

Ultrasonic, hydrodynamic and microwave biodiesel synthesis – A comparative study for continuous process

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Abstract

In this presentation a detailed study of hydrodynamic, ultrasonic and microwave techniques for the intensification of FAME production is presented. The equipments used were a single-mode microwave type TE applicator powered by a solid-state generator; a rotor-stator type hydrocavity equipment and two continuous ultrasonic reactors, using Vibracell and MMM-clamp-on ultrasonic devices.

For all the equipment used, the power consumed from the grid was measured, and in all the experiments, the concentration of FAME was determined, after the separation of glycerine and unreacted methanol.

Our purpose was to demonstrate that using these methods of process intensification biodiesel can be obtained in very compact installations (with small residence time) with minimum energy consumption.

The specific energy consumption of the studied equipment, in order to obtain standard quality FAME, decreases in the order: probe system, MMM-clamp-on, microwave, hydrocavitation and in the best case, the cost of energy consumed represents only 0.08% of the value of the biodiesel obtained.

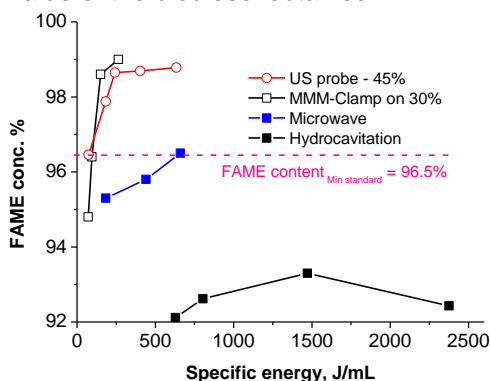


Fig.1 The specific energy consumption for studied processes

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