

IMPROVEMENT OF HYDRAULIC PRESS FOR VEGETABLE OIL EXPRESSION IN RURAL AREAS

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ABSTRACT

*Cultivation of oil producing crops especially *Jatropha* and *croton* as source of vegetable oil for biodiesel production is being encouraged in rural areas. To recover oil from seed, manual press is the feasible method in rural areas where there is no electricity. Research was conducted to improve hydraulic oil press machine for rural application. Factors affecting oil recovery were found to be: moisture content of seeds, operating pressure, seed oil content, and the amount of seeds pressed per batch. Percentage oil recovery was improved by reducing diameter of press cylinder, hence increasing expression pressure, and either reducing amount of seed processed per batch or placing disk within the seeds to improve oil flow. The maximum vegetable oil recovered from *Jatropha* seeds at a pressure of 20.8 MPa after improvement was 57.5% of the total oil in seeds. There was no significant difference in terms of oil recovery between pressing whole seeds or milled seeds. Suggested further improvement includes: higher pressure than 20.8 MPa, reduced radial distance travelled by oil and replacement of hydraulic jack with a self retracting double acting hydraulic power cylinder to reduce batch cycle.*

*Keywords: Vegetable oil, Oil recovery, Oil press, *Jatropha**

INTRODUCTION

Introduction of converting vegetable oils to bio-diesel technology in Tanzania is expected to bring a significant change in agriculture sector. Recently, emphasis has been put into growing *Jatropha* plants, a potential source of raw material in production of bio-diesel. There are many advantages of bio-diesel over petroleum diesel; biodiesel is renewable and environmentally friendly. Farmers are likely to benefit from cultivating oil producing plants such as *Jatropha* and *croton* if they can express oil from seeds instead of selling whole seeds. In addition, they may use extracted oil for lighting and cooking (de Jongh, 2010).

Methods of recovering oil from seeds include oil expression using expellers, manual presses machines such as ram and hydraulic press and solvent extraction. Solvent extraction is the most efficient

method that can recover most of the oil contained in the seeds leaving behind a cake with only 1% (w/w) oil (Considine and Considine, 1982; Kibazohi, 2006 and de Jongh, 2010). However, this method is expensive and only feasible for large scale production, and requires skilled personnel. Oil expression by power driven expellers is next to solvent extraction method in term of efficiency leaving behind a solid cake with 8 to 10% (w/w) oil (Considine and Considine, 1982; Kibazohi, 2006). However, oil expellers are driven by electric power or internal combustion engines both of which are either not available in rural areas or expensive for small scale farmers.

The third and least efficient method is oil expression by manual presses which is the cheapest method for recovering oil from seeds, nuts, and kernels when compared to others and does not require skilled

