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“Bridging the gap between increasing knowledge and decreasing resources”

Sedimentation of Mechanical Extracted *Jatropha curcas* L. Oil Applying Multiphase Flow Fundamentals

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Abstract

Jatropha curcas L. is an attractive crop which has the ability to provide plant oil as an income source for rural communities inducing economic growth, welfare and securing fuel for cooking, lightning and heating. Mechanical extraction is the most common method to produce plant oil in a decentralised system. Raw *J. curcas* oil includes up to 35% impurities originating from organic pressed material which should be removed in order to improve the chemical properties. For any technical use those impurities must be removed in order to prevent clogging of technical components and to de-accelerate oxidation and hydrolysis. The oil temperature is an important factor to be considered for an efficient clarification process. When the temperature decreases, the rate of sedimentation becomes slower because it is influenced by the density of the particles, as well as by the density and kinematic viscosity of the fluid. In this study, a multiphase sedimentation unit was constructed at University of Hohenheim based on “Weihestephan-Standard” and assimilated with pressing machine type Komet D85-1G. The multiphase sedimentation unit was tested for its performance regarding total contamination reduction efficiency and sedimentation time. Furthermore characteristic and variable chemical properties were analysed and compared with DIN-norm (DIN 51 605). The multiphase sedimentation unit showed a high reduction of total contamination demonstrating a considerable potential for improving *J. curcas* oil properties for use in rural communities. It is expected that this sedimentation principle can be established in developing countries to assist local communities in producing high quality oil at low costs.

Keywords: Clarification, *Jatropha* oil, multiphase flow, sedimentation, total contamination