction times 1 – 7 hr. It was found that free fatty acid (FFA) removal efficiency was high at higher temperature and lower pressure from the waste cooking oils. In this study, compositions of the extracted samples and the raffinates were characterize in detail using size exclusion chromatography (SEC), UV-Vis Spectrophotometry. The optimal condition of fractionation is at 80 °C, 200 bar, 40 g/min during 3 hour. The waste cooking oils have more than 2 % H.M.W.C, more than 90 % TG, 0.13 % conjugated dienoic acid, more than 2 % FFA, and the others 22.8 % polar compounds. But the extracts obtained from extraction included less than 2 % H.M.W.C, more than 93 % TG, 0.0701 % conjugated dienoic acid, less than 1 % FFA, and the others 9.00 % polar compounds. They can be similar to fresh oil after extraction with scCO₂.