

## **Use Of Wastewater And Treated Water For Jatropha Curcas Cultivation And The Possibility Of Oil Seed Use As A Biofuel**

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### **ABSTRACT**

All experiments were carried out in 2018-2019. In the present work the characteristic fuel properties of Jatropha oil were studied to assess compatibility of blends with diesel. The relative density at 150C of raw Jatropha oil is 0.876 higher than those determined for diesel (0.839). The values of the kinematic viscosity of raw Jatropha oil and diesel at 400C are found to be 5.8 and 3.08 respectively. The cetane number of Jatropha raw oil determined in the present study was ranged 46 to 70. The flash and fire point of Jatropha oil was found to be 1280C and 1360C respectively. Our results showed that higher heating value (HHV) of Jatropha oil ranged from 39.24 to 41.87 and the lower heating value (LHV) ranged from 36.53 to 38.94. The heating value (MJ/kg) for Jatropha biodiesel is lower than those reported for petro diesel, nucleus dates biodiesel and olive biodiesel but higher than those reported for castor biodiesel and coconut biodiesel. Determination of Iodine number of Jatropha crude oil revealed to high Iodine number to be 101. Sulphur weight % in Jatropha oil determined in the present work is 0.0024%. Specific heat capacity (SHC) of Jatropha oil determined is 0.80 Jk-1g-1.

Eight water mixtures were used for germination and cultivation of Jatropha in pot experiments. The results showed that germination percentages of Jatropha seed ranged from 54 to 87% and the highest percent was recorded when irrigation with untreated drainage water (100%UDW) was used and the lowest one (54%) was for sample irrigated with 50%tap water+50% untreated drainage water (50%TW+50%UDW). Generally, higher germination percentages were recorded when untreated drainage water (raw) was applied and lower ones were reported when tap water was used. Fractionation of fatty acids process was done using GC. Jatropha oil has more 19% saturated fatty acids (C16:0, C17:0, C18:0, and C20:0) and more than 80% unsaturated fatty acids (C16:1, C17:1, C18:1, C18:2, C18:3 and C20:1).

Levels of total saturated fatty acids (TSFA) in Jatropha sample are 19.16 and the most abundant fatty acid in Jatropha is palmitic acid (C16:0) followed by stearic (C18:0) and the lowest one is Arachidic acid C20:0. These results also, showed existence of odd chain saturated fatty (OCS-FAs) margaric acid C17:0 (0.29). Results showed that levels of total unsaturated fatty acids (TUSFA) in Jatropha sample is 80.81 and the most abundant fatty acid in Jatropha oil is linoleic C18:2 followed by oleic C18:1 and the trienoic acid (linolenic C18:3) is lowest one

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