Genetically modified food debate muted in generally accepting science community

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Food has been genetically modified on the farm for centuries. But now genes are swapped in labs, and the shift is fueling major changes in agriculture - and a political backlash.

Proposition 37 on the Nov. 6 ballot, would make California the first state to require labeling genetically engineered foods - that is, foods from a plant or animal whose DNA has been manipulated in a laboratory.

If the initiative passes, a majority of the foods on supermarket shelves that come in a box, bag or can would have to be labeled.

Backers of Proposition 37 argue that consumers have a right to know how their food was created. The premise is that lab-designed food is significantly different from other food - for instance, that fruits and vegetables tweaked to resist droughts, pesticides or herbicides are different from traditionally bred crops.

But that's an assumption much of the scientific community questions, including the U.S. National Research Council, an independent panel that informs government decision-makers.

Many scientists say there is no difference between a food created through modern molecular techniques and food created through conventional breeding.

"There is nothing new about introducing traits into crop plants, just the

methods used to do it," said Martina Newell-McGloughlin, director of strategic research initiatives and agricultural biotechnology at the University of California, Davis.

Both traditional and lab-based genetic crossings are safe, and they deserve equal weight in the marketplace, said Peggy G. Lemaux of UC Berkeley, who researches the use of genomic technologies to understand and improve cereal crops.

There's a long history of human tinkering with agriculture. Today's corn bears little resemblance to its grasslike ancestor teosinte. Tasty tangelos are a genetic cross between tangerines and grapefruit. Our beefy black angus and milk-rich Holstein cattle descend from the fearsome and extinct auroch.

Like these examples of classic breeding techniques, genetic engineering alters the sequence and regulation of genes. But there are differences.

Traditional breeding techniques move tens of thousands of genes in an organism. In contrast, lab-based crosses change a few genes - maybe just one or two. Sometimes, the genes are simply tweaked to alter their behavior.

And although traditional breeding crosses closely related creatures, lab scientists can cross distantly related or unrelated species.

This can result in gene combinations not previously seen. Voila! Rabbits, mice, roundworms and bacteria that glow green under a black light, thanks to an inserted jellyfish gene. This discovery, which led to a 2008 Nobel Prize, helps researchers visualize the movement of key proteins.

Some lab-altered crops grow faster. Others are more resistant to disease. A few fend off drought.

But fear of the unknown can stop lab-based breeding from helping consumers, scientists say.

Take the special seed sleeping in a basement at UC Berkeley, awaiting its day in the sun. The genetically modified wheat seed was designed for people with wheat allergies.

Because of anti-genetic-engineering sentiment, food companies did not embrace it, Lemaux said. "No one is interested in moving it to the marketplace," said Lemaux, who designed the seed and now cares for it.

But scientists also warn that it is important to monitor risks. For instance, they caution about the environmental effect if an introduced gene jumps to other crops - or the risk to human health if the gene triggers allergies. And there is the potential of unintended effects - say, if an introduced trait unexpectedly alters plant metabolism.

Supporters of Proposition 37 say that lab-based breeding techniques have not been adequately studied and point out that the biotech industry paid for much of the research. And, the initiative's backers argue, no long-term studies have been done to prove that the new techniques aren't harmful to human health.

Indeed, the body of peer-reviewed research on genetically engineered foods is small, consisting mostly of a handful of studies done on mice. Some of those studies suggest links to immune-system impairment and other problems.

Scientists in France on Sept. 19 concluded that rats fed corn engineered to withstand the herbicide Roundup developed tumors and trouble with their livers and kidneys, but geneticists sharply criticized the study for its small size, use of tumor-prone rats and other methodological problems.

The most thorough review yet - an analysis of 24 studies in animals of the short and long-term dietary effects of genetically modified corn, potato, soybean and rice, published this year by French and British scientists - found no evidence of health hazards.

Foods made from genetically engineered crops undergo safety testing by the companies or institutions that develop them. Then this data is reviewed by federal regulatory agencies like the U.S. Food and Drug Administration, which says that genetically modified foods are safe to eat and do not need labels. The American Medical Association has taken the same position.

"On balance, neither the weight of scientific research - nor the great majority of the scientific community - supports the view that organisms modified using the present-day biotechnology pose novel, or greater dangers, to human health than organisms developed by other means," Newell-McGloughlin said.

Human studies are tough to conduct because "people don't want to be guinea pigs," Lemaux said. But, she added, genetically modified foods are a fixture in grocery stores, with no apparent untoward health effects.

Because the FDA is tasked with deciding how products are labeled, Lemaux predicted, it will likely challenge a state's attempt to trump its authority.

"In the end," he said, "it is not going to be decided by you and me."

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