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Clarification of *Jatropha curcas* Oil for Direct Use in Plant Oil Stoves

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Abstract

Jatropha curcas cold-pressed oil can contain up to 30 % of impurities of its total volume. These impurities influence the combustion characteristics and performance of plant oil stoves. In this study the efficiency of discontinuous and continuous systems for the clarification of the Jatropha oil was analyzed. Viscosity and density of the oil for different temperatures were determined in order to evaluate their influence on the clarification process. The total contamination of the oil and the particle size distribution (PSD) of the sediments were used as parameter to assess the efficiency of the clarification systems.

The PSD of the raw oil varied in a wide range, from 4.25 μm to 735 μm. This wide particle size distribution of the oil resulted in a broad range of required sedimentation time for the particles. The efficiency of the removal of particles using the discontinuous system, *i.e.*, horizontal tank, was about 65 % in 3 days. From this point onwards the reduction of the total contamination was very slow, since the suspended particles in the oil are very small, and therefore the system is no longer efficicient. The Weihenstephan continuous system was more time efficient than the discontinuous system reaching 35 % of reduction of particles within 5 hours. The time required for the removal of the particles is dependent on the geometry of the tank, namely, the larger the falling height of the particles the longer the time of the particles to settle. The sedimentation time reduces with the increase of temperature of the oil. Specifically, by increasing the temperature from 20°C to 50°C the time was reduced by factor 10. The results will form the basis for developing clarification systems for village level in rural areas.

Keywords: Chemical properties, *Jatropha curcas*, oil clarification, Weihenstephan standard

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