Effects of Various Chemicals On the Growth of *Brassica rapa*

By

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INTRODUCTION

The purpose of our investigation was to observe the effects that certain chemicals would have on Fast Plants (*Brassica rapa)*. Since our environment is full of chemicals and additives that can accidently mix with the growth of plants, we chose to test the effects that three chemicals would have on plants in a fixed environment. Our opening hypothesis is that the chemicals will cause the plants to not grow as tall as the plants without the chemicals. For our method we tested the effects that vinegar, maltose, KCL, and ½ wicks with no chemicals would have. This investigation will help us decide the type of effect chemicals in our environment have on the growth of plants. There was a previous experiment done also testing the effects of substances in the environment. In the experiment titled Bioassays with Fast Plants (University of Wisconsin-Madison 1990) they show that 50% of the plants that came in contact with their substance died.

METHODS AND MATERIALS

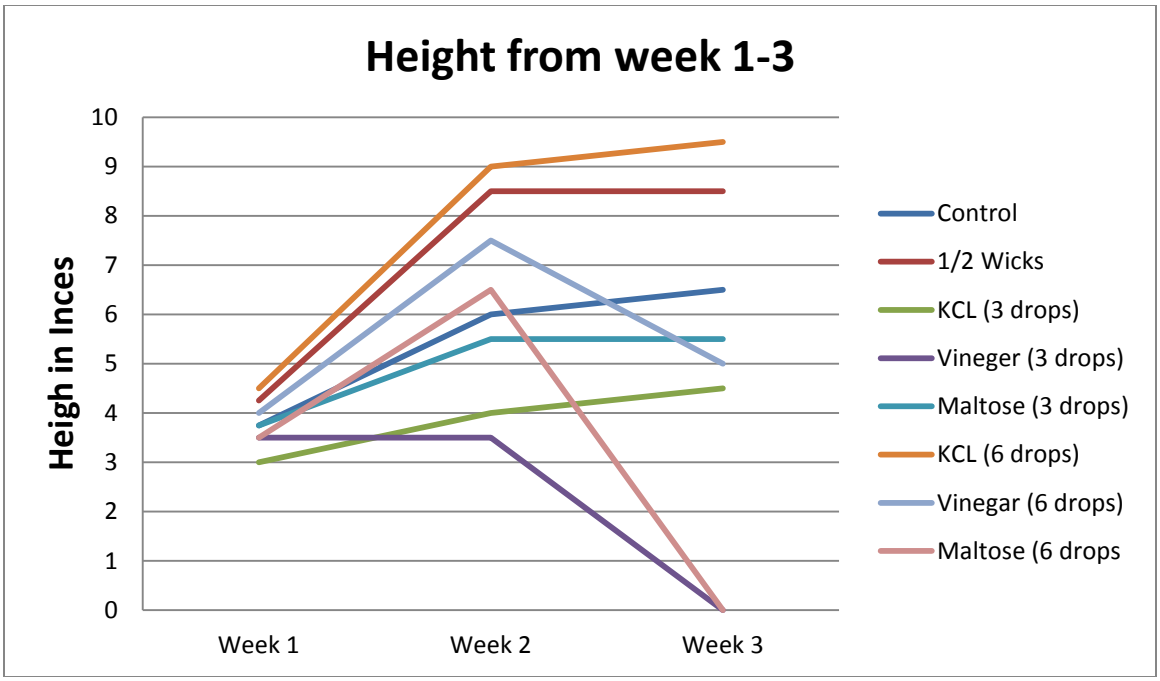
In our experiment we had 7 treatment groups and one control group of *Brassica rapa* planted with four replicated for every quad to ensure the results. Once a week we would add our solutions and take measurements of the heights of the fast plants. The solutions we added with a pipet were vinegar, maltose, and KCL. Each solution had two quads, one with three drops added per week and one with six drops added per week. By adding different amounts of the solutions we could find out if the amount of the solution had an effect or if it was just the solution itself. There were six treatments with solutions in them, one with ½ diamond wicks and no additives, and the control which was completely unaltered. To keep the plants and the soil

moist we used a water reservoir with a water mat dipped into it which would allow the plants to be constantly watered.

RESULTS

As you can see by referring to table 1, the measurements seemed to vary in many different ways. From week 1 to week 2 all the measurements seemed to rise with an exception to the ones with the three drops of vinegar solution. From week 2 to week 3 the measurements seemed to stay about the same height with minor fluctuations.

TABLE 1	Week 1		Week 2		Week 3	
Control	3.25 in	3.75 in	4 in	6 in	4 in	6.5 in
	2.5 in	3.5 in	5.5 in	5 in	5.5 in	5 in
1/2 Wicks	3.25 in	4.25in	6.25 in	5 in	6.5 in	5 in
	4 in	3 in	5.5 in	8.5 in	5.5 in	8.5 in
KCL (3 drops)	2 in	3 in	4 in	4 in	4.5 in	4.5 in
	2.5 in	2.75 in	4 in	3.5 in	4 in	3.5 in
Vinegar (3 drops)	2 in	2 in	Dead	3.5 in	Dead	3.5 in
	1.75 in	3.5 in	Dead	Dead	Dead	Dead
Maltose (3 drops)	3.75 in	2.25 in	5 in	3 in	5.5 in	3 in
	2 in	3.75 in	2 in	5.5 in	3 in	5.5 in
KCL (6 drops)	1.75 in	4.5 in	1.5 in	9 in	2.5 in	9.5 in
	2.5 in	5 in	4.5 in	6 in	4.5 in	6 in
Vinegar (6 drops)	2.5 in	4 in	3.5 in	5 in	3.5 in	5 in
	2 in	3.75 in	3 in	7.5 in	3 in	2.5 in
Maltose (6 drops)	1.25 in	3.5 in	2 in	6.5 in	Dead	Dead
	1.5 in	2.5 in	4 in	3.5 in	Dead	Dead



* Measurements were taken from the highest one per week for each

Graph-1

Graph-1 gives a better example of the growth of the plants from week 1 to week 3. Most of the plants seemed to rise and then steady off. But a few plants had a rise in height and then dropped significantly.

DISCUSSION

We had many different results throughout our experiment that you can draw many conclusions from. Our hypothesis was that with these solutions added to the plants, they would not grow as tall as the plants that had nothing added to them. The control grew at a steady pace, and grew from week to week. The ½ wicks that also had no additives grew even taller than the control from week 1 to week 2, and then it stayed about the same height from week 2 to week 3. Only three of the plants showed any form of decreasing in size, and two ended up dead by the third week. From our observations it seems that KCL did not kill the plant, and seemed to grow a good amount. Vinegar seemed to have the opposite effect killing one plant,

and decreasing drastically in the other from weeks 2-3. And then Maltose had two different effects depending on the amount added. When adding 6 drops of Maltose the pants died, but when adding only 3 drops the plants showed a small growth. In all cases except for the 6 drops of KCL all the solutions seemed to slow the growth rate, or decrease the growth by a substantial amount. In the experiment done previously as stated in the introduction, 50% of the plants died when their substance (LD_{50}) was added. As you can see some two of the plants died in our experiment. And maybe one more would die after another week or two. But still there was a much greater amount than 50% surviving.

CONCLUSION

In conclusion of our experiment we found that by the end of three weeks most of the plants with the solutions did not grow as tall as the plants without the solutions. This is with exception to the one plant that we assed six drops of KCL to. So it seems that our hypothesis that the chemicals would cause the plants to not grow as tall as the plants without the chemicals was pretty close. After reviewing our data it seems that the chemicals have a negative effect to cause the plant to grow at a slower rate, and even in some cases die. So as far as our experiment goes it seems that the substances in the environment do have an effect on the growth of plants.

LITERATURE CITED

1990 Wisconsin Fast Plants, University of Wisconsin-Madison, College of Agricultural and Life Sciences Department of Plant Pathology, 1630 Linden Drive, Madison, WI 53706 1-800-462-7417 wfp@fastplants.cals.wisc.edu

http://www.fastplants.org/pdf/activities/bioassays.pdf