What Ever Happened to the Flavr Savr Genetically-Engineered Tomato?

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By Michelle Fabio

If you were interested in tomatoes back in the mid-1990s, you probably heard of the Flavr Savr, the genetically-engineered (GE) tomato from the Californian company Calgene.

Now that GE tomatoes are back in the news for possibly fighting birth defects and anemia, you might be wondering–what ever happened to that Flavr Savr?

First, for those who haven't heard of this history-making tomato, the Flavr Savr was the first genetically engineered food given the stamp of approval by the U.S. Food and Drug Administration for human consumption; the FDA even found that no special labeling was necessary on the GE tomatoes because there was no evidence of health risks and nutritional content was the same as naturally-produced tomatoes.

The Flavr Savr was designed to be able to be left longer to ripen on the vine (many natural tomatoes are picked unripe and then ripened through chemical means) and to have a longer shelf life than natural tomatoes. Accordingly, the introduction of this GE tomato to the marketplace in 1994 was meant to revolutionize the availability of fresh, ripe tomatoes.

But high production costs mixed with the company's inexperience in tomato growing, handling, and transport led to financial troubles for the Flavr Savr. Eventually Calgene was bought out by Monsanto, a multinational agricultural company, and the Flavr Savr disappeared from shelves for good in 1997, just three years after its introduction.

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The genetically modified tomato went to U.S. market on May 21, 1994 known as the Flavr Savr. This transgenic tomato was no longer able to produce polygalacturonase(PG), which is an enzyme involved in fruit softening, due to an deactivated gene. Tomatoes are normally picked before ripening when they are still green and ripened artificially by ethylene treatment. The Flavr Savr tomatoes, however, are left to ripen on the vine and still have a long shelf life, which was thought to allow them to develop their full flavor.

The Gene

Scientists knew that polygalacturonase had the ability to dissolve cell wall pectin, which was the key to fruit softening. According to California Agriculture, "researchers at Calgene, Inc proposed to suppress PG accumulation in ripening tomatoes by introducing a reverse-orientation copy of the gene, an "antisense" copy designed to prevent or drastically reduce the formation of PG." In 1987, Calgene researchers cloned a PG gene along with methods of transformation and regeneration. They inserted this PG antisense gene into the DNA of some tomatoes. The reason for inserting PG antisense gene was to reduce the amount of PG produced in the tomato. Data found that these tomatoes generated as little as 1% of the PG found in traditional tomatoes. The U.S. Food and Drug Administration approved the introduction of Kanamycin-resistance gene constructions needed to create the PG anitisense gene.

Is there a difference?

As with all genetically modified foods, there comes concerns. Calgene researchers tried to handle all concerns about the Flavr Savr tomato by doing studies. There were concerns about the Kanamycin resistance protein and allergic reactions, however, date showed that allergic reactions were highly unlikely. According to California Agriculture, data submitted by Calgene showed that the Flavr Savr tomato was indistinguishable in almost every aspect from the traditional tomato. There were only two ways in which two tomatoes were different. The first difference was that the fruit cell wall pectin degraded more slowly in the genetically modified tomato(this being the main point of making the new tomato). The second difference was that in the new tomato, the tomato paste had a higher viscosity. The only differences between the two tomatoes supposedly did not increase any risk, it just changed the taste.

The Disadvantages

Although the demand for this tomato was high and remained high the entire time it was on the market, there was still many who opposed genetically modified foods. There is very little known about the long term effects of genetically modified foods, such as the Flavr Savr tomato. According to Actionbioscience, there have been acute toxicity studies conducted with male and female rats for the tomato. These studies claim that the tomato has absent toxic effects, but many people see flaws in the study. There was an unacceptably wide range of rat starting weights and no histology of the intestines was done. There were many factors that make the studies done invalid.

Where are they now?

Calgene was very transparent with their processes and labeling. According to a video done by the New York Times, the company Monsanto bought out Calgene because they had patents to key technology and encouraged labeling. Monsanto denies these accusations, however, they are one of the leading companies in genetically modified foods who does not support labeling. Shortly after Monsanto bought out Calgene, the Flavr Savr tomato was shelved and has been ever since.

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