CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
S0816

Project Title
Soil Microbes in Southern California : A Source of Global Warming?

Abstract

Objectives/Goals
The objective of this experiment was to understand the role of soil microbes in global warming. Few studies have been done on carbon released as a result of microbial activity in soils, and even fewer have looked at the amount of carbon released at elevated temperatures.

Methods/Materials
MATERIALS
Materials used included a Low Temperature Illuminated Incubator for storing soil samples, 5-ml, 1-ml, and 200-ìL micropipettes for diluting solutions, and Biolog plates for assessing reactivity.

METHODS
Soils from three different locations (mountain, beach, and urban) were collected and stored at a temperature of 4 degrees C to inhibit microbial activity. The soils were then sieved and placed into 48 labeled bottles, and 24 were kept at the control temperature of 10.0 degrees C whereas 24 were kept at the variable temperature of 21.6 degrees C. The soil samples were suspended in saline solution in a ratio of 1g to 10 liters in a sterile manner. The suspensions were then placed into 9 Ecolog plates in which each well contained an organic compound. Then the plates were covered and placed at room temperature for 1 week for the reactions to take place. Appearance of purple color indicated a positive well.

Results
When all three soil types were compared, higher temperature significantly increased the number of positive wells. (P = 0.013) At the elevated temperature, the average number of positive wells was 4.83, compared to an average of 2.25 wells at the control temperature. Within each soil type, variation between different samples was insignificant (P = 0.417). At both control and higher temperatures, beach soils were the most effective as decomposers, followed by the urban soils, followed by the mountain soils.

Conclusions/Discussion
This data suggests that as global warming continues to occur, soil microbes will decompose organic matter at a higher rate, releasing more CO(2). Thus soil microbes are an important factor that should be taken into consideration in models of global warming.

Summary Statement
This project analyzed the effects of elevated temperatures on the decomposing ability of microbes in Southern Californian soils and their role in global warming.

Help Received
Used lab equipment at UCI under the supervision of Professor Kathleen Treseder; Mother helped glue together board