CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Michele K. Jenkins

Project Number
J0817

Project Title
Determining the Effects Polymers Have in Reducing the Toxicity of Contaminated Soil

Abstract

Objectives/Goals
The objective of my project is to determine the efficacy of water-absorbing polymers in absorbing liquid contaminants in soil.

Methods/Materials
Diazinon, used motor oil, and gasoline were used as the variables in my trials with living organisms (crickets). Glyphosate and a salt solution were the variables in the germination rate tests (radish seeds). I contaminated 5 identical individual soil samples made from sand and potting soil with each of the variable, then took more soil samples for the testing. Prior to this, I took the pH of each of the contaminants for data purposes. I then contaminated the soil with a set amount of contaminant, and tested the toxicity level of each (ie. Timing the cricket's death rate and plant's germination rate). After the data was collected, I added water and polymers to the soil from which the samples originated, and a 48 hour absorption period ensued. After that, I retested all of the trials, then collected and compared the corresponding results.

Results
The polymers reduced the toxicity of the contaminants in each of the cases, excluding the motor oil. In the cricket trials, the gasoline's pre-test average compared to the post-test average had increased the insect's longevity rate by 6:894 minutes. In the diazinon's averaged trials, the longevity was increased by 5:99. In the germination trials, the germination rate was reduced in the glyphosate by 43 1/3 hours, and in the salt solution's by 10 2/3 hours.

Conclusions/Discussion
When the data is analyzed in my project, it can be concluded that polymers can reduce soil toxicity when contaminated with a water-based solution. Because of this, I have also proved that polymers also have a positive effect on the environment when used under these circumstances. Unfortunately, the polymers have no effect on the motor oil, seeing as they did not absorb any of it, even though its fumes were not toxic to the insect.

Summary Statement
My project studies the effects of polymer crystals in absorbing contaminants from soil.

Help Received
Mother typed Introduction, Grandmother taped board, Aunt helped with research, Uncle provided oil and pesticide