GMOs in Imported Products

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Abstract

The research was based on exploring the prevalence of GMOs in snack foods, imported from East Asia and a few sources from the United States. Specifically, corn- and soy-based chips, tofu, and papaya from China, South Korea, the Philippines, and the United States were investigated. 7 representative samples were analyzed using polymerase chain reaction (PCR) to amplify the 35S promoter region derived from cauliflower mosaic virus and the nopaline synthase (NOS) terminator originally isolated from *Agrobacterium tumefaciens*. These two sequences are found in over 90% of transgenic plants developed for commercial use and serve as a means of detecting genetic modifications of plants. PCR products were visualized on polyacrylamide gels using electrophoresis and compared against positive and negative controls. None of the Asian food products revealed evidence of genetic modification.

Introduction

Concerns over toxicity, organ damage, gene transfer, and cancer growth arose from the successes of the slowly growing GM industry. Debates over human health, ecological impact, and labeling began to take place as the GM industry tried to stake its claim in agriculture and those who sought safer consumption defended their position on traditional farming practices. These setbacks did not stop the possibilities for GMO production to halt, however, as countries like India, China, and dozens more grabbed the reins themselves and started producing crops like Bt cotton and Bt corn. These countries still have some regulatory legislation in place, but sometimes mistakes slip through the cracks. The purpose of the research was to provide a valuable check on GMO testing of imported products, specifically those of East Asian origin with minor focus on nations with opaque information dissemination like the People's Republic of China. While testing for GMOs is a generally well-practiced process in American foods, it does not occur as frequently in imported foods.

Results

All the samples tested negative for the 35S promoter and NOS terminator sequences usually used in genetic modification, or they were inconclusive with no results from the lane of sample material.

Sample	Outcome
Japan, soy	inconclusive
China, papaya	PMM +, GMM -
China, soy	inconclusive
USA, soy	inconclusive
South Korea, corn 1	PMM +, GMM -
South Korea, corn 2	PMM +, GMM -
Philippines, corn	PMM +, GMM -

Table 1. Summary of results of the PCR experiments performed.

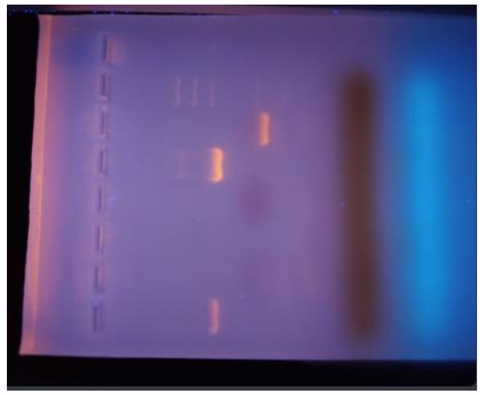

Figure 1. Polyacrylamide gel showing negative PCR results of a Chinese tofu product .

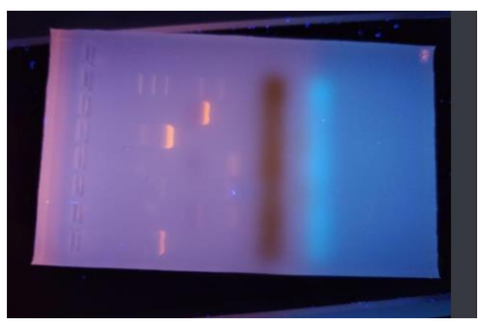

Figure 2. Polyacrylamide gel showing negative PCR results of a South Korean corn snack.

Table 2. How lanes are organized and labeled, including controls and samples.

Lane	Contents
8	Empty
7	Marker
6	+ GMM
5	+ PMM
4	Test GMM
3	Test PMM
2	- GMM
1	- PMM

Figure 3. South Korean singer Psy advertising a type of corn chip studied in the experiment.

Discussion

None of my test samples of imported food products tested positive for GMOs. This, however, does not mean that all imported food from East Asia is of organic origin. I used primitive DNA extraction techniques, and the DNA from samples may have lacked retrievability as most of it was from very processed foods like chips, pastes, and tofu. In conclusion, much of my research lacks consistency, and shortage of certain materials like primers and dye were a problem as well. Certain dyes and primers were shorted (i.e., from 20 microliters to 17 or 15) in order to account for each sample, and perhaps this also affects our ability to determine results. These factors are most likely responsible for the high number of inconclusive results and hard-to-read conclusions. Regardless, all I can do is hope for another opportunity to remedy these mistakes and retrieve better results. For now, data suggests that the products received from East Asia – specifically China, South Korea, and the Philippines – are organic.
A strong reason for lack of GMO products can be concluded by looking at East Asian residents' ideas of GMO products.

Figure 4. Tofu sheets used in the China-soy sample.

It has been observed in both Chinese and South Korean population samples that a mistrust of GMO products is present. GMO products in these countries are presented as low-cost alternatives to more expensive organic products. Despite this, people still generally choose the more costly, organic foods. Because of this, it might be more difficult to transparently sell non-GMO crops to the residents of these countries and even harder to have items shipped overseas to places like North America and especially Europe, where GMO products are already prohibited. Nonetheless, performing regular checks for GMO material is an under-practiced process and could yield interesting results in the future.

Acknowledgements

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References

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