CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J0820

Project Title
Will Biodegradable Plastic Spoons Decompose in Common Environments?

Abstract

Objectives/Goals
By performing this experiment, I hoped to find out in what types of environments wheat-based and corn-based biodegradable plastic spoons might or might not decompose. I also tried to incorporate the question: 'Do the spoons biodegrade in common environments in an amount of time reasonable enough to warrant the higher cost per utensil?'. I believed that such a question, once answered, would motivate people to spend a little more now to help preserve our natural resources and environment for the future.

Methods/Materials
To conduct the experiment, I set up four environments and placed five of each type of spoon in them. The three types of spoons were wheat-based, corn-based, and petroleum-based plastic (for a control. The environments in which the spoons were placed included household worm-enhanced compost, air (outside exposed to the elements), freshwater, and SF bay water. After removing the spoons from their respective environments at 33 days, I gave them all a uniform rinse. The spoons were left to dry overnight. They were inspected for signs of pitting, mold, or other decay. They were then placed on a balance, with the five exposed spoons of one type from the same environment weighed against five unexposed spoons of the same type.

Results
Of the three types of spoons tested, only the wheat-based spoons showed signs of decomposition. The wheat-based spoons in the compost lost weight and showed obvious signs of decay. The wheat-based spoons in air, freshwater, and bay water all gained slight amounts of weight due to moisture absorption from the damp environments, as well as showed signs of early biodegradation. No changes occurred with the corn-based spoons or petroleum-based spoons throughout the experiment.

Conclusions/Discussion
The wheat-based spoons showed considerable amounts of biodegradation. In my hypothesis, I stated that both types of biodegradable plastic spoons would show the most signs of decomposition in the compost because of the biologically active environment it provided. However, the corn-based spoons had no weight difference between the unexposed and exposed ones in any of the environments due to their more specific biodegradation requirements. The wheat-based spoons began to decompose in every environment, making them the clear choice for consumers willing to pay the extra pennies to conserve our natural resources, and minimize the impact on our landfills.

Summary Statement
The purpose of my project was to determine if biodegradable plastic utensils will decompose in common environments in an amount of time reasonable enough to justify their additional cost.

Help Received
I received help in the form of transportation while purchasing and collecting materials. My father helped me construct an enclosure to keep my spoons safe from animals while they lay in the compost.