Talented Desert Nut

Rapeseed and soybeans are being supplemented as sources for biodiesel by a very undemanding plant: the jatropha physic nut, which offers huge potential from both an ecological and a social viewpoint

A handful of *Jatropha curcas*: Oil from the physic nut will be used to power engines in the future

The economic viability of cultivating jatropha is being examined at a test farm in Bhavnagar (Gujarat State, India). The fruit from this evergreen plant has an oil content of 25 to 35 percent. Assuming a distance of 2.5 meters between plants, and depending on soil properties and climate, it would be possible to harvest two to four tons of the oily nut per hectare

TEXT THOMAS LANGE

INTRODUCING *Jatropha curcas,* a plant of the spurge family that's been around for 70 million years. The plant was used as a laxative in the past, but will soon be taking on new tasks—for example, helping to improve the climate. It's also something of a pioneer plant that can put down roots on otherwise barren land. Its use will also help conserve the earth's fossil fuel reserves, making it a true ray of hope for the future.

And this hope is by no means unfounded, as this physic nut is set to join rapeseed, soybeans, and coconuts as a raw material for the production of biodiesel. That alone may be nothing special—but the jatropha plant also offers a huge range of benefits that go far beyond anything the other plants can deliver.

Public perceptions about jatropha are dominated by the key fact that cultivation of the plant does not compete with food production: The physic nut is inedible and does not need to be grown in the type of soil used for food crops. In fact, it grows mostly in tropical and subtropical areas and even in desert-like conditions. Barren land could thus be used to create jobs in many of the world's structurally weak regions. What's more, because jatropha plants are often more than two-and-a-half meters high, they protect other plants from wind and water erosion. Finally, after just one year of jatropha plant cultivation, food crops can be planted in between them.

Like all other plants, jatropha has a neutral CO_2 balance because its combustion releases only the same amount of CO_2 that the plant absorbed while it was alive. The combustion of one ton of biodiesel thus generates savings of 2.7 tons of CO_2 compared to fossil diesel. Use of machines to harvest jatropha would, of course, lead to the emission of additional CO_2. Until now, however, jatropha has only been harvested by hand.

DOMESTICATING THE NUT

Professor Klaus Becker from the University of Hohenheim in Stuttgart is a jatropha expert who has been studying the plant for nearly 20 years. "When I got started, the price of oil was still very low and public agencies saw no necessity for conducting research into the jatropha plant," Becker recalls. Michael Markolwitz and André Noppe from Evonik Industries AG took a different view: The two have been interested in the physic nut for quite some time now. Markolwitz, a product manager, and Noppe, a sales director, work in Lülsdorf near Cologne, where they are involved in the production of alcoholate catalysts. These materials make manufacturing biodiesel a worthwhile undertaking. After all, because pure plant oil congeals into a solid mass at cool temperatures, it is necessary to chemically modify the oil. By adding methanol, it is possible to keep the plant oil in a liquid state in winter as well, while catalysts from Evonik ensure an efficient bonding of oil and methanol. "We are monitoring jatropha research very closely." says Noppe. "And we have already tested our catalysts with oil from the jatropha plant." The result: "They functioned 100 percent."

Market potential for jatropha is huge: According to Daimler AG, some 30 million hectares of land worldwide are suitable for jatropha cultivation; BP and D1 Oils plan to convert around one million hectares into jatropha plantations by 2012. However, before the nut can be used for industrial purposes, it needs to be domesticated. "Until now, the yield has varied from plant to plant, and has ranged from nothing to satisfactory," says Becker. Still, researchers have successfully removed the toxins normally contained in the jatropha plant. "Flour from jatropha can thus now replace soy flour, which means it can be used as animal feed," says Becker.

Markolwitz is always pleased to hear about progress made in jatropha research. And he retains close contact with the subject in the form of a jatropha plant he has been growing in his office. The plant has yet to produce any seeds. But that doesn't matter: Becker has learned to be patient after studying jatropha for 20 years. <

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