



Alberto Denberg

Professor Moti Hershkowitz with a fuel-creating prototype at his Ben-Gurion University lab this week.

# Seaweed: The world's engine?

*In light of the environmental damage of 'first generation' biofuels, researchers are turning to cleaner energy sources*

By Zafir Rinat

**W**hat if it turned out that corn and cane sugar fuels, considered substitutes for more polluting fuel, were also the cause of serious environmental damage? We would then search for greener substitutes: seaweed, animal fat and other fruits and vegetables containing oil.

Over the past year, Israeli researchers have accelerated attempts to develop various types of "green" fuel, and research groups are hard at work developing technology that will become part of a global oil substitute trend.

At Ben-Gurion University of the Negev (BGU), they are working on a new diesel fuel based on plant and animal fat. Several researchers are trying to develop the technology to produce oil from seaweed, which would then serve as a basis for fuel.

The production of veteran biological fuels is devastating to the environment. It involves, among other things, cutting down rain forests and damaging sensitive ecology. When we add this damage to the use of chemical fertilizers and insecticides, as well as an increase in the price of food resulting from widespread investment in crops for this purpose, it seems that the production of biological fuels may create more problems than it solves vis-a-vis pollution.

In the past year, the Samuel Neeman Institute in the Technion-Israel Technological Institute convened a forum of experts to discuss ways of promoting Israeli development in the field of bio-fuels. At the first session, which was held about half a year ago, Dr. Amit Mor emphasized the need to develop "a second generation of biological fuels."

The fuels of this generation are produced from agricultural waste, sewage sludge, seaweed or crops that can be developed on the margins of the agricultural area. "The direction is to encourage the production of second-generation fuels from various types of waste and from inedible plants," Mor emphasized.

At BGU the latest devices for data processing and the analysis of types of materials have been enlisted to develop a new type of biological fuel, "iso-diesel," based on plant and animal fats. About a year ago, the university submitted a request to have the new product recognized as a patent.

***'The plants from which we produce the oil serve as a means of absorbing this [greenhouse] gas.'***

"We are using fat that remains as surplus from meat processing, and a wide variety of oils from plants," says Prof. Moti Hershkowitz of BGU. "What is unique about our product is that as opposed to other biological fuels, which at present cannot be placed directly into the engine and have to be mixed with other components, we have developed a diesel fuel that can be used directly in the vehicles."

The scientists have succeeded in removing the oxygen from the oils and creating fuel that is similar to the diesel that is presently used in vehicles. "The difference is that our fuel is from a plant source and is cleaner," says Hershkowitz.

itz. "Therefore the emission of pollution will be lower. It's true that the emission of greenhouse gases from vehicles will not be reduced, because carbon dioxide, which is a greenhouse gas, will still be discharged. But the plants from which we produce the oil serve as a means of absorbing this gas."

According to Dr. Isaac Berzin, an Israeli scientist who worked for years in the United States and who has recently returned to Israel, seaweed is likely to provide a significant percentage of energy needs and to reduce greenhouse gases. Berzin, who has received the backing of the Interdisciplinary Center in Herzliya to establish a center on the study of alternative fuels, says "the idea is to take the gases discharged from the chimneys of power stations and to transfer them to a system where seaweed is found in brackish water. Sun, fertilizer and carbon from the chimneys help them to multiply in large quantities. About one quarter of their weight is vegetable oil, from which biological fuel can be produced."

Berzin says: "If they reduce a fifth of the emission of carbon dioxide in the power stations of the U.S. [and decide to] raise seaweed, it will be possible to produce biological fuel that will save about one fifth of this country's import of quarry fuel (coal, gas and oil)."

However, many experts claim that many difficulties lie ahead before seaweed can be turned into "the world's engine" and emphasizes there has been no proven success in raising a stable system of seaweed. "I believe that in the future there will be a variety of alternative energy types and biological fuels, and we will have to assess the environmental and economic cost of each of them," says Hershkowitz.