Modified Foods

Genetically modified foods have always existed. An example is wine, modified through the fermentation of grapes. However, modern biotechnology based on DNA decoding has made these processes predictable and controllable. The process improves specific characteristics of the plant, makes it more resistant to pests, and improves its nutritional quality. The objective is a greater production of food with better agronomic and nutritional characteristics. ●

More benefits

The development of transgenic plants has allowed the production of food with more vitamins, minerals, and proteins, or with less fat. The development of genetic technology has also been able to delay the maturation of fruits and vegetables and, in other cases, make them more resistant to specific pests, thus reducing the need for applying insecticides to crops. The genetic modification of some crops also produces smaller and stronger plants, while simultaneously increasing their yield, because they invest more energy into producing their edible parts.

The marine strawberry

Research has been conducted in modifying strawberries with a gene from the plaice to make the fruit more resistant to frost. This is a simple process from which the crop yields can be improved by a high percentage.

CONJUGATIVE PLASMIDS
The plasmids are mixed with DNA bits to form conjugative plasmids.

ELECTRICAL PULSES
Bacteria are added, and quick electrical pulses are applied that cause the plasmids with the transgene to enter the bacteria.

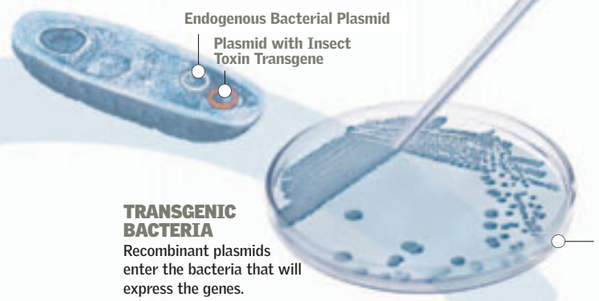
RESTRICTION ENZYME
The enzyme is added to the cloned DNA in a test tube to segment or divide it into pieces the size of the gene. The bacterial plasmids that were extracted using the same enzyme are added in another test tube.

1 Cloning the Desired Gene

All the DNA is extracted from the *Bacillus thuringiensis* bacteria in order to locate and copy the gene responsible for this characteristic.

BT Corn

has been genetically modified to make it resistant to the western corn rootworm, a pest that feeds on the root of the plant. Bt corn produces the Bt toxin, a toxin naturally produced by a soil bacterium. The pest is killed either when the larvae attempt to feed on the root or the adults attempt to feed on the foliage of the Bt corn.

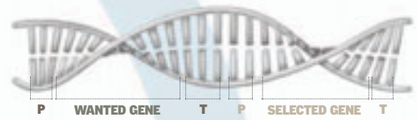


TRANSGENIC BACTERIA
Recombinant plasmids enter the bacteria that will express the genes.

DESIRED GENE
Bacteria multiply to obtain a copy of each one of the thousands of genes from the organism. The desired gene is located and hundreds of copies are made.

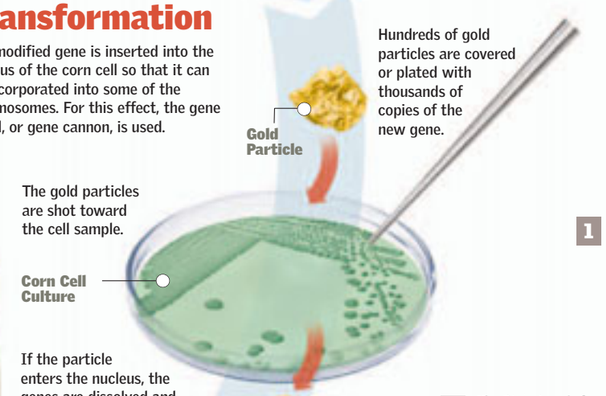
2 Modified Gene Design

The gene is composed of a codified sequence (wanted gene) and of regulatory sequences, which can be altered for the gene to be expressed in a desired form. The selected gene confers an advantage, for instance, resistance to an herbicide.



3 Transformation

The modified gene is inserted into the nucleus of the corn cell so that it can be incorporated into some of the chromosomes. For this effect, the gene pistol, or gene cannon, is used.

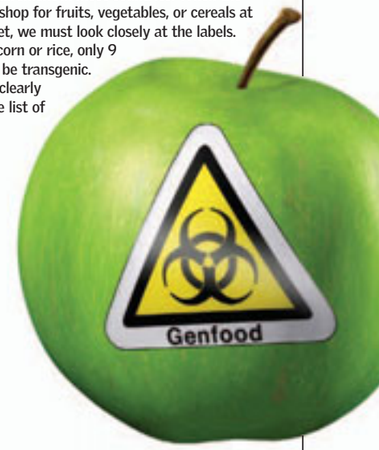


4 Culture

The transgenic corn cells are distributed in crop media that contain the necessary nutrients. Those that proliferate form a whole plant from transformed cells. The adult transgenic plants are transplanted to the agricultural fields. This transgenic corn and its descendants will be resistant to the western corn rootworm.

The labels

Transgenic foods have their own label. This is a legal requirement in most countries. When the time comes to shop for fruits, vegetables, or cereals at the supermarket, we must look closely at the labels. In the case of corn or rice, only 9 percent should be transgenic. This should be clearly explained in the list of ingredients.



Golden rice

Golden rice is the first organism that was modified genetically for the purpose of providing an increased level of vitamin A for populations with a deficiency in the vitamin. The embryo of golden rice stores beta carotene and other carotenes, which are the precursors of vitamin A.

1 The genes used are those that encode for the enzymes phytoene synthase and lycopene synthase in the plant *Narcissus pseudonarcissus* and the enzyme carotene desaturase from *Erwinia uredovona* bacteria.