

PRODUCTION OF ETHYL ESTERS FROM *Jatropha curcas* L. OIL UNDER SUPERCRITICAL CONDITIONS IN CONTINUOUS MODE

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The feedstock flexibility is the most important advantage to consider for biodiesel production methods because the resultant price strongly depends on the feedstock price. The cost of the raw materials currently represents about 70% of the total production cost. The free fatty acids and water content in low grade feedstocks and hydrated ethanol pose a negative effect on the conventional homogeneous alkali-catalyzed process and heterogeneous catalytic methods, but can be successfully used in the transesterification reaction using an alcohol at its supercritical conditions. In Brazil, *Jatropha* oil is an investment in biodiesel production, however, this feedstock has a high percentage of free fatty acids. In the present study, the transesterification of *Jatropha* oil in a continuous catalyst-free process using supercritical ethanol were investigated. Experiments were performed in a packed-bed tubular reactor and variable studied were reaction temperature (523 K to 598 K), pressure (15 MPa and 20 MPa), water concentration (0 wt% to 10 wt% in ethanol) and co-solvent to oil mass ratio (0 wt% to 10 wt%) maintaining fixed ethanol to oil mass ratio in 1:1 for different residence time. Results demonstrated that temperature and pressure had a positive effect on FAEE production. The addition of water and co-solvent in the reaction medium favors conversion of the reaction and decreases the decomposition of fatty acids. In the experimental range investigated appreciable FAEE yields (90 wt%) achieved at 598 K, 20 MPa, oil to ethanol molar ratio of 1:40 and 10 wt% of water concentration with low fatty acid decomposition.

Keywords: biodiesel, *Jatropha* oil, supercritical method.

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