

How Do Small Amounts of Sodium Chloride Affect the Growth of *Brassica Rapa* (Mustard Plants)

Winter 2021-2022

The Introduction

Tap water contains small amounts of salt. If someone uses tap water instead of rain or desalinated water to water their plants, does that hinder the growth of the plants? Studies show that salt harms plants by absorbing the water that plants need, creating a “drought-like environment for plants” (Perry, L., n.d.). Also, sodium chloride can displace other mineral nutrients in the soil and interfere with the photosynthesis process (Bayer, M., & Njue, G., 2017, February 7). This study investigates the effects of low concentrations of salt on *Brassica Rapa* growth.

Materials and Methods

The study utilized the following materials: 12 *Brassica Rapa* seeds, seed starting potting mix soil (contains fertilizer), three gallons of distilled water, sea salt, six clay pots with drainage, measuring cup, and measuring apparatus.

The procedure for this study was to prepare three solutions, one with distilled water, one with distilled water mixed with $\frac{1}{8}$ teaspoon of sea salt per gallon of water, and one with $\frac{1}{4}$ teaspoon of salt per gallon of distilled water. In addition, fill up six clay pots with three-quarters full of soil, and plant two seeds in each pot. Next, separate the pots into three groups with two in the control group, two pots in the $\frac{1}{8}$ teaspoon of salt per gallon group, and two pots in the $\frac{1}{4}$ salt per gallon group. Label the two pots in each group A and B. Water each plant with the corresponding label to solution by $\frac{1}{3}$ of a cup of the solution and measure the height of each plant daily. After the first day of growth, cut the shorter of the two plants in each pot. Keep plants in a sunny area.

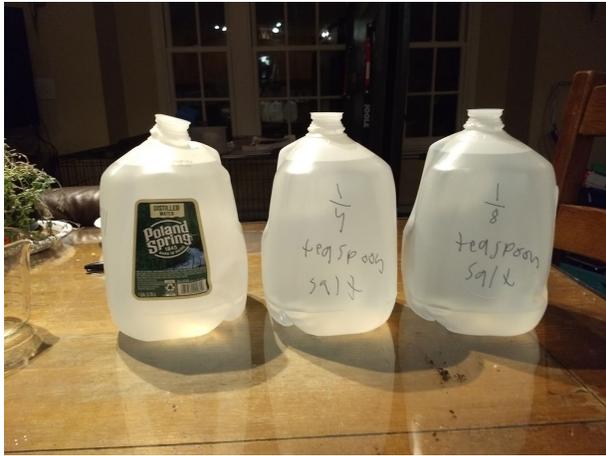


Figure 1: Control, $\frac{1}{8}$, and $\frac{1}{4}$ teaspoon of salt per gallon solutions

Figure 2: Day one, pots with seeds planted in them

Results

The results of the study were that in the first seven days, all the groups were equivalent, in days eight through 15, the control group grew faster than either of the treatment groups. On days 16 through 20 all the groups grow at the same rate. The control and $\frac{1}{8}$ salt per gallon groups ended up very similar, but the $\frac{1}{4}$ salt per gallon group ended up slightly shorter.

Plant Heights

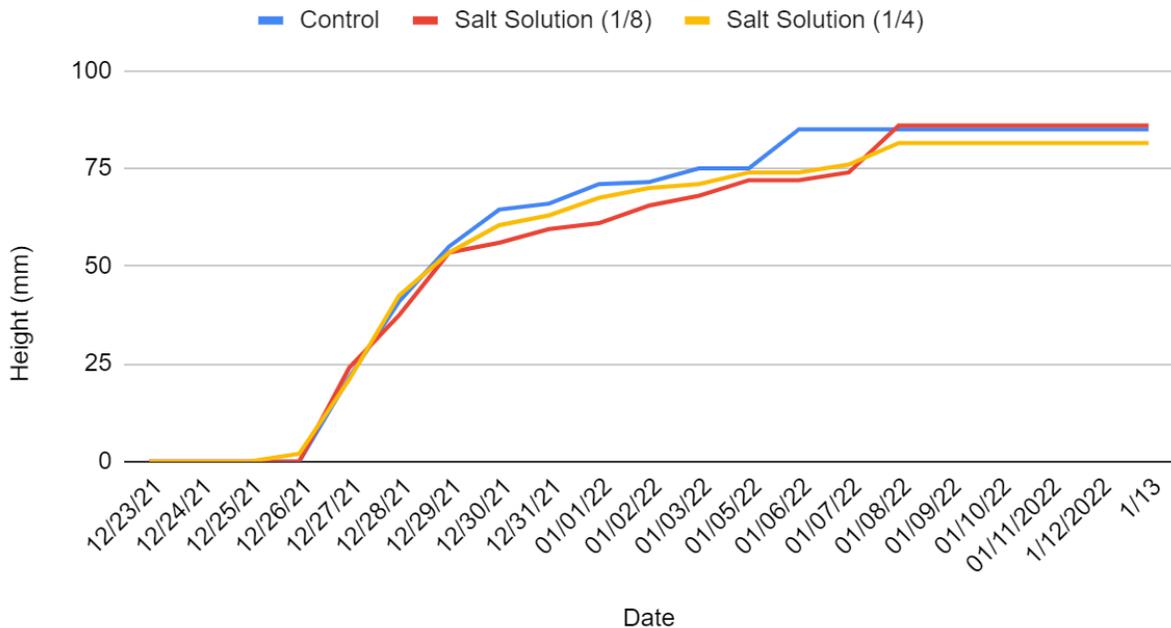


Figure 3: Daily average height for each group



Figure 4: End of week two of measurements

Discussion

The results indicate that a very small amount of salt does not have a real impact on the growth of *Brassica Rapa*. Some limitations of the study are that measuring the plant heights was challenging due to the need to make the plants straight, which caused some minor imperfections in the final measurements. In addition, the small sample size meant that variations in the data may not be totally correlated to the experiment.

The results of the study show that the salt present in tap water that is not in distilled water(which is very close to rainwater, because both are very pure) does not make a big difference in the final growth of plants.

Conclusion

Even though salt hurts plant growth by absorbing water that the plant needs and interrupting photosynthesis, because of the low concentration of salt, it did not have a big effect. Some ideas for future studies are to test $\frac{1}{2}$ a teaspoon of salt per gallon of water, and a full teaspoon of salt per gallon. In addition, a future study should have a bigger sample size in each group.

Bibliography

Bayer, M., & Njue, G. (2017, February 7). *The impact of salts on plants and how to reduce plant injury from winter salt applications*. Center for Agriculture, Food, and the Environment. Retrieved January 20, 2022, from

<https://ag.umass.edu/landscape/fact-sheets/impact-of-salts-on-plants-how-to-reduce-plant-injury-from-winter-salt>

Lacoma, T. (2019, March 2). *What happens when you put saltwater on plants?* Sciencing. Retrieved January 20, 2022, from <https://sciencing.com/happens-put-saltwater-plants-6587256.html>

Perry, L. (n.d.). *SALT DAMAGE TO PLANTS*. Salt damage to plants. Retrieved January 20, 2022, from <https://www.uvm.edu/pss/ppp/articles/salt1.htm>