

Engineered Edible Cottonseed Could Feed Millions, Researchers Say



A Texas researcher has found a way to reduce toxin in cottonseed that until now could only be eaten by cattle. The bovines' multiple stomachs gradually digested the poisonous substance called gossypol.

The new seeds can be eaten by pigs, chickens, fish and humans and could show up in protein bars, shakes, breads, cookies and other foods within about 10 years. The amount of cotton already grown worldwide contains enough protein to feed 500 million people per year, researchers said.

"There are a lot of poor people that cannot afford diets that contain a reasonable amount of protein," said Keerti S. Rathore, the Texas A&M University researcher who made the breakthrough. "It will nice to be able to utilize this source."

Gossypol drops blood potassium to dangerous levels in humans and can harm the heart and liver in people and animals. Chickens eating only cottonseed die within a week.

Researchers have worked for decades to neutralize the substance and achieved partial success in the 1950s when scientists produced a gossypol-free plant by shutting off the gene that produces the toxin throughout the plant. But without gossypol, insects and diseases ravaged the cotton.

Rathore found a way to shut off gossypol production in only the seeds, leaving stems, leaves, flowers and tissue protected.

Cotton raised in field trials earlier this year at A&M had both stable growth and safe levels of gossypol in the seeds. More tests involving a variety of cotton strains lie ahead as well as regulatory hurdles, but researchers are optimistic about the technique's potential.

"We're trying to proceed cautiously, but we're optimistic," said Jodi Scheffler, a research geneticist in the U.S. Department of Agriculture's Crop Genetics and Production Research Unit. "So, so far, so good."

Rathore said there could be less resistance to eating the genetically-altered cottonseed because his technique involves shutting down a chemical process within the seed, not adding something to it.

The method also has potential with crops such as the Indian pea, a legume that grows in Asia and Africa. Farmers grow the pea as an emergency crop because it's high in protein and hardy in drought, but it contains a neurotoxin that paralyzes the lower body when eaten in large amounts.

Rathore's cottonseed meets World Health Organization and U.S. Food and Drug Administration standards for food consumption, but needs approval from the USDA, FDA and possibly other agencies to make it commercially available. If approved, the seed could be as valuable as the cotton fiber used to make blue jeans, T-shirts and other garments, said Tom Wedegaertner, director of cottonseed research and marketing at Cotton Inc., an industry promotion group.

"It's huge," Wedegaertner said.

Cottonseed now is worth about 10 cents a pound; the fiber is worth about 70 cents a pound.

At about 22% protein, cottonseed could improve the diets of malnourished people in developing nations worldwide, researchers said. The kernel has a nutty flavor and can be roasted and salted. And unlike the protein in soybeans, Rathore's cottonseeds produce no flatulence when eaten.

"It's not quite like peanuts," said Scheffler, the geneticist. "I've tasted worse. They do taste better than the roasted soybeans."

Oil pressed from cottonseed has long been used in such things as mayonnaise and salad dressing. Without the threat of gossypol, the leftover kernel could be ground into meal and combined with wheat or corn flours to enrich them with protein. In tests, the meal has been used to make pancakes, cereals, caramel popcorn and tortillas.

"There are all kinds of uses for this thing," Rathore said. "Our hope is that our cotton farmers will get more value for their crop."

Plains cotton farmer Rickey Bearden said the extra income could help offset higher prices for diesel fuel, fertilizer and electricity to run irrigation systems.

"It's going to make a viable market that we've never had," Bearden said. "Who knows what the possibilities are?"

(Source: The Associated Press)