

Genetically modified organisms in processed foods

[Food & Diet, Genetically Modified Food](#)



Introduction

During the course of this lab, we explored whether or not certain processed foods contained Genetically Modified Organisms. Genetically modified food is an important subject in the world today. Ever since Flavr Savr came out with their tomatoes grown from genetically modified seeds in 1994 genetically modified foods has become ever more popular amongst distributors of produce (Mestel, 2013). The world's population has grown by around one billion in the last decade (US Bureau of the Census).

At this rate, Genetically Modified Organisms within food products will increase dramatically, but is this for the best? There are many risk factors that have been brought up with genetically modified foods such as potential increase of cancer according to a French study conducted by Dr. Giles Eric Seralini (Kilham, 2012). Genetically modified food is a popular subject among scientists, as it has been researched quite often. A study was done in the Czech Republic over a course of five years (2002- 2007) to test many foods, such as tomatoes and rice, for approved and unapproved Genetically Modified Organisms.

Similar to the experiment conducted in the botany lab, the scientists involved in this study used a Polymerase Chain Reaction, or PCR, method to determine their results (Kyrova, Ostry, Laichmannova, Ruprich, 2010). Enrico Dainese and his partners did another similar study, on soybeans specifically. Like our experiment conducted on the cornbread mix, Dainese and his colleagues followed their PCR results with an Agarose Gel Electrophoresis (Dainese, Angelucci, De Santis, Maccarrone and Cozzani, 2004).

An additional experiment closely related to the one performed by my partners and I is a study done in Brazil to better detect for GMO within their foods sold in markets and other places (Cardarelli, Branquinho, Ferreria, da Cruz and Gemmule, 2005). These articles show how GMO within foods are present all over the world. The reason my fellow group members and myself are conducting this experiment is to test a sample of processed food (in this case cornbread mix) for any existence of Genetically Modified Organisms using PCR methods. We hypothesize that the cornbread mixture has been genetically modified and herefore will show that in the results.

Materials and Methods

The purpose of this experiment is to use PCR method to identify genetically modified foods. During the experiment we, as a group, tested a known non- GMO food sample, oatmeal, along with our cornbread mix. We first weighed out 0.77 g of the non- GMO oatmeal. We then proceeded to add 3.85 ml (5.00 ml per 1.00 g) of distilled water (DW) to the oatmeal and ground them together with a pestle. The same was done with 0.99 g of the cornbread mix and 4.95 ml of DW. We pipetted each of these into separate screw-cap tubes consisting of 500 μ l of an InstaGene solution.

These we incubated and centrifuged for approximately 5 minutes each. We then took six PCR tubes and filled them each up, 2 with the non- GMO oatmeal mixture, 2 with the cornbread mixture and 2 with a known GMO positive substance. The Non- GMO and GMO positives served as controls for the experiment. One of each of the two tubes contained 20 μ l of plant MM and GMO MM. The PCR tubes were then placed in a thermal cycler and after this we did an agarose gel electrophoresis to provide us with the necessary data received from bands that should've shown up in the gel.

Results

Even though we had followed procedure and accurately mixed the correct amount and type of DNA and Master Mix together, as shown in Table 1, we ended up getting shocking results. Photos were taken of the final gel slab the morning of the experiment (Fig. 1) and that same afternoon (Fig. 2). There seemed to be very little signs, if any, of Genetically Modified Organisms within the cornbread mixture. Agarose Gel Electrophoresis results FIGURE 2. GMO Evening (PM) Agarose Gel Electrophoresis results Discussion: The purpose of this experiment was to determine whether or not a sample of an off-brand cornbread mix had contained Genetically Modified Organisms (GMO). As a result, we determined that there were no GMO traces located in the cornbread mix.

This could be due to mistakes that may have been made during the procedure such as poor measuring or mixing, misreading results, or the cornbread mix really was not made with genetically modified foods. These results disprove our hypothesis, which stated that we believed there would be GMO traces found within the cornbread mix. It was disappointing to see that we had a negative result while many of the other groups received bold lines on their agar gel indicating that their foods contained high amounts of GMO. I was glad to see that not all processed foods contain it though as in with the results of the Czech Republic study.

Out of all the tomatoes and papayas they tested, not one had resulted in the detection of GMO traces (Kyrova, Ostry, Laichmannova, Ruprich, 2010). We knew that the gel was accurately detecting GMO traces in foods by using the GMO positive control. Also to back up our assumptions that the Agarose Gel Electrophoresis results are accurate, it is shown in Dainese's, and other's, <https://assignbuster.com/genetically-modified-organisms-in-processed-foods/>

work. He used this method of GMO detection in his study to show that this is an effective way of detecting GMO traces (Dainese, Angelucci, De Santis, Maccarrone and Cozzani, 2004).

It is interesting to see how genetical modified foods are not only in the US but also in the Czech Republic and even in Brazil markets, where Cardarelli and his associates looked into Roundup Ready soybeans and checked other substances for GMO traces (Cardarelli, Branquinho, Ferreria, da Cruz and Gemmule, 2005). Though I was disappointed to get negative results, I am happy that there was a variety in GMO traces within the whole lab. I don't know if we would have learned much if we all got positive results. It would cause us to just assume that all processed foods have been genetically altered.

The other researchers' results intrigued me as to how different they all were yet they were all about the same thing in a sense. This lab has helped me realize how GMO within foods is affective all around the world and doesn't just mean that the food is bigger or tastier, but has been affected by chemicals, both good and bad. Literature

Cited:

1. Cardarelli, Paola; Branquinho R, Maria; Ferreria T. B. , Renata; da Cruz P, Fernanda; Gemmule L, Andre. 2005. Detection of GMO in food products in Brazil: the INCQS experience. Food Control. 16(10): 859-866.

2. Dainese, E; Angelucci, C; De Santis, P; Maccarrone, M; Cozzani, I. 004. A multiplex PCR-based assay for the detection of genetically modified soybean. *Analytical Letters*. 37(6): 1139-1150. Kilham, C.
3. What You Need To Know About GM Foods Is Half The Story. 2012 Dec. 07. *Forbes Magazine*. Kyrova, V; Ostry, V; Laichmannova, L; Ruprich, J. 2010.

AN OCCURRENCE OF GENETICALLY MODIFIED FOODSTUFFS ON THE CZECH FOOD MARKET. *Acta Alimentaria*. 39(4): 387- 396. Mestel, R. 2013 Feb 23. Genetically modified foods: Who has to tell?. *Los Angeles Times*. US Bureau of the Census. Current Population Projections. 2013. www.census.gov.