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Jatropha curcas L.: A new source of sustainable food feed and fuels

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Jatropha curcas L. (jatropha) is a multi-purpose perennial plant that can be cultivated in the arid tropics and subtropics. Jatropha has the potential to produce food feed and fuels on degraded land, upgrade poor soils and generate employment in rural isolated areas. Exploiting the full potential of this plant requires investment in its genetic improvement because the plant has not been domesticated. Historically, the domestication of plants took several hundred years. Nowadays, the challenge is to reduce the time needed for domestication of new plants to one or two decades. With the scientific methods developed in plant breeding and the availability of advanced biotechnological tools, plant domestication can be achieved rapidly. Large genetic variation exists for traits of economic importance in Jatropha germplasm. The products from this plant can replace edible oils and protein enriched food, animal feed meals and fossil fuels. In parallel, atmospheric carbon is sequestered and stored below ground. Plant biomass increases the level of soil organic matter and improves its quality and value. The main focus of the presentation would be to show the complete process of research and development from breeding to specific utilization cases. The untapped potential of Jatropha to contribute to food security globally will be particularly addressed.

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Antioxidant food factors are multifunctional

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Currently, the third function of food attracted much attention that is pharmacological or physiological function. Thus the old tale "foods are medicine" is revived and extended studies are being carried on the active ingredients in edible resources that is called food factor. It is turned out that the food factors generally show wide variety of functions in contrast to drugs as exemplified in curcumin, resveratrol and other polyphenols. Our studies on Schisandrin B (Sch B), isolated lignan from a medicinal herb *Schisandra chinensis* also showed variety of functions such as antioxidant, anti-inflammation, neuroprotective, cardiac dysfunction and anti-aging. It also modulates many cellular signaling pathways. In addition, Sch B was found to interact rather strongly with ATR Kinase involved in cellular DNA damage checkpoint device. These findings suggest the differential function of food factors compared to drug attributes to this bifacial mode of action. One is a general and indirect action such as through its antioxidant activity and another is a direct action onto specific receptor leading to a respective activity. Based on this nature, the food factors applied for functional foods should be classified into two categories. One is mainly used for disease prevention (Mibyou treatment) and another is for clinical usage in complementary or integrated medicine. The essential requirement for the former functional food is the safety and the latter requires strict dose-response data, clear mechanism of action and in some case, ADME.

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