CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J1709

Project Title
How Does Excess Carbon Dioxide Affect Plant Growth?

Abstract

Objectives/Goals

My experiment had two purposes: first, to see if excessive amounts of CO2 would affect plant and seed growth and second, to see if the CO2 would affect the temperature of the air around the plants. I could get carbon dioxide very easily from dry ice. Dry ice is the solid form of carbon dioxide. It does not melt like water; it goes straight to gaseous form in a process call sublimation. So by controlling the amount of dry ice I placed next to each plant, I could control how much CO2 each would be exposed to.

Methods/Materials

The materials used were:
6 large glass jars, 7 thermometers, dowels and paper rulers to make the measuring sticks, a measuring cup for watering the plants, grow light, potting soil, wheat grass seeds, wheat grass, Tupperware containers and terracotta pots to plant the grass in, a scale, dry ice, protective gloves, a hammer, and a screwdriver.

The procedure calls for two phases of experiments; one with seeds and one with plants. The steps of both phases were almost identical. Six test seeds or six test plants were placed in glass jars. Two were control groups, two were exposed to 10 grams of dry ice daily, and two were exposed to 20 grams of dry ice daily. The amount of growth and the temperature were measured daily.

Results

During both the seed germination phase and the plant growth phase, the temperatures did not significantly vary from jar to jar.

The only seeds that grew were in the control group. Those seeds sprouted and grew to a height of 3 centimeters within seven days. None of the other seeds sprouted.

The growth of the plants did show significant differences. The more CO2 the plants were exposed to, the less they grew. The most growth was found in the control group, at 12.5 centimeters while the least was found in the group exposed to 20 grams of CO2. This plant only grew to 7.5 centimeters.

Conclusions/Discussion

None of the seeds exposed to CO2 sprouted. However, no conclusion can be drawn about whether the failure to sprout was due to CO2 because one of the two control groups did not sprout either.

The growing plants exposed to CO2 resulted in dramatic changes and the results were consistent: both of the control group plants flourished while the plants exposed to CO2 grew less. In fact, the more CO2 the plants were exposed to, the less they grew. This experiment proved that high doses of CO2 adversely affects plant growth.

Summary Statement

The purpose is to see whether excessive amounts of carbon dioxide will cause the temperature of air in a contained space to rise and to see how carbon dioxide affects the growth of plants and seeds.

Help Received

Mother helped me get all necessary materials; Father proofread my board.