CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

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Project Number

31539

Project Title

pHocus on the Basics

Abstract

Objectives/Goals

For our experiment, we tested the effects of pH on the growth of radishes. We wanted to know how the pH of the soil (acidic or basic) would affect the growth in height above ground of radishes, when using the 4 types of Sparkler, Cherry Belle, Champion, and Icicle Short Top. We hypothesized that the acidic (pH 6.0) soil would cause the radishes to sprout the quickest and grow the tallest, rather than the neutral (pH 7.0) soil and basic (8.0 soil). We hypothesized this because our research indicated that not only do radishes grow well at the pH range of 6.0 to 7.0, but that the soil of this pH has more readily available nutrients and bacteria that break down organic matter into food for the plants.

Methods/Materials

To test this hypothesis, we divided the soil into three groups and changed the pH, using sodium hydroxide and hydrochloric acid, to soil pHs of 6.0, 7.0, and 8.0. Once the pH of the soils were set, we planted the 4 different radishes in each soil: 4 plots for each type divided into acidic, neutral, and basic. This added up to a total of 16 plots (32 seeds) for each pH group. We watered the plants every other 24 hours and recorded the heights every 24 hours, once they sprouted.

Results

After the plants had grown for 19 days, we recorded final measurements. The average height of the basic soil was 69mm, the average height of the neutral soil was 68mm, and the average height of the acidic soil was 64mm. Of the 32 seeds planted in each pH, 96.88% of neutral sprouted, 93.75% of basic sprouted, 87.50% of acidic sprouted. Neutral and acidic soil radishes sprouted the fastest (Day 7 of the experiment), while the basic soil radishes all sprouted by day 9. The tallest plant (106mm) was produced by the basic soil, while the shortest plant (35mm) was produced by the acidic soil.

Conclusions/Discussion

We concluded that our hypothesis was mostly incorrect. Basic, not acidic, grew the radish sprouts the tallest, while the neutral soil sprouted the highest percentage of seeds planted, followed by basic soil and then acidic soil. We also concluded that although our data pointed toward basic soil growing the radish sprouts the best, errors could have entered the experiment due to the pH of the water added to the soil as well as inaccurate readings of the soil pHs. However, if these errors do not adversely affect the experiment, then our experiment concludes that the basic soil is the best for growing radishes.

Summary Statement

Which type of soil - acidic (pH 6.0) soil, basic (pH 8.0) soil, or neutral (pH 7.0) soil - causes radishes to sprout quicker and grow fastest (when measuring height above ground)?

Help Received

Teacher provided hydrochloric acid and sodium chloride to change pH, Parents helped obtain materials