CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
S0421

Project Title
Is Organic Certified Corn Actually Genetic Modified?

Abstract

Objectives/Goals
To test if organic certified corn will be contaminated with genetically modified (GMO) corn using PCR amplification of the Round-up ready gene.

Methods/Materials
enomic DNA isolation: 1. Use 4 corn ears from the same source (use 10 embryos from each ear). 2. Extract genomic DNA from 40 frozen corn kernels (= 1 sample) 3. Grind frozen kernels to a fine powder with mortar and pestle. 4. Lyse cells with extraction buffer and centrifuge. 5. Add potassium acetate and centrifuge to separate DNA from the cell debris pellet. 6. Add cold isopropanol to precipitate DNA from the supernatant. 7. Repeat above steps for the other four sources of corn. 8. Measure the amount of DNA extracted per sample with a spectrophotometer at OD260. 9. Separate 10 ul of each sample by agarose gel electrophoresis to look at genomic DNA. Polymerase Chain Reaction Amplification 1. Set up PCR reactions with diluted genomic DNA. 2. Use for control primer: Zein sequence (found in all corn) 3. Use for experimental primer: NOS sequence (found in Roundup Ready GMO corn) 4. Run PCR reaction in thermocycler at for 35 cycles total, with 30 seconds in each of these temperatures: a. 95 C denaturation, b. 55 C annealing primers, c. 72 C DNA strand extension. Agarose Gel Electrophoresis 1. Separate 15 ul of each corn sample and 2 ul of DNA standards on a 3% Nu-Sieve agarose gel. 2. Run gel at 100 volts for 30 minutes. 3. Observe ethidium-bromide stained DNA bands under uV light.

Results
Pooled Corn Samples with ZEIN gene (control) shows the DNA samples amplified with the ZEIN primer. It shows that all of the corn has the storage protein that is only found in corn. PCR Amplification with the NOS primers shows the amplified Roundup Ready gene for five corn samples at various dilutions.

Conclusions/Discussion
I tested corn on whether organic certified corn was free of any genetically modifications. In order to test this, I isolated the DNA and amplified the Roundup Ready gene using PCR. All of the tested corn samples contained NOS sequences, which are found in 95% of Roundup Ready GMO corn. Therefore, all tested corn were contaminated with GMOs. Corn is wind pollinated. The pollen from one GMO corn plant can travel up to 0.5 miles in a few minutes in 15 mph wind. So the GMO pollen could possibly contaminate an entire field of non-GMO corn.

Summary Statement
I wanted to test if organic certified corn (no GMO) is free of contamination from GMO corn by looking for the Round-up ready gene.

Help Received
Used lab equipment at Inscent, Inc. under the supervision of Dr. Daniel Woods.