Name(s)	Project Number
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Project Title

Measuring the Effectiveness of Indoor Plants in Reducing Indoor Air Pollution

Abstract

Objectives/Goals

The objective of this study is to measure the carbon dioxide absorption capabilities of different indoor plants and their effectiveness in reducing indoor air pollution.

Methods/Materials

I chose 5 different species of plants, each of 2 different sizes (large and small), and measured the amount of carbon dioxide absorbed by each plant one at a time using a carbon dioxide monitor. I used a homemade terrarium made from a large clear plastic box and plastic wrap to create a controlled environment for each test run over a span of 24 hrs for each plant. I also measured the leaf surface area of these plants using graph paper so that I can account for carbon dioxide absorption in ppm (parts per million) per square centimeter. I conducted several trials (10 per each plant) and calculated the average carbon dioxide absorbed per square centimeter for each plant. I tried to maintain the amount of water, exposure to sunlight and soil condition constant across all trials for all the plants.

The plants that I used in my experiment were Snake Plant (sansevieria trifasciata), Peace Lily (spathiphyllum wallisii), English Ivy (hedera helix), Gold Capella (schefflera arboricola) and Aloe Vera (aloe barbadensis miller).

Results

I found that the large English Ivy absorbed the most carbon dioxide on average over 10 trials at 310 ppm, but it was the small Snake Plant that absorbed the most carbon dioxide in parts per million per square centimeter area of the leaves, at 0.201 ppm/sq.cm.

Conclusions/Discussion

Given the large leaf surface area of the large Peace Lily, I expected that it would absorb the most carbon dioxide, but it turned out that the small Snake Plant was the overall winner. During my research, I learned that it is because Snake Plant is one of the few plants which can absorb carbon dioxide and release oxygen not only during the day, but also at night through a process called Crassulacean Acid Metabolism (CAM) photosynthesis. This was an adaptation acquired due to arid conditions in its natural habitat. Also, I learned that the reason the large English Ivy absorbed the highest average amount of carbon dioxide in ppm is because it is a very invasive plant which grows at a rapid pace and has higher stomatal density than any other plant.

Summary Statement

I showed that large variations exist in carbon dioxide absorption capabilities of common indoor plants making some plants more effective than others for reducing indoor air pollution.

Help Received

I have done the research needed, designed and performed the experiment myself at home and my science teacher reviewed my results and provided his feedback.