

The Effect of the Amount of Miracle Gro All Purpose Plant Food on the Number of Tomatoes Produced by the *Solanum lycopersicum* Tomato Plants

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(Title and Authors clearly stated. Title should include the independent and dependent variable)

INTRODUCTION

The introduction has three parts: 1) The question asked, 2) Background context – where does this questions fit with what is known, and 3) Your hypothesis presented in an “if ... then” statement. In addition, a prediction should be included describing the type of data that would support your hypothesis. Pictures are always helpful.

Question: Does adding more Miracle Gro All Purpose Plant food fertilizer to tomato plants increase the number of tomatoes produced?



Background: This experiment was performed to investigate whether adding Miracle Gro All Purpose Plant food fertilizer containing nitrogen phosphorus would increase the number of tomatoes produced. Their advertisements claim that it would yield 50% more tomatoes and this experiment tested to see if their claim is accurate (Thumb).

Hypothesis: If more Miracle Gro All Purpose Plant food fertilizer is added to tomato plants, then more tomatoes will be produced. The plants receiving the most amount of Miracle Gro All purpose Plant food will have at least 50% more tomatoes than the control group receiving no fertilizer.

METHODOLOGY

Describe the steps you took in paragraph format in enough detail so that others can repeat it. Include quantities, concentrations, volumes, mass, length, etc whenever possible. Identify the control group, experimental groups, constants, independent variable, and dependent variable.

Four groups of the tomato plant species *Solanum lycopersicum* was used in this experiment. Each group contained 20 plants that were planted as seeds and kept under the exact same conditions, except for the amount of fertilizer. Each seed was given its own 10 inch pot, 100 grams of Miracle Gro potting mix soil, given 50 ml of water daily, kept under 21 °C with continuous grow lights. Group 1 was the control group and received 0 grams of fertilizer each week. Group 2-4 were the experimental groups containing various amounts of fertilizer each week as follows: Group 2 received 10 grams, Group 3 received 20 grams and Group 4 received 30 grams per week. The amount of fertilizer is the independent variable. The number of tomatoes was counted (the dependent variable) at the end of 4 weeks. The average number of tomatoes per group was determined.



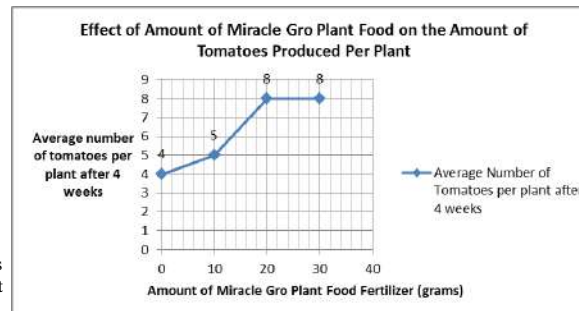
Present data in clearly labeled tables, titled graphs and titled charts. All graphs should have properly labeled axes, legends if appropriate, color coding for easy reading. Units of measurement should always be provided. Write a one to two sentence caption under each one that highlights and describes the data being presented. Save any conclusions for the Discussion section.

Table 1

Group number	Amount of Fertilizer Added (Grams)	Average Number of Tomatoes per plant after 4 weeks
1	0	4
2	10	5
3	20	8
4	30	8

Table 1 shows the average number of tomatoes per plant as the amount of fertilizer is changed.

Graph 1



Graph 1 shows that both 20 grams and 30 grams of fertilizer produced the most number of tomatoes per plant.

LITERATURE CITED

Include all work mentioned in your presentation.

Thumbs, Green. "Miracle Gro Plant Food is a Miracle!." *Daily Mail* [London] 19 July 2013: n. pag. *InfoTrac NewsStand*. Web. 23 Sept. 2013. <<http://go.miraclegro.com>>.

Revisit your hypothesis. Was it supported? What do your results mean? Point out the significance of your results. Provide a biological explanation for your results. If the results are unexpected or contradictory, you should attempt to explain why and point out possible avenues for further research. What further questions do you still have? Discuss any weaknesses in your experimental design or problems with the execution of your experiment. What further investigation would you like to do next?

Our hypothesis was: if more Miracle Gro All Purpose Plant food fertilizer is added to tomato plants, then more tomatoes will be produced. Our data partially supported this hypothesis. The average number of tomatoes increased from 10, 11, and 13 when 0 grams, then 10 grams, and 20 grams respectively were added to the plants. However, as even more fertilizer was added (30 grams), only 10 tomatoes grew which is the same number as the control group receiving 0 grams of fertilizer. It seems that adding fertilizer to a certain amount did increase the number of tomatoes, and adding more fertilizer after that amount did not increase the number of tomatoes.

A biological explanation for the increase in tomatoes from 10-20 grams of fertilizer is added, is perhaps due to the nitrogen and phosphorus that is in the fertilizer. Nitrogen is needed for protein synthesis and phosphorus is needed to build DNA, RNA and ATP. Perhaps these elements were in limited quantities in the potting soil. By adding more from the fertilizer, more proteins could be made such as enzymes that speed up chemical reactions and other proteins that act as cell signals such as hormones. Perhaps these proteins signal cells to divide and increase cell division, thus producing more tomatoes. This data does support the advertisement's claim that 50% more tomatoes will grow. Without Miracle Gro, four tomatoes grew. With 20 grams and 30 grams Miracle Gro, eight tomatoes grew, which is 100% more tomatoes!

The data also show that there is a certain amount of fertilizer that helps in growing tomatoes. If any more is added, it does not increase the number of tomatoes. This is seen on Graph 1 where both 20 grams and 30 grams of Miracle Gro produced the same number of tomatoes, eight. It seems that plants need a certain amount of nitrogen and phosphorus, and any additional amounts will be in excess and not be needed.

It would be interesting to determine if adding more than 30 grams of Miracle Gro would have the same effect as 30 grams. Or would it damage or stunt the growth of the plants?

We found that keeping everything except the Miracle Gro Plant Food amount constant was difficult. It was hard to place the lights evenly around the plants, so perhaps some plants received more light than others. Further experiments would try to minimize this.

RESULTS

DISCUSSION