

The Hippies  
WRIT 120.001  
Professor Bailey-Hartsel

### Concerned Parent Summary

**Summary:** Our Writing 120 class at the University of Wisconsin- Eau Claire has been studying genetically modified organisms (GMOs) over the course of several weeks. We had the opportunity to perform an experiment of extracting DNA from several different foods to see if they contained GMOs. There were five groups, all testing different foods, however, all were corn-based products. Group A tested a soft tortilla shell from Chipotle. After extracting DNA, they discovered that Chipotle soft shell tortillas contain not one, but two, different GMOs. Group B, tested Honey BBQ Fritos, and Group C tested Tostitos tortilla chips, which both tested positive for traces of GMOs. Group D extracted their DNA from buttered movie theater popcorn from Carmic's. The results of the movie theater popcorn, unfortunately, came back inconclusive due to DNA contamination. Finally, Group E tested Nacho Cheese Doritos and also found traces of GMOs in their results. However, note that because this study was qualitative, we do not know the amount of GMOs found in each food. A qualitative study, with higher power equipment, would need to be performed to determine how much of each food is genetically modified.

**Problem:** Genetic modification of our crops has become a hot topic. Ranging from thoughts of what contains GMOs to the effects of them, concern is spreading rapidly throughout the public. Are GMOs safe? What are you consuming that could potentially contain GMOs? Studies have shown that GMOs can lead to cancerous tumors in rats. However, there is no known research as to whether there is a link between effects on rats versus humans. Therefore, it is important to properly educate yourself on the facts of GMOs.

**Methods:** We began our experiment by putting on latex gloves to avoid contamination of our own DNA to the DNA we were testing. We were Group D, testing Carmic's buttered movie theater popcorn. Every experiment needs a control group to test against whatever you happen to be testing. To determine if our popcorn contained GMOs, we planned to test our results against certified non-GMO oats. Therefore, everything we would do to our popcorn, we would perform the same experimental tasks on the oats. Our first task would be to mix approximately one gram of popcorn with 5 mL of distilled water in a bowl, and approximately one gram of oats and 5 mL of distilled water into another bowl. Therefore, we began by weighing the popcorn and oats. We then placed one gram of popcorn and 5 mL of water into one bowl and 1.2 grams of our non-GMO oats and 5 mL of water into the other bowl. Next, we would need to grind the contents in each of the bowls to a slurry, which is the scientific term for sludge. Our contents were still a bit dry, so we added another 5 mL of water to each of the contents in the bowl. When our slurry had the proper consistency, we needed to transport the contents into

six screwcap tubes containing InstaGene, which would help extract the DNA from the popcorn and oats; three would contain the popcorn slurry and the other three would contain the non-GMO oat slurry. We made sure to label each tube with a “P” for popcorn or a “C” for control so we would not confuse what was contained in each tube. Next, it was time for the water bath. After closing each tube, we carefully placed them in holes within a foam block so they would float when we put them in the water. The tubes were placed in 95 degree Celsius water for five minutes. Then, they were taken out of the bath and placed in a centrifuge for five minutes. This process was used to have the DNA we needed come to the top of the tube, while the unnecessary debris fell to the bottom. This was a two day process, so after they were done in the centrifuge, they were placed in the refrigerator for a day until we came back to finish the experiment. The next day was much more tedious work. Our tubes were taken out of the refrigerator. The next step was to add the different primers to each of the tubes. We labeled the tubes one through six to correspond to the chart of primers we would be adding to it. We would be adding 20 microliters of primer to each tube. To avoid contamination of primers, we made sure to use a new tip for each primer. The first one we added a green plant primer to a non-GMO oat tube. The second one we added a red GMO primer to our non-GMO oat tube. The third one we added green plant primer to a popcorn tube. The fourth we added a red GMO primer to a popcorn tube. The fifth one we added green plant primer to a GMO positive DNA tube, and finally the sixth one we added a red GMO primer to a GMO positive DNA tube. Our tubes were then placed into a thermo cycler. Basically, that is a high-tech refrigerator. For our experiment we used it to program certain temperatures so it could go from very hot to very cold quickly. This machine offered much more accuracy to the temperature part of the experiment than doing it by hand.

**Data and Results:**

Group	Food Item	Contains GMOs
Group A	Chipotle soft shell tortilla	Yes
Group B	Honey BBQ Fritos	Yes
Group C	Tostitos tortilla chips	Yes
Group D	Carmic’s buttered movie theater popcorn	Inconclusive Data
Group E	Nacho Cheese Doritos	Yes

**Conclusion:** In conclusion, several of the corn-based snack foods you and your children may be consuming contain GMOs. Nacho Cheese Doritos, Honey BBQ Fritos, and Tostitos tortilla chips all show traces of genetic modification in their DNA. Chipotle’s soft tortilla shell contains two different ingredients that have been genetically modified. Finally, movie theater popcorn, specifically from Carmic’s, showed no sign of GMOs, however, there was also an issue with DNA contamination. Therefore, we must establish those results as inconclusive. Keep in mind, this was a qualitative study. Whether these foods may actually be harmful to you could depend on the amount of

GMOs present in each. Further qualitative studies would need to be done to determine the amount of genetically modified ingredients are found within each of these foods.