edited by CONSTANCE HOLDEN

Another Fat Substitute

There may be no free lunch. But there's still hope for making it fat-free. At the American Chemical Society meeting last month in Orlando, Florida, U.S. Department of Agriculture (USDA) researcher George Inglett introduced a new fat substitute to the world: Z-Trim. Unlike the new synthetic fat, Olestra, it's made from all-natural ingredients and therefore isn't likely to face the same regulatory hurdles in proving its safety.

While Olestra is a synthetic combination of sugar and vegetable oil, Z-Trim is all fiber, from sources such as oat and soybean hulls. Similar stuff has been in "microcrystalline cellulose" fat replacers in the past, but their coarse texture can make them hard to digest. Z-Trim, though, is supposed to go down easy: Inglett says he "blows it to pieces" in a grinder, washes it, and dries it to an ultrafine powder which can absorb up to 24 times its weight in water, and which when cool forms a fatlike gel.

Flavorless Z-Trim won't be putting olive oil or butter out of business. Rather, says Inglett, it can replace some fat to keep foods such as baked goods moist and tender. USDA taste tests suggest it works: Panelists gave equal marks to brownies made with 25% fat and Z-Trim brownies containing only 15.5% fat. "Z-Trim could have health benefits because you would replace fats and be removing calories and eating more fiber," says biochemist Richard Greene at USDA's Agricultural Research Service in Peoria, Illinois.

Inglett says he expects Z-Trim to gain quick FDA approval, as it won't need years of safety tests. But don't hold your breath—even without FDA holdups, other all-natural fat replacers have taken at least 4 years to make it to market.

Grants for Former Soviets

The U.S. Civilian Research and Development Foundation (CRDF), the government-sponsored entity that took over the task of helping struggling Russian scientists from George Soros's International Science Foundation a year ago, has awarded its first round of grants. At a 4 September press conference, director Gerson Sher said CRDF is spending $10 million to support 238 joint projects between U.S. and formerly Soviet researchers.

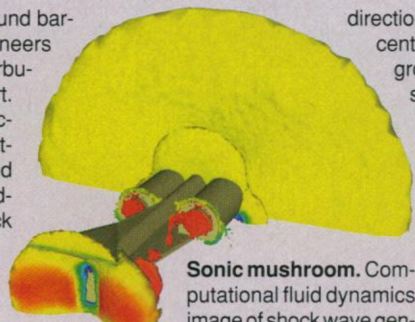
Sher said the awards, which range from $10,000 to $80,000, represented less than one-quarter of the "fundable" proposals among the 3100 that were received. To expand the program, which gets 20% of its money from governments of former Soviet republics, the CRDF hopes to achieve an operating budget of $20 million by the end of the year, including $1 million from the National Institutes of Health. The fund is still dwarfed by the Soros effort, which pumped about $130 million into Russian science over 3 years.

Mach 1 on Land

When pilots challenged the sound barrier nearly 50 years ago, engineers feared the shock waves and turbulence would tear the craft apart. Now race-car designers are facing the same concerns. Two jet-powered "cars," from Britain and the United States, are being readied for a race in Nevada's Black Rock Desert next month. If all goes well, one or both will break the sound barrier on land for the first time, reaching Mach 1—1215 km per hour at the desert's altitude—within 30 seconds and 8 km from the starting point.

The British team, led by racer Richard Noble, is fielding a 16-meter, 6-ton monster called "Thrust SSC." It has the driver's seat sandwiched between two jet engines that deliver a combined thrust of 80 megawatts, the power of "145 Formula One race cars or 1000 Ford Escorts," says Noble. Its equally fierce competitor, the single-engined "Spirit of America," will be driven by racer Craig Breedlove.

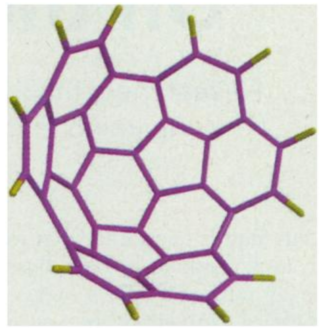
When planes travel faster than sound, their shock waves are dissipated over many kilometers in all directions. But a race car rides just 25 centimeters above the ground. "The ground totally distorts the air flow," says the Noble team's aerodynamicist, Tom Ayers. The sonic boom could thus reverberate back into the car with devastating force—unless the car can be shaped to contain the shock wave under it.



SSC PROGRAMME LTD.

Sonic mushroom. Computational fluid dynamics image of shock wave generated by "Thrust SSC."

Ayers says his team has done computer simulations, wind-tunnel tests, and a rocket-powered scale model test to understand the supersonic airflow around "Thrust SSC" with the help of scientists at the University of Wales at Swansea and the British Defense Research Agency. He won't reveal details, but aeronautics researcher Mark Drela of the Massachusetts Institute of Technology notes "There's no new physics here, but it's a very difficult computation." Breedlove's team prefers to rely on experience rather than simulations. They have built a full-scale prototype, which is modified after each incrementally faster test run to handle the increased stresses.



L. SCOTT

A bit of bucky. Buckybowl.

Better Buckies Through Chemistry

Buckyballs, the soccerball-shaped all-carbon molecules, have not yet lived up to their early promise, when researchers pictured them leading to new catalysts, optical materials, and other material marvels. The problem goes back to the way they are made: in a high-energy electrical discharge, which gives researchers little control over the final product.

Now chemists at Boston College think they've found a better way of making buckyballs, through chemical synthesis. It's not the first work of its kind (*Science*, 3 May, p. 648), but it comes the closest yet to producing a structure that matches the original. Larry Scott and his team at Boston College report in the 11 September issue of the *Journal of the American Chemical Society* that heating an off-the-shelf compound called decacyclene causes this almost flat molecule, made of fused carbon hexagons and pentagons, to curl up. The result is a spectacular bowl-shaped molecule—a buckybowl—identical to a big chunk of buckyball.

Roger Taylor of Sussex University, a pioneering fullerene chemist, says the achievement may finally help buckyballs realize their potential. "A whole new area of chemistry is about to take off as a result of this discovery," he says. It will be a straightforward matter, says Taylor, to expand Scott's bowl, now made of 36 carbon atoms, to 42 carbons and beyond (a complete buckyball has 60)—and so create new chemical cousins of the buckyball with novel shapes and functions ripe for testing.