Testing for Genetic Modification in Corn Products Using PCR

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Introduction

- GMOs, or genetically modified organisms, are organisms that have been altered by genetic engineering, which involves transferring a gene from one organism or species to another (Key *et al.*)
- Food products containing GMOs do not have to be labeled
  - in a study conducted in 2015, 61% of Europeans stated that they do not support GMOs and would like to see them labeled (Twardowski & Malyska, 2015)
- PCR and gel electrophoresis were utilized to detect the presence of GMO DNA in GMO labeled corn meal, organic corn, and unlabeled corn
  - PCR: polymerase chain reaction, amplifies the number of DNA segments present in a sample (Powledge, 2004)
  - Gel electrophoresis: An electric charge is transmitted through agarose gel causing bands of DNA to separate by size (Tan *et al., 2007*

Hypothesis

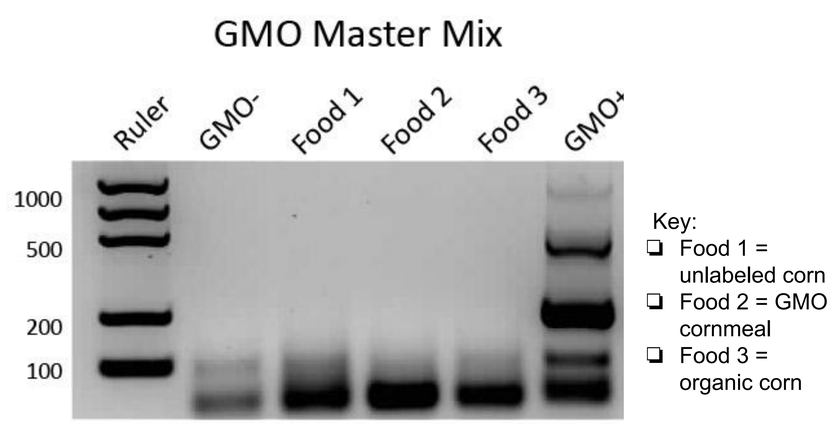
If DNA is extracted from the corn meal, organic corn, and unlabeled corn, then GMO DNA will be present in the corn meal and the unlabeled corn

Methods

- 1.7 grams of each food and a GMO positive and GMO negative control were added to 8.5 ml of water and ground to form a slurry
- The slurry for each food type was pipetted into tubes containing 500 µls of InstaGene matrix to prevent damage by enzymes
- 20 µls of green plant master mix (PMM) were added to half of the tubes and 20 µls of red GMO master mix (GMM) were added to the other half
- 20µls of extracted DNA of each sample were pipetted into the tubes of master mix
- The solutions of DNA and master mixes were cycled through PCR to multiply the DNA in the sample
- 20µls of the new solution were added to the gel electrophoresis and results were observed using a gel imaging system

Results

- The plant gene was 500 base pairs long
- Three foods had DNA bands at the length of the plant gene, the GMO- and GMO+ controls and test food 1



- The GMO marker sequence was 200 base pairs long
- Only one food, the GMO+ control, had a DNA band at the length of the GMO marker

Conclusion

- The GMO+ and GMO- controls were successful and had the anticipated results
- The unlabeled corn was the only corn product that successfully had DNA extracted from it. Because of this, our results cannot be accurately summarized.
- Our hypothesis was not supported because GMO DNA was not found to be present in the corn meal and unlabeled corn, although DNA was not extracted from the corn meal at all.
- If this experiment were to be repeated, we would try to be more precise in transferring the DNA into each test tube and more carefully follow the procedure.
- In the future, new tests should use additional kinds of corn products to gather more data about food labeling and the presence of GMOs in corn products

References

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