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“Competition for Resources in a Changing World:
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Physical, Mechanical and Chemical Properties of *Jatropha curcas*

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Abstract

Lack of energy resources and increasing energy demand is a worldwide recognised phenomenon. Biofuels are well known as an alternative source of energy, physic nut (*Jatropha curcas*. L) is a drought resistant shrub belonging to the family *Euphorbiaceae* and is an eminent plant for biofuel production. The role of *J. curcas* as a substitute of fossil fuel is remarkable. Cultivated in Central and South America, *J. curcas* was distributed by Portuguese seafarers in Southeast Asia, India and Africa. The plant and its seeds are non edible (toxic) to animal and humans; toxicity of seeds is mainly due to the presence of curcine and deterpine. The post-harvest technology, physical, mechanical and chemical properties of *J. curcas* nuts and kernels were investigated and reported. The physical properties studied embrace: moisture content, 1000-unit mass, geometric mean diameter, sphericity, bulk density, solid density, porosity, surface area, specific surface area, static friction coefficient on various surfaces, angle of repose and suspension line. The chemical properties include oil content in seed and kernel, crude protein in seed and kernel, ash content, free fatty acid, iodine value, acid number, saponification value and gross energy in seed and kernel. The mechanical properties were rupture force, deformation at rupture point, deformation ratio at rupture point, hardness and energy used for rupture (toughness). In the oil industry, different processes must be done before oil extraction occurs: **(a)** dehulling, separating hull from nut, **(b)** deshelling, separating shell from kernel, **(c)** drying and than **(d)** oil extraction. Physical, mechanical and chemical properties of seed and kernel are needed for the design of equipment to handle, transport, process, store and assessing the product quality.

Keywords: Biofuel, *Jatropha curcas*, oil extraction, physical properties