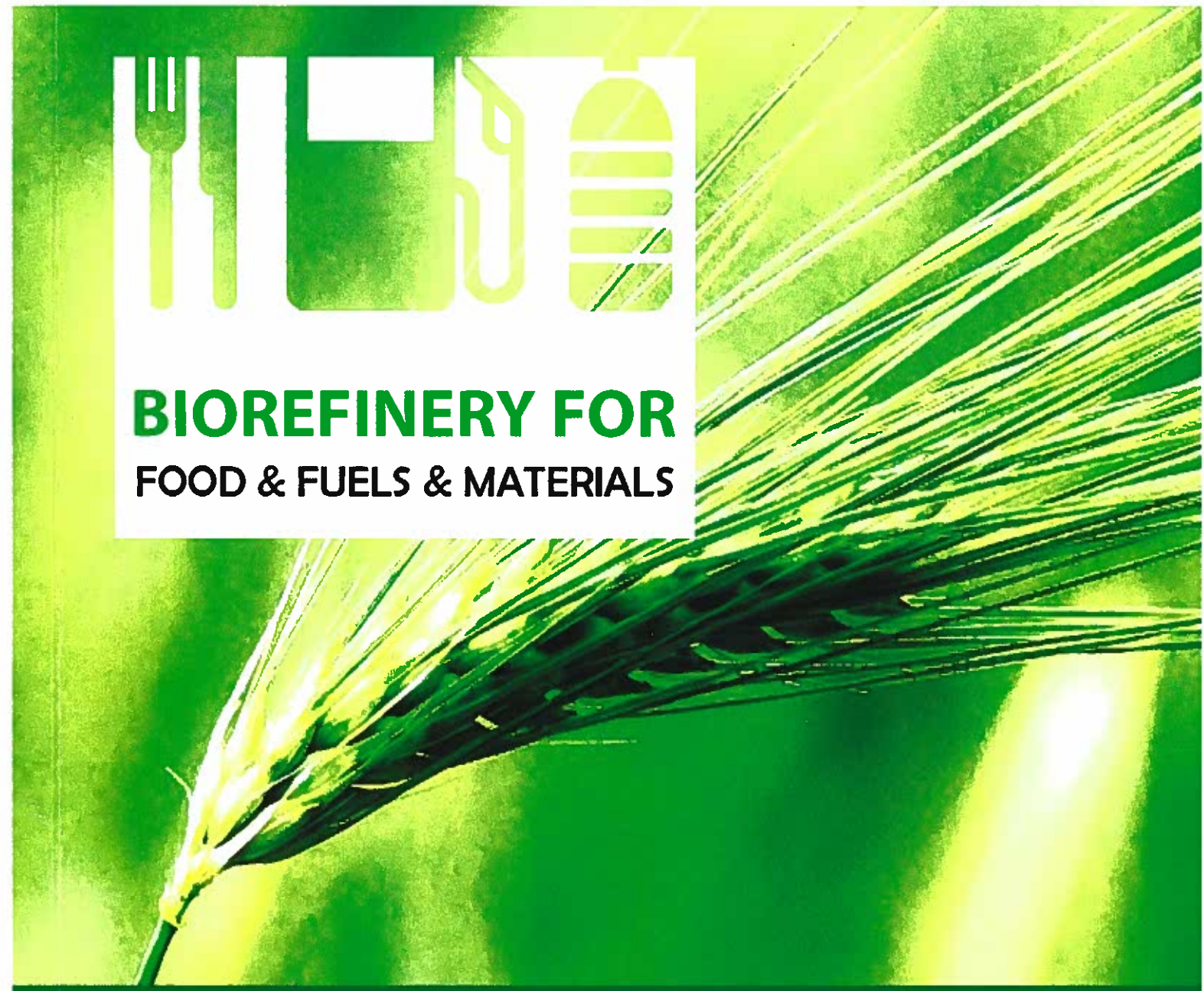

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The Implementation of the Biorefinery Concept to *Jatropha curcas* L. Crop in Mozambique

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The growing demand for low-cost, non-food and non-rain-fed-based feedstock for biodiesel production have drawn attention to *Jatropha curcas* L. due to the high non-edible oil content of its seeds.

This small tree, belonging to the *Euphorbiaceae*, is native from Central America and was spread to Asia and Africa by the Portuguese traders in the 16th century as a hedge plant and for medicinal uses, via Cape Verde Islands and Guinea-Bissau. The first commercial applications of *J. curcas* oil from Cape Verde were reported in Lisbon, for soap production and for lamps (early 19th century). Jatropha has been described as a wild plant, drought-resistant and well adapted to semi-arid-climates, and therefore a promising crop to prevent desertification and to improve socio-economic development in poor tropical rural areas.

In 2008, Galp Energia, the Portuguese enterprise of petrol and natural gas production, started the implementation of a project in Mozambique aimed at the establishment of a complete green energy chain: *J. curcas* crop installation, seed oil extraction and transesterification to biodiesel, local commercialization of the majority of biodiesel and exportation of the surplus.

More than 1.5 million Jatropha plants were planted in about 1000 ha, in the centre of Mozambique (Búzi and Lugela districts) where temperatures vary from 14 to 40ºC (average of 30ºC), and a relative humidity ranging from 43 to 100% (average of 81%). Seeds from these plants from 12 different accesses, grown under the same edapho-climatic and agronomic conditions, had oil contents from 37% to 45% (d.w.). These oils were rich in oleic (mean 40 %) and linoleic (mean 40 %) acids and poor in linolenic acid (mean 0.22 %); had high content of beta-sitosterol (71 % of total sterols), low acidity and low levels of oxidation products, making them adequate for biodiesel production by alkaline-catalyzed transesterification. The oil exhibited high oxidative stability during 6 months at 28 or 35 ºC, due to the high levels of gamma-tocopherol (69-182 mg/kg). When seeds were stored at these temperatures and 75 or 92 % humidity, faster oil degradation was observed. Thus, under tropical conditions, instead of seed storage, the oil must be extracted and stored under closed containers until its use for biodiesel production.

Also, the valorisation of by-products of biodiesel production chain will increase the economic profit of rural population under the biorefinery concept.

Keywords: Jatropha curcas, Biodiesel, Biorefinery.