

Freedom II squash: Ready for launch

With a name befitting a new spacecraft or a South African rock band, Freedom II, a genetically engineered yellow crook-neck squash, will make its debut in produce bins early this summer. Scientists at the Asgrow Seed Co. in Kalamazoo, Mich., designed the transgenic squash plant to resist viruses that frequently damage these gourds.

Freedom II carries an inserted gene for a protein found in the watermelon mosaic virus 2 (WMV2) and the zucchini yellow mosaic virus (ZYMV). Those viruses won't attack plants that contain the protein, says Asgrow scientist David M. Tricoli.

This spring, farmers will plant their first crop of Freedom II, primarily in the southeastern United States. When the gourds make it to market this summer, however, they may not bear their proud moniker, and many consumers may never know they are eating a genetically engineered product.

Asgrow will label the seeds, but farmers and distributors may not label the squash itself or keep it separate from others. The Food and Drug Administration, which has declared the product safe for humans to eat, does not require the vegetable to be labeled.

Some scientists worry that during the plants' growth period, pollen from the transgenic squash might transmit the virus-resistant trait to wild squashes, which could then become more troublesome weeds. However, Department of Agriculture officials dismiss this concern and consider Freedom II as safe as other squash varieties.

The new squash follows to market the Flavr Savr tomato, the first transgenic whole food (as opposed to food ingredient) allowed in the United States. Grocers began selling the tomato last May (SN: 5/28/94, p.342).

Arming plants to survive dry spells

Researchers know that fructans, a kind of carbohydrate derived from plants, make a good low-calorie sweetener. Fructans may even serve as a useful ingredient in fabric softeners and biodegradable plastics, says Elizabeth A. H. Pilon-Smits of the University of Utrecht in the Netherlands.

But what fructans do for plants has stumped scientists.

Most plants store starch for use during times of stress. However, 15 percent of flowering plant species produce and store fructans, which — unlike starch — are soluble in water. And water-soluble molecules help attract water to plants, says Pilon-Smits. Do fructans help plants survive times of drought? researchers have wondered.

To find out, Pilon-Smits and her coworkers compared the growth rates of laboratory-raised conventional tobacco plants and tobacco plants genetically engineered to produce and accumulate fructans, they report in the January *PLANT PHYSIOLOGY*.

The scientists engineered the plants to express the SacB gene, which codes for fructan production in the bacterium *Bacillus subtilis*. This enabled the plants to store fructans. Researchers have yet to isolate plant genes involved in fructan metabolism.

Under droughtlike conditions, the transgenic plants grew 50 percent faster and 55 percent bigger overall than the non-transgenic plants. The tobacco that thrived best under stress also accumulated the most fructans, the researchers report. However, under normal growing conditions, fructans did not alter growth rate or yield, Pilon-Smits and her coworkers note.

"These results . . . provide the first experimental data suggesting that accumulation of fructans in plants is effective as a device against water stress," they assert.

The Dutch researchers don't yet understand how fructans help plants resist the effects of drought. However, the larger roots of the engineered plants may enable them to tap more water and withstand dry spells better, they suggest.

Color colon cancer away?

Curcumin is the pigment that gives turmeric — and any food to which this fragrant spice is added — its bright, yellow-orange hue. A new study now suggests that curcumin may also suppress the development of colon cancer.

Regions in which turmeric dresses up much of the traditional cuisine — especially Asia, where it colors curries — tend to have a low incidence of colon cancer, notes nutritional biochemist Bandaru S. Reddy of the American Health Foundation in Valhalla, N.Y. But what really caught the attention of his research team was the herb's medicinal reputation.

"It's been used since ancient times in India as a household remedy for the treatment of sprains and swellings," notes Robert McCaleb, president of the Herb Research Foundation in Boulder, Colo. Because aspirin and many other nonsteroidal anti-inflammatory drugs (NSAIDs) inhibit colon cancer in animals and some research links the use of such drugs to low rates of the cancer in humans (SN: 3/16/91, p.166), Reddy's team decided to evaluate how curcumin measures up.

After administering a powerful colon carcinogen to 66 rats, they added curcumin at the rate of 2,000 parts per million to the diet of 30 of them. At the end of a year, 81 percent of the rats eating regular chow had developed cancerous tumors, compared to 47 percent that dined on curcumin-treated fare. Curcumin-treated animals also developed smaller tumors.

Moreover, 38 percent of the tumors in rats eating normal diets proved invasive — almost twice the rate in rodents munching curcumin-colored food. Reddy and his colleagues report their findings in the Jan. 15 *CANCER RESEARCH*.

Reddy's group also showed that curcumin lowered concentrations of potent, hormonelike substances that play a role in inflammation, both in tumors and in regular colon tissue. So curcumin's mechanism "appears to involve some anti-inflammatory pathway," he says. Most promising, Reddy notes, curcumin exhibited none of the toxicity or side effects of NSAIDs administered at similarly effective doses.

Filtered coffee friendlier to the heart

A strong cup of java can do more than give the heart a jolt. Depending on how it's made, coffee can also elevate blood concentrations of cholesterol and triglycerides — compounds tied to the formation of artery-clogging plaque.

Last year, Martijn B. Katan of the Agricultural University in Wageningen, the Netherlands, and his coworkers identified the agents responsible: cafestrol and perhaps kahweol — alcohols in the oil droplets that can float atop a rich cup of coffee. Now, Katan's group reports that ingesting coffee grounds — such as the sediment that can remain suspended in French press, espresso, and Turkish or Greek coffees — can jack up the cholesterol of even healthy young adults.

In one test, 14 volunteers ate a sweet dairy dessert at the same time every day. However, half the group mixed 8 grams of finely pulverized, used grounds into the dessert before eating it. That hefty daily dose corresponds to the sediment from about 1.5 liters of Turkish coffee.

Within 3 weeks, cholesterol had climbed an average of 25 milligrams per deciliter of blood in persons eating grounds, but it remained unchanged in those who ate their dessert plain. During a second, 4-week test, 15 volunteers experienced comparable cholesterol gains whether they consumed fine or coarse grounds. Katan's group published its findings in the January *AMERICAN JOURNAL OF CLINICAL NUTRITION*.

But coffee lovers, take heart. While the researchers argue that "frequent ingestion of coffee bean particles . . . or turbid coffee brews [such as Turkish] should be avoided," they report that paper filters used in most drip brewers reduce those cholesterol-raising alcohols in coffee to "negligible amounts."