

Chompaka Tantrakool 2006: Simulation of Oil Extraction from Sunflower and Jatropha Curcas Seeds for Biodiesel Production. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering. Thesis Advisor: Associate Professor Penjit Srinophakun, Ph.D. 120 pages.
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This study was carried out to find the optimum yield in extract oil from vegetable seed, were sunflower seed and jatropha seed. ASPEN SIMULATION was used in this study. ASPEN PLUS was applied to find the optimum condition. The investigation was performed by varied ratio of solvent and substance, temperature, pressure and type of solvent for extracting, i.e. hexane, ethanol and methanol. The numbers of plate in the extractor was set of 6 stages for all experiments and had two outlet streams, one was miscella and another was raffinate. Miscella was part separator to separate oil and solvent, which can re-use in extractor. The best condition to extract sunflower oil was at 70°C, 1 atm and the ratio of 3:1, which the efficiency were 91.18% by hexane, 93.53% by ethanol and 89.41% by methanol. For jatropha oil, the best condition was the same at 70°C, 14.5 MPa and ratio of 3:1. The efficiency at the optimum condition was 87.60% by hexane, 91.53 by ethanol and 88.46 by methanol.

Then was ASPEN ICARUS used to calculate the economic assessment by mapping data from ASPEN PLUS. Set value of main product, vegetable oil, and by-product, raffinate, were equal for all experiment. Those were 1.4 dollar for main product and 0.6 dollar for by-product. Set life cycle for extraction plant was 20 years. Result found the best sunflower oil extracted plant to investment that was extract by hexane because had most Interest rate of return (IRR) value, 24.4018%, .Net Present Value (NPV) was 600,346 dollar for 20th year and Payback period in 11th year. For extracted jatropha oil, had best investment when used hexane as solvent. Payback period in 10th year, Interest rate of return (IRR) value, 25.5849% and Net Present Value (NPV) was 605,241 dollar for 20th year

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Thesis Advisor's signature

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