CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36689

Project Title

Plants, Photons, Phototropism: How Does Light and Color Affect Plant Growth?

Abstract

Objectives/Goals

My hypothesis is: If, a plant is exposed to the right light, right color, and right color temperature (kelvin), then, the growth of the plant will accelerate because, light and color affect growth. My goal is to see which light type (CFL or LED), Kelvin (2700 or 5000), and Color (red,blue, green) causes the three plants that I am experimenting with (spinach, sunflower, and okra) to grow at its best pace.

Methods/Materials

I set up my lab area first, planted my plants, conducted my different experiments, watered the plants, and took the measurements of plant growth daily for 25 days. I did 2 trials.

The materials I used for Scientific Data Collection were Footcandles Meter (Minolta T-10), Moisture Control Meter, Soil Thermometer, Data Collection Sheet, Electronic Thermometer, Electronic Balance. The other materials I used were 12 cardboard boxes, Two long strip of wood, CFL 5000 light bulb(3), LED 5000 light bulb(3), Measuring Cup, CFL 2700 light bulb (3), LED 5000 light bulb (3), 12 clamp lights, Ruler,Pen, and Red, Blue, and Green Color filters.

Results

Different types of lights (CFL and LED) affect plant growth differently. Furthermore, color temperature (Kelvin: 2700 and 5000) is especially important while growing plants. You need the right color, light type, and color temperature (Kelvin) for a plant to grow at the best pace. Different plants need a different combination of these three things to grow at their best pace. For example, spinach grows best with the color green, LED lights, and with a Kelvin of 2700. Sunflower grows best with the color red, light type of LED, and with a Kelvin of 2700. Okra grows best with the color blue, CFL lights, and a Kelvin of 5000. The lights and color that I have tested in my study all have a positive impact to plant growth compared to natural light. However, with the right combinations of color, light type, and color temperature (Kelvin) a plant will grow at its best pace.

Conclusions/Discussion

My research has never been done before. It changes the way the farmers, specifically vertical farmers, grow their crops. It speeds up the process of growth for plants without having to use GMO#s. My research also goes for a variety of plants, leafy plants(spinach), green seed pods(okra), and seeds (sunflower).

Summary Statement

I experimented the plant growth of three different types of plants (spinach, sunflower, and okra) with the independent variables of Light Type (CFL and LED),Kelvin (2700 and 5000) and Color (Red, Blue, Green)and found the best combinations.

Help Received

Sacramento Municipal Utility District lent me use their lighting room and they lent me a foot candle meter for my research.

Preliminary