

No-Cal Powder May Sub for Food's Fat

A new, no-calorie fat substitute called Z-Trim may change the adage that whatever's good for you must taste bad. Z-Trim, a bland mix of insoluble fiber made from the crushed hulls of grains, can replace the fat and some of the carbohydrates in foods such as chocolates, brownies, cheese, and ground beef.

"It represents a new generation of fat replacers," says its inventor, George E. Inglett of the U.S. Department of Agriculture's Biopolymer Research Unit in Peoria, Ill. Inglett unveiled Z-Trim on Aug. 26 at the American Chemical Society meeting in Orlando, Fla.

Most fat replacers based on carbohydrates add calories back to the food, Inglett says. One example is a fat substitute that Inglett himself developed 6 years ago, called Oatrim (SN: 5/26/90, p. 330). Made of a digestible fiber from oat flour, it provides 4 calories per gram—less than half the calories of fat but calories nonetheless. By contrast, Z-Trim passes through the body undigested.

Z-Trim also differs from the notorious, no-calorie fat substitute olestra, which can cause gastrointestinal distress and sweep vitamins and carotenoids out of the body (SN: 1/27/96, p. 61). The new substitute does not have those drawbacks, Inglett declares. He argues that to reduce their chances of developing intestinal disorders, people should actually eat more of the kind of insoluble fiber that makes up Z-Trim. Unlike olestra, however, Z-Trim cannot be used to fry foods.

"I wouldn't expect Z-Trim to have the same kinds of problems as olestra," says Margo Wootan, a senior scientist at the Center for Science in the Public Interest in Washington, D.C. "Fiber is already found in our diet, while olestra is a synthetic chemical."

Inglett spent 3 years perfecting a multistage processing technique to produce the smooth, palatable Z-Trim from the tough hulls of corn, oats, or rice. First, he crushed the hulls in a mill with a highly alkaline solution of hydrogen peroxide, shearing the plant cells apart. Spinning the mixture in a centrifuge washed away all the peroxide and other water soluble components.

After this treatment, the pieces were still too large, making the fiber coarse and gritty, Inglett says. But putting the material through the mill and centrifuge again made it smooth and able to absorb a lot of water. "That second whammy is what really does the job," he says. "It takes every cell and busts it to fragments."

The result is a fine, white cellulose powder that can be made into a gel by

adding water. Different concentrations of the powder yield gels that vary from a pourable liquid to a soft solid, like mashed potatoes. He can also blend powders of the different grains to vary the gel's consistency.

There is concern that the "microbial stability" of foods containing Z-Trim hasn't been adequately tested. "Whenever you remove the lipid material and replace it with water," says Thomas H. Parliment, a flavor

chemist for Kraft Foods in White Plains, N.Y., "microbes are able to grow, and you can get mold." That concern would have to be worked out before Z-Trim could be used in the food industry, Parliment says.

If you want to replace fat in food, Inglett says, only three safe, no-calorie possibilities exist: water, air, and fiber. "You don't sell anybody air, you don't sell anybody water, but you can sell them Z-Trim." — C. Wu

Coffee can give many species a boost

Humans aren't the only creatures that rely on coffee to get through the day—so do a wide variety of wild birds, insects, and other animals, studies demonstrate.

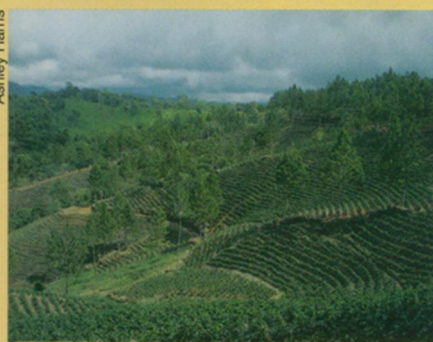
Many animals live on traditional coffee plantations, in the abundance of trees and bushes that the farmers cultivate along with the coffee crop. Growers, however, are quickly converting to agricultural methods that produce higher yields but offer much less protection for wildlife, Ivette Perfecto of the University of Michigan in Ann Arbor and her colleagues explain in the September *BIO SCIENCE*. They focused their report on Latin America, but they say that the trend is widespread.

The high-yielding approach grows coffee bushes in full sun, without the diverse ground cover and canopy that the old-fashioned farms feature. The so-called sun plantations have little food or shelter to offer wildlife. "Even the most cursory observation in sun plantations shows them to be almost devoid of birds," the researchers report.

Shade plantations, on the other hand, often serve as species-rich islands in otherwise deforested regions. They may feature more than 40 different types of trees, including fruit trees. Their canopies house epiphytes, parasites, mosses, and lichens, which themselves support insects, amphibians, and other animals, the authors note. The diversity of insects and migrant, forest birds on these farms rivals that seen in tropical forests.

By describing how quickly land is being converted from shade to sun plantations, Perfecto's report sounds an alarm, says ecologist Michael Huston of the Department of Energy's Oak Ridge (Tenn.) National Laboratory.

Growers began switching methods in the 1970s. In Brazil, the world's leading coffee producer, almost all farmers now grow the bean without shade. In northern Latin America, from Mexico to



A shade coffee plantation (top) in Tapachula, Mexico, and a sun plantation (below) in Chiricui, Panama.

Columbia, farmers have converted almost half of their coffee production—about 1.1 million of the region's 2.7 million coffee-producing hectares, Perfecto and her colleagues report.

The growers originally switched to sun plantations, which have drier soil, to save their plants from a common leaf rust that thrives in moist conditions. The rust never proved as destructive as anticipated, but now higher yields tempt farmers to convert. However, cultivating sun-grown coffee costs 39 cents per kilogram more than producing the shade-grown bean. Sun plantations spend more on chemical pesticides and fertilizers; on shade plantations, ants and spiders help control pests, and plant litter adds soil nutrients. — T. Adler