

### Hydrolysis of Waste Cooking Oil in Supercritical CO<sub>2</sub>

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Hydrolysis of triacylglycerol(TAG) from fats and oils to glycerol and free fatty acid (FFA), also referred to as fat splitting, is an important reaction for the olechemical industry. Typically, hydrolysis is carried out at 100–260°C and 100–7000 kPa using 0.4–0.15(w/w) initial water to oil ratio with or without catalysts. It is an endothermic reaction occurs in a stepwise manner where TAG is initially hydrolyzed to diacylglycerol (DAG) then to monoacylglycerol(MAG) and finally to glycerol. water, in its subcritical state, can be used as both a solvent and reactant for the hydrolysis of triglycerides. subcritical water (150°C < T < 370°C, 0.4 < p < 22Mpa) can act as an acid or base catalyst. To investigate milder reaction conditions, in this study, waste cooking oil and fresh soybean oils will be hydrolyzed to free fatty acids with deionized water under SC CO<sub>2</sub> medium in a batch reactor. Effects of the reaction temperature, time and solvent to feed ratio on FFA in the hydrolysis at equilibrium will also be observed for optimum conversion of oil. The reaction products will be analyzed by acid–base titration, GC FID and HPLC.