
Seed moisture dependent on physical and mechanical properties of *Jatropha curcas*

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The moisture-dependent physical and mechanical properties of *Jatropha curcas* were studied. Five levels of moisture content ranging from 5.85 to 25.85 % d.b. were used. Standards methods were used to determine the physical properties, while Instron Testing Machine was used to determine some of the mechanical properties. The average length, width, thickness, thousand grains mass increased as the moisture content increased and coefficient of friction of *Jatropha* increased linearly against various surfaces with increased in moisture content. The bulk density and true density were found to increase from 428 to 474 kg/m³ and 863 to 1035 kg/m³ respectively, while the porosity was found to increase from 50.3 to 54.2 %. The maximum rupture force was 113.99 N in the horizontal loading position, while the minimum of 26.83 N was in the transverse loading position. The maximum deformation of 2.5 mm was in the horizontal position and minimum of 0.40 mm in the vertical position. Moisture content was found to affect the properties.

Key words: *Jatropha*, Moisture content, mechanical and physical properties, rupture force, hardness.

Introduction

Jatropha curcas is a perennial poisonous shrub belonging to the Euphorbiaceae family. It is an uncultivated non-food wild-species, a perennial shrub, easy to adapt in marginal areas and resistant to a medium-long periods of dryness. The seeds contain 28-36% oil that can be processed to produce a high-quality biodiesel fuel, usable in a standard diesel engine. The seed production is around 3.5 tons / hectare. The *curcas* fruit contains 37.5% shell and 62.5% seed (Singh *et al.*, 2007). Seeds are said to resemble castor in seed shape and black in color. They are 42% husk and 58% kernel (Singh *et al.*, 2007).

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