

2023 - 2024 Aydin Seifi Science Fair Logbook

December

Dec 10 - Decided on manipulated variables to be hydrocarbon, sodium and caprylates

Dec 14-17 - Worked on hypothesis specifically the question, revision, and preliminary research stages

Dec 19 - Started variable stage

Dec 20 - Worked on and completed the procedure stage, but did add some things to step one of the procedure later on

Dec 21 - Changed manipulated variable from caprylates to arsenic

Dec 24 - Completed the variables stage

Dec 27 - Began work on the hypothesis stage on the CYSF platform, completing the Introduction stage

January

Jan 1 - Completed Bases stage of the hypothesis, allowing me to move on to the actual hypothesis and get started on the application stage as it does not require precise results, just where to use them in the real world

Jan 2 - Completely finished the hypothesis and completed slightly less than half of the research section on the CYSF platform, allowing me to move on to the actual experiment once I finished the applications

Jan 20 - Began listing the appropriate ingredients/materials for the experiment

Basic Needs of the Radish

The basic needs of all plants are food/ nutrients, water, sunlight, and temperature. I will assess the radish based on these and some other parameters.

Food/ Nutrients

Radishes need moderate potassium, meaning they don't want too much but cannot get by on too little. This vegetable needs moderate phosphorous and little nitrogen. The ideal fertilizer for radishes would be monopotassium phosphate fertilizer as it meets this plant's needs. The amount of nutrients this plant needs makes it a straightforward plant to care for.

Space and Water

Each radish bulb needs about 4 - 8 inches of space. This is based on the soil and the amount of potassium and phosphorous in the soil per square inch. The radish needs plenty of water about half a cup a day. The most important matter is to keep the soil moist. If the soil is not moist this will cause the roots to develop a bad taste. Excess amounts of water will cause the root to spoil and rot.

Light and Temperature

The radish needs full sun meaning about six hours of direct sun a day. This is necessary as growing the plant in the shade will cause it to focus on developing its leaves rather than its roots, which is the part that humans use the most. This plant is more resilient towards cold weather, its optimal temperature range being from 10 degrees Celsius to 21 degrees. Higher temperatures will cause the root to become woody or spongy and have a hollow center. The spongy center is the result of the cell walls of the plant separating due to the hot weather.

Soil

Radishes grow best in loam or a little bit of sandy soil that has good drainage its roots can grow easily. The soil in which the radish grows must not be very packed together as then the roots will have difficulty growing into the most they can be.

Effects of Hydrocarbon on General Plants

Hydrocarbons are an organic chemical compound that is the basis of many important energy sources. This chemical compound can interfere with plant growth in a few scenarios:

- Pipeline accidents in fields
- Unauthorized collection of petroleum through oil pipelines
- Leaks in fields due to unauthorized collection of petroleum through oil pipelines

These are some of the effects of Hydrocarbons on plants:

- Hinder the uptake of nutrients into the plant from the soil
- Leaf biochemical alteration, or chemical processes in the leaf were altered in common rainforest plants
- Reduced plant transpiration
- Cellular respiration may increase or decrease but it is dependent on the plant species or oil type

Did you know that there have been over 3000 spills in the Amazon forest from the 2800 km of oil pipelines that run underneath it? These spills have affected the wildlife and most of all the plants in the vast areas where there have been accidents, the plants there are now suffering from the effects stated above.

Effects of Sodium Chloride on General Plants

Sodium chloride is a chemical compound that the human body needs to maintain a regular fluid balance. All natural waters have some amount of sodium chloride usually six to 130 ml per litre. For humans, too much sodium chloride can lead to heart disease, stroke, or high blood pressure.

This subject in the experiment represents if a home gardener decided to give their radish plants tap water. The results of this experiment will be helpful to this group of people.

These are some of the effects of sodium on general plants:

- Root exposure to high amounts of sodium stunts growth due to excess salts
- Hinders water uptake - Therefore this will lead to dry tissues

This chemical may lead to the death of sensitive and fragile plants.

Effects of Coconut Milk on General Plants

Coconut milk is a liquid that has many different chemicals and nutrients in it. Below is a list of nutrients and chemicals in coconut milk per 240 g or approximately one cup of coconut milk:

- 631 mg potassium
- 88.8 mg magnesium
- 38.4 mg calcium
- 13.3 mg carbohydrates
- 5.5 mg protein
- 57.1 mg fat

This experiment will not be testing each of these chemicals as an individual on the plant but coconut milk as a whole. This liquid is a key part of tropical Asian culture and the origin of using it as a fertilizer for plants. This subject in the experiment tests the effect of this seemingly clever fertilizer on specifically radishes. This fertilizer is also used by many home gardeners as it seems to have a positive effect on most plants.

Jan 28 - Acquired all needed materials for experiment and began experiment, also decided to add more materials

Jan 28 - Began timer for water gave water to the plant every 12 hours

February

Feb 2 - Observations, 5 plants have germinated, at least 1 from each type of water given to it. One control, both hydrocarbons, a coconut,

Feb 9 - Moved spot of experiment from a shower to a bathtub but still all sunlight is about the same amount as it was before the switch

Feb 15 - Most plants are thriving, only 12 days left of the experiment

March

March 2 - Starting observations section, experiment is finished, realised grave error:

This plant has three main leaves, each 1.5 cm wide and 1 cm tall

4 cm taproot

Also no red bulb but there is a spot that is a maroon colour and that is where it would have grown

Rich healthy green leaf

No radish bulb

There was a section of the stem that was the maroon color of a bulb

1 cm above the dirt

Two 3 mm leaves sprouting out of the stem

2 cm tap

Healthy plant compared to others and counterpart

Two main stems sprouting out

Same-sized leaves as control 2

8 leaves - all a healthy green

Somewhat weak root and grew taller by 2 cm than its counterpart

Two plants grew but one had extremely small leaves and an abnormally weak stem

The second plant had 3 healthy leaves sprouting out of its stem

The leaves on the second plant were 0.76 cm bigger than the other

The second plant had a longer taproot by half of a grew 7 cm above soil level

4 leaves sprouted out of its stem

Dry and wispy leaves

3cm taproot

root is well established in the soil

Leaves are frail and very light green

This plant did not germinate

Further investigation showed that about 2 mm of the root had developed downwards

Radish has an 80% germination rate so this blunder could be a matter of probability
Extremely weak stem

Dry, wispy leaves

Though the root was long it was not well developed inside the soil as most of the root was stationed in one specific spot rather than branching out into the depths of the soil

The second plant or the plant closest in the picture's leaves were not well developed

One plant had 2 leaves sprouting out of its stem whereas the other had three as they were not well developed

This plant's stem was also extremely weak

Stem could not hold the whole plant up as you can see in the photo

Again one plant's leaves were well developed though frail, wispy and dry and the other's not grown and still had the same characteristics

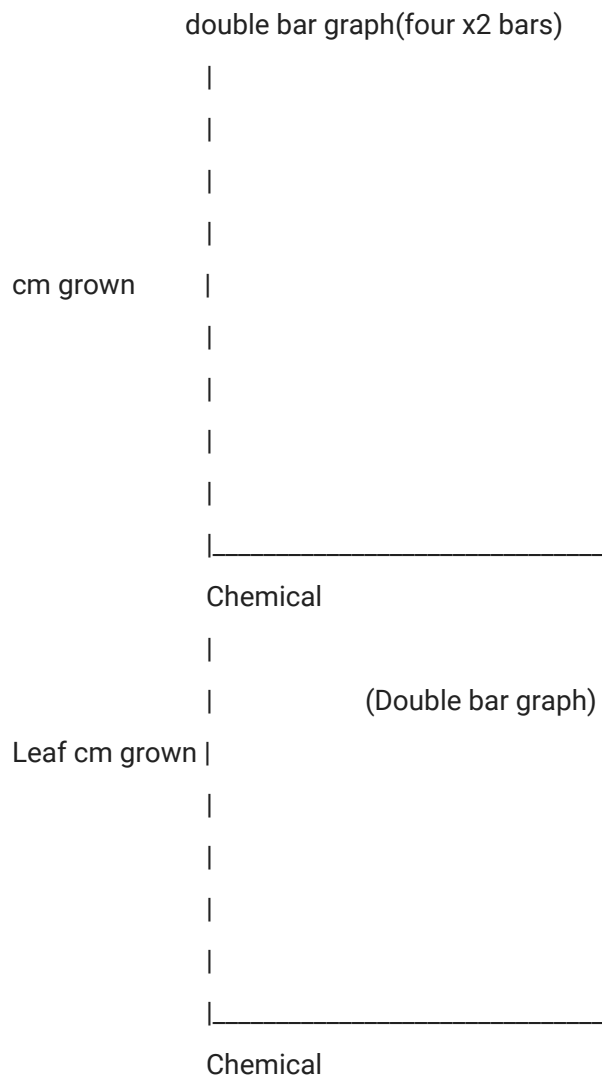
3 leaves sprouting out of each plant's stem

The plant on the right was 1cm taller

March 11 - Starting analysis

March 8 - Done Observations

March 12 - Graph drafts



If hydrocarbon enters the lungs, it can cause a pneumonia-like condition; irreversible, permanent lung damage; and even death.

