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Research Poster

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Vaccines For Plants?

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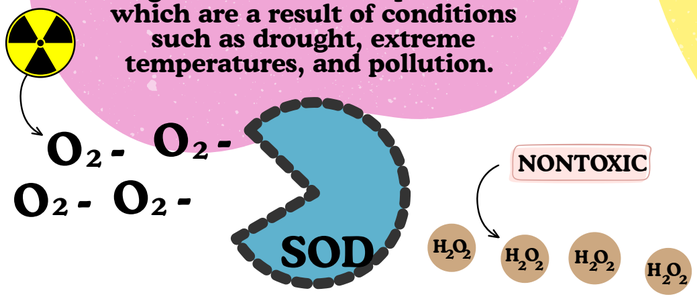
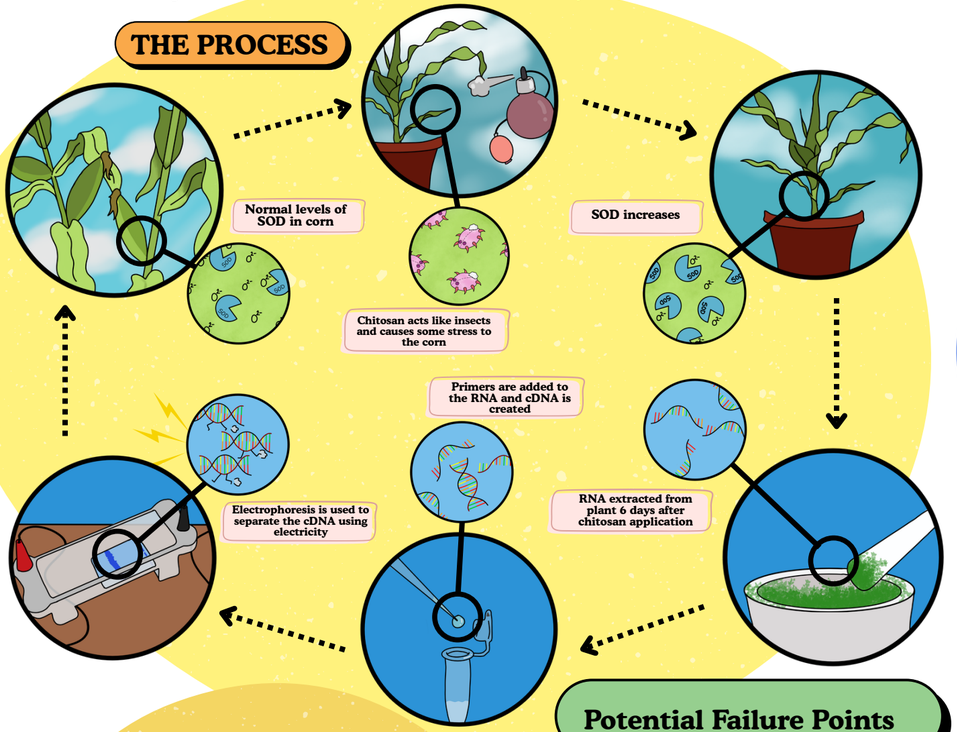
How can we protect corn, one of the U.S most widely used crops, from stressful conditions?

The goal of this project is to determine how the expression of Superoxide Dismutase (SOD) responds to 1% chitosan foliar sprayed on young corn plants. SOD is a stress gene linked to removing high levels of *toxic* superoxide which are a result of conditions such as drought, extreme temperatures, and pollution.



THE PROCESS



How does chitosan affect the expression of Superoxide dismutase (SOD)?

We are addressing a gap in research by refining the procedure involving Chitosan's effect on a plant's stress gene. Because the application of this product is recent, this gap is significant. Chitosan is derived from chitin and can improve a plant's resistance to abiotic stress by imitating the stress induced by an insect. We want to determine how affected the expression of our SOD stress gene is by a chitosan treatment on our corn.

Experiment Variables & Housekeeping Gene

Independent
f the 2 plants sprayed with chitosan treatment

Dependent
Intensity of SOD gene expression

Controlled
Both plants sprayed with solvent
Both plants should have expression of an Actin gene

Annealed at 60 degrees C

Housekeeping Genes
We used ZmActin1 as a stabilizer to give us a baseline to compare our SOD gene expression.
The actin primer used was formulated for a specific homozygous cultivar corn plant. The plants used throughout our experiments were heterozygous commercial corn plants.

Potential Failure Points

Wrong actin primer for RT-PCR

Improper annealing Temp for actin primer

Contamination during RNA extraction.

Poor aseptic technique

Poor pippetting skills

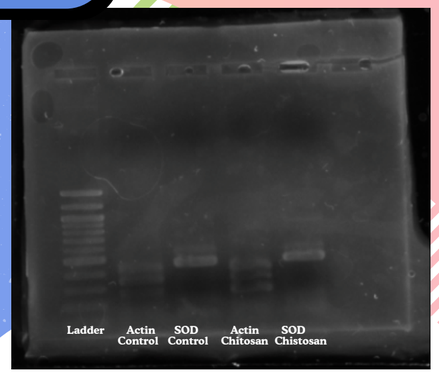
Hypothesis/Anticipated Results

We anticipated an increase in SOD expression in our Chitosan treated plant. This would show up in our gel electrophoresis results as bands around 135 base pairs.

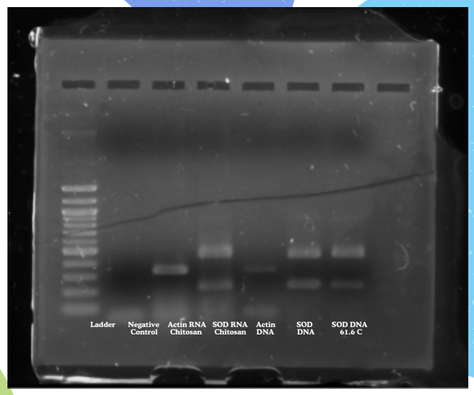
Results from RT-PCR

Our results were not immediately conclusive. Bands did indeed show up but they were the wrong size. The size corresponded to the size of the genomic DNA which led to a hypothesis of DNA contamination in our RT-PCR extraction.

Solution: Run PCR on our extracted cDNA sample.



Results from PCR



These results proved that genomic DNA had contaminated our sample. It also showed multiple bands in DNA which suggests a higher annealing temperature is needed for the actin primer.

Next Steps

1.Run experiments to find proper annealing temperature for actin primer.

2.Extract RNA at different times and compare for highest gene expression.

3.Change corn plant from heterozygous corn plant to homozygous cultivar to match the primer.