



## Plant traits are transferred to genetically engineer food

Some issues are so "hot" that it can be difficult to get the facts straight. A current example is making sense out of the potential risks and benefits of foods from genetically modified organisms, commonly called GMO foods.

This fear is not new. In 1906 horticulturist Luther Burbank said, "We have recently advanced our knowledge of genetics to the point where we can manipulate life in a way never intended by nature."

We must proceed with the utmost caution in the application of this newfound knowledge."

Burbank was referring to the selective breeding practices that he and many others were using to produce plants with desirable traits. Now, more than 100 years later, genetic engineering is at a similar stage of development and carries comparable concerns.

**Question:** How does genetic engineering work?

**Answer:** The process first involves identifying the segment of DNA that contains the code (gene) for a desirable trait. Using various laboratory techniques, the specific DNA segment is then inserted into the DNA of a plant to give the plant a desired trait. Because a gene has been transferred from one organism to another, the altered organism is said to be transgenic.

**Q:** Do foods from genetically engineered plants have different nutrient contents than foods from conventional plants?

**A:** It depends on the food. For example, when the genetic modification is designed to make a plant resistant to a particular pest, there typically is no effect on nutrient content. On the other hand, some genetic modifications have been designed to increase the nutrient content of a food. An example is "golden rice," which gets its color from beta carotene the body can convert to vitamin A.

**Q:** Are GMO foods more likely to cause allergic reactions?

**A:** The potential for allergies to GMO foods is a concern because genetic modifications introduce a new or altered protein into the food. Allergies are immune system reactions to specific proteins.

Consequently, companies producing GMO foods test newly developed plants for possible allergenicity, usually in association with the U.S. Food and Drug Administration. To date, no allergenic foods have been introduced through commercialized GMO crops. Of local interest, the GMO papaya that is resistant to the ring-spot virus has been tested and found to pose no risk of food allergy.

**Q:** Is the decline in honeybees related to GMO crops?

**A:** Studies conducted on GMO corn found no effect on bees. The best evidence indicates the bee decline is primarily due to pesticide exposure and a lack of genetic diversity in honeybees in the United States. In Hawaii, mites and hive beetles have been the biggest problems for bees.

**Q:** Do GMO crops reduce pesticide use?

**A:** Plants modified for insect resistance have resulted in a decreased use of pesticides. In time, insects may develop resistance to the GMO crops. To date, however, insect-resistant GMO crops have decreased environmental impact due to reduced pesticide use.

**Q:** How are genetically engineered plants regulated?

**A:** In the U.S., three federal agencies are involved in regulating GMO plants and foods derived from them. The FDA evaluates food safety aspects, the Environmental Protection Agency regulates both food safety and environmental concerns, and the U.S. Department of Agriculture oversees potential agricultural and environmental impacts. All three agencies have the power to demand removal of any GMO product from the market.

Joannie Dobbs, PhD, CNS and Alan Titchenal, PhD, CNS  
are nutritionists in the Department of Human Nutrition, Food and Animal Sciences,  
College of Tropical Agriculture and Human Resources, UH-Manoa.  
Dr. Dobbs also works with the University Health Service.

© 2013 Honolulu Star-Advertiser -- <http://staradvertiser.com>  
<http://www.nutritionatc.hawaii.edu/Articles/2013/527.pdf>