

## Paper (7)

### Comparison of different methods for producing bio oil from Egyptian jatropha seeds

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#### Abstract

The increasing demand for diesel fuel and environmental concerns encouraged the use of bio oils as alternative fuels in diesel engines. Extraction method affects oil yield, extraction time, and the physical and chemical properties of the produced oil. The latter influence engine performance and emissions. This research aims to find the optimum method for producing bio oil from Egyptian jatropha seeds. Four extraction methods were considered, namely screw press, hydraulic press, Soxhlet, and solvent. A screw press was designed to produce bio-oil at extraction temperature of 100<sup>0</sup>C. A hydraulic press and solvent extraction methods were used to extract oil at room temperature. The effects of extraction temperature and time on produced bio-oils were studied for the four processes. Correlations were deduced to relate viscosities and densities with oil temperatures. The effect of extraction methods on free fatty acid (FFA) compositions was measured. Temperature affected oil viscosity and density by the different processes. Screw press proved to be the optimum process. The use of the screw press extraction reduced FFA to 2.7% compared to a Soxhlet value of 21.1%. Extraction times were 2400, 7200, 30 and 720 min for oil extraction yields of 25, 20, 19 and 11% for Soxhlet, solvent, screw press and hydraulic press extraction processes, respectively.