

Biotechnology: Designer Genes for Familiar Foods

Participant Handout

Biotechnology is the use of living organisms to make or modify products such as food. This is often done by changing the genes. Genes make up the blueprint that determines the traits of a plant or animal..

Conventional crossbreeding results in the random combinations of thousands of genes from each parent. Through genetic engineering, it's now possible to modify individual genes or transfer genes from one type of organism to another. This is faster as well as more precise and more reliable than classical techniques. The results are sometimes called "genetically modified organisms (GMO)" or "genetically engineered (GE)."

Biotechnology Quiz




How knowledgeable are you about biotechnology?

- | | | |
|---|---|--|
| T | F | 1. About 70 percent of <u>processed</u> foods sold in U.S. supermarkets contain genetically engineered organisms. |
| T | F | 2. Genetically engineered foods are closely monitored by government agencies such as the U.S. Department of Agriculture and the U.S. Food and Drug administration. |
| T | F | 3. Labeling of genetically modified foods is voluntary. |
| T | F | 4. Tortilla products with genetically engineered Starlink corn were recalled in autumn 2001, because of safety concerns. |
| T | F | 5. <u>Bt</u> corn (genetically modified to resist a destructive insect) is harmful to Monarch butterfly larvae. |
| T | F | 6. Certified organic foods won't contain genetically engineered organisms. |

7. Which of these does NOT currently have genetically engineered components?

- | | |
|--|-------------|
| a) artificial sweeteners (e.g., Equal) | c) fish |
| b) canola oil | d) soybeans |

Food Products Likely to Contain Ingredients from GE Plants

<p>Soybean & Soy-based Ingredients Soy-protein, flour, “isolate,” lecithin, oil and isoflavones</p> 	<p>Canola Canola oil is extracted from the canola plant. This oil is used in cooking and may be found in processed foods.</p>
<p>Corn & Corn-based ingredients Corn flour, oil, syrup, starch, masa & gluten. Genetically modified sweet corn is not yet available in markets.</p>	<p>Cotton & Cotton-based Ingredients Cottonseed oil is used in some fried snacks, peanut butter and candies.</p>
<p>Other Common Ingredients Derived from Corn or Soybeans <i>Amino acids:</i> cysteine, lysine, threonine, tryptophan <i>Sweeteners:</i> aspartame, dextrose, fructose, sorbitol, invert sugars <i>Vitamins:</i> A, B2, B12, C and E <i>Other:</i> Caramel syrup, cellulose, malt & malt extract, mono-and diglycerides, monosodium glutamate, vegetable oil, Vegetable protein, xanthan gum</p> 	<p>Potato, Papaya, Yellow Squash and Zucchini GE varieties are available but are rare in most markets.</p>  <p>Other Plants GE varieties of tomato, rice, flax, sugarbeet and radicchio (red-leaf chicory) have been approved for use but are not currently present in any foods. GE potato varieties have been discontinued since 2000.</p> <p>Animals No genetically engineered animals are on the market.</p>

Are genetically engineered foods new?

GE foods are a fairly recent invention. In fact, it’s been said that biotechnology has had the most rapid acceptance of any agricultural technology since the tractor. U.S. acreage planted in GE crops has grown rapidly since their introduction in about 1996.

Why are we using biotechnology in our food supply?

Scientists use this technology to create food plants and animals with certain desirable traits. New traits that might be beneficial to growers and to consumers include:

- Plants that are more resistant to insects and disease, and in some cases allow reduced pesticide use
- Plants that are resistant to herbicides thus making weed control easier and potentially reducing soil erosion
- Fruit or vegetables that stay fresh longer
- Foods with enhanced nutritional value

Are you eating genetically engineered foods?

The answer is – more than likely you are. It's estimated that 60 to 70 percent of processed foods contain at least one ingredient from a GE plant. The biggest contribution is from GE corn and soybean crops that are widely used in processed foods. To these add foods containing oil from GE canola and cotton and that nearly covers GE plant ingredients in the American diet (see table on page 2).

Are genetically modified foods safe to eat?

The FDA considers a new GE food to be as safe as a similar non-GE food. If a GE food has any detectable difference in nutrition or allergens from the comparable non-GE food, it must be labeled or kept off the market entirely. There is no evidence to date that GE foods on the market are less safe than their non-GE counterparts.

How are genetically modified foods regulated?

In the U.S., three agencies regulate various aspects of genetic engineering. If humans or animals will consume a new GE crop variety, the Food and Drug Administration (FDA) evaluates its safety. The Environmental Protection Agency (EPA) oversees the safety of pesticide levels in GE plants that manufacture their own pesticides (Bt corn for example.) The EPA considers potential impact both on human health and on the environment. The U.S. Department of Agriculture (USDA) monitors plantings of experimental varieties in field trials and evaluates the potential impact on the environment.

Why aren't genetically engineered foods labeled?

Currently the labeling regulations for GE foods are the same as for conventional foods with two exceptions. The first is if there is a concern about causing allergies or having natural toxicants (poisons). The second exception is if there is a major change in nutrients, composition or identity (e.g., broccoflower). In each of these cases, the product must be labeled appropriately. Food producers argue that labeling would be too expensive and impractical and would needlessly scare consumers. On the other hand, consumers who have health, religious, or moral concerns may believe that the expense or inconvenience would be worth the right to know.

What if I don't want to eat GE foods?

The best option is to choose certified organic foods. National organic standards (which go into effect in October 2002), don't allow use of GE foods if a product is certified as being organic.

Pros and Cons Of Biotechnology – Legislative Hearing

Speaker	Pros (for)	Cons (against)

Biotechnology and Public Policy

Biotechnology has become a public policy issue. Many states had legislative activity related to agricultural biotechnology in 2001. In Oregon, the State Legislature defeated a bill urging Congress to require labeling of genetically modified foods and a bill prohibiting release of genetically modified plants into unconfined areas. The Governor passed three bills that make destruction of GM crops a crime.

An Oregon ballot measure (Initiative 23) requiring labeling of GM foods has been circulating. If enough signatures are obtained, it will be on the November 2002 ballot. The label requirements would extend to GM foods that pass through the Port of Portland headed for non-Oregon destinations. The majority of foods at the supermarket would require labeling under this initiative. Critics have charged that it's not realistic to require national companies to prepare GM labeling for just one state. (In fact, some companies might withdraw their products from the Oregon market rather than go to this expense.) Federal legislation is perhaps the best approach for labeling regulation.

For Further Information...

Program for the Analysis of Biotechnology Issues (Oregon State University)

<http://oregonstate.edu/extension/pabi>

Genetically Engineered Organisms – Public Issues Education Project (Cornell Cooperative Extension)

www.geo-pie.cornell.edu

Issues in Agricultural and Natural Resource Technology (Oregon State University course)

<http://www.oregonstate.edu/instruct/bi399/>

Answers to Biotechnology Quiz

1) T 2) T 3) T 4) T 5) F 6) T 7) c-fish

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