Comparison of FAME and GC coproduction in the solvents and solvent-free system

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Increased demand for energy, oil prices, predicted shortages of fossil fuels and global warming are accelerating the research for biodiesel production and application of its by-products. Glycerol carbonate is a versatile, stable and colorless liquid derived from glycerol with many possible applications. In this study, we comparison of biodiesel and glycerol carbonate coproduction of in the organic solvents and solvent-free system. To evaluate coproduction of biodiesel and glycerol carbonate, various solvents (*tert*-butanol, acetone, THF, toluene, xylene) and solvent-free system were investigated in the conditions of soybean oil with DMC using Novozym 435 as a catalyst. The trends of biodiesel and glycerol carbonate production were similar in the same solvent types. Hydrophilic solvents produced more glycerol carbonate than the biodiesel. However, hydrophobic solvents presented different production trend compared with hydrophilic solvents. Solvent-free system, to produce biodiesel and glycerol carbonate simultaneously, showed possibility to coproduction of biodiesel and glycerol carbonate.