Poster E1

Continuous Catalytic Process for Biodiesel Production Using Microalgal Oil in Supercritical Conditions

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Biodiesel is a processed fuel derived from the esterification and transesterification of free fatty acids and triglycerides, respectively, which occur naturally in renewable biological sources such as plant oils and animal fats. Microalgae have been recognized as a promising alternative source for biodiesel-convertible lipids, which can grow in fresh water or marine environments, without using arable land and competing with food production. In this work, biodiesel production from microalgae oil was investigated using commercial acid resins supported on a porous silica matrix in a continuous fixed bed reactor under supercritical conditions. In order to decrease the operational temperature and pressures, a cosolvente (carbon dioxide) was added into the reactants. The influence of temperature, reaction time and oil to alcohol mass ratio was evaluated throughout experiments performed at pressure of 250 bar. The temperature ranged between 150 and 210°C, reaction time of 2 to 10 minutes and the oil to alcohol mass ratio varied between 1:20 and 1:40. With the optimal reaction temperature of 180°C, and alcohol to oil ratio of 25, a 92% yield of methyl esters was observed in only 6 minutes at the supercritical conditions with the solid acid catalyst. Acid resin can considerably improve the rate reaction for biodiesel production in supercritical conditions.