FCS1101

UNIVERSITY OF FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

Paraprofessional Update: Food Biotechnology[1]

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Learning Objectives:

The paraprofessional will:

- Define biotechnology.
- List potential consumer benefits of biotechnology.
- Discuss the source of controversy surrounding biotechnology.

Glossary of Terms

Biotechnology - a wide range of scientific techniques used to modify and improve plants, animals, and microorganisms.

Genetic engineering - the use of technology that allows scientists to take sections of DNA containing one or more specific genes (for desirable traits) from any organism and introduce it into a specific crop species.

Genetically - modified organism (GMO)- organism that has been modified by using genetic engineering.

What is Food Biotechnology?

Food biotechnology uses what is known about plant science and genetics to improve food quality and food production. Farmers used to rely on plant breeding to create crops that were resistant to drought, insect pests and diseases and produced higher yields. This process would take several growing seasons. Genes are responsible for traits like a vegetable's taste or ability to resist disease. Using modern biotechnology, scientists can move genes for valuable traits from one plant into another plant. This way, they can make a plant taste or look better, be more nutritious, be resistant to disease, protect it from insects, or produce more food.

What is the impact of food biotechnology in our lives?

Examples of currently approved genetically modified (GM) crops in the United States include soybeans, corn, potatoes and squash. In developed countries, scientists hope to create healthier foods such as cereal grains with increased amounts of fiber, milk with improved calcium availability, and vegetables with boosted levels of antioxidants.

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Potential benefits of genetically modified foods include:

- *Protection of the Environment.* Scientists have made some foods, like papaya and potatoes, more resistant to disease. These crops need less chemical spray to protect them from harmful insects or viruses, which is better for the environment.

- *Greater Crop Yields.* Farmers also use biotechnology to help plants survive. For example, new varieties of corn and cotton ward off harmful insects, and improved soybeans can tolerate herbicides. Farmers can expect to harvest more crops from these hardier plants. Increase in crop yields can help address food shortages and hunger.

- *Better Tasting Foods.* Sweeter peppers and tomatoes that ripen more slowly are just two examples of how biotechnology can produce better tasting, color-rich foods.

Controversy

Although proponents claim GM foods and crops have many potential benefits—from a healthier food supply to improved crop yields and decreased pesticide use—more and more controversy is being generated worldwide as to whether or not GM foods are safe for human consumption and the environment. Much of the controversy stems from disagreement over the safety of GM foods and crops to humans and the environment, the adequacy of testing done, and the need for labeling GM foods.

The Food and Drug Administration (FDA) regulates production and labeling of genetically modified foods. Some people have raised concerns that the genes from one food that are inserted into another food may cause an allergic reaction. For instance, if peanut genes are in tomatoes, could someone with a peanut allergy react to tomatoes? The long-term side effects of genetically modified foods are still to be determined with more testing and time.

The Safety of Food Biotechnology

Genetically modified foods are generally regarded as safe. There are no reports of illness or injury due to genetically modified foods. Each new food will have to be judged individually.

Labeling

Labeling food from genetically modified plants and animals has become an important issue. Some consumers and consumer groups believe they have a right to know whether genetic engineering was used to produce a food. Some want to be able to choose food on the basis of how it is produced, and some believe labels are needed to notify consumers of potential allergens or possible toxins. Others believe labeling is not necessary if foods are essentially equivalent in composition.

Food labels are regulated by the Food and Drug Administration (FDA) and, in some cases, by the US Department of Agriculture (USDA). Current policy does not require mandatory labeling for GM foods. FDA guidelines from 1992 require that foods grown using biotechnology have special labeling if:

- a known food allergen has been introduced in the new food.
- the nutritional content or product composition has changed.

The Possible Future of Biotechnology

- *Grow More Food on Less Land.* By the year 2050, 10 billion people will live on Earth. That's about twice the number of people here today. Using biotechnology, farmers may be able to produce more crops on the land they already have. Developing countries may benefit most from this modern technology

since they will have the largest population growth.

- *Keep Food Safe to Eat.* Scientists may be able to identify viruses and bacteria that affect plants sooner and more accurately. If that is the case, then the risk for food-borne illnesses could decrease.

- *Provide Healthier Food.* Enhancing some foods using biotechnology may help lower our risk for chronic diseases like cancer and heart disease and other health conditions. For example.
  - Some fruits and vegetables may contain more antioxidants, vitamin C, and vitamin E.
  - Cooking oils may be made from plants that contain fewer saturated fats.
  - Potatoes may contain more carbohydrates so that they absorb less oil during frying.
  - Peanuts may contain less of the proteins that cause allergies.

- *Keep Animal Feed Safe.* Some types of fungi that can be found in corn release substances that can harm animals that eat it. These substances are already regulated in the United States, and biotechnology provides another tool that will help reduce the amount of these substances in corn.

Years of research and the lack of evidence of harmful effects of biotechnology should be a reassurance as for the safety of biotechnology. Even though there is no such thing as “zero risk,”at this point in time, the benefits of agriculture biotechnology outweigh possible risks.

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