Pothos in Potassium

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Intro:

In plants, potassium is a promoter for carbohydrate movement and food production in photosynthesis. “It’s involved with enzyme activation within the plant, which affects protein, starch and adenosine triphosphate (ATP) production. The production of ATP can regulate the rate of photosynthesis.”(Kaiser and Rosen 2014) This overall increases root growth which is why it is an excellent fertilizer for plant. The hypothesis was that the plants with the most potassium would have the most root growth. The null was that the amount of potassium would not affect root growth. How does the amount of potassium affect root growth?

The experiment investigates the optimal amount that should be given to Epipremnum aureum plants for root growth. Using a K2O solution in different concentrations the root growth was compared. “Plant tissues analyze the form in these fertilizers and convert it in a more bio-available form.”(Tajer 2016)

Materials

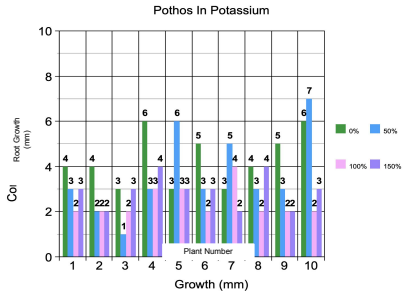
-glass vials
-pothos cuttings
-seaweed extract
-pipettes

Methods:

-take cuttings of a pothos plant making sure that the cutting is beneath the node
-label each cutting and place it in a tube
-fill each tube with 25 ml of the correct concentration of potassium solute
-let sit for 1 week and check back on root/node growth

Results:

After a week, the data collected shown in the graph measures the growth in millimeters per plant. A T-test was performed to compare the results to the control and show how effective the potassium solution was for root growth. The 50% solution had a P-Value of 0.149. This is over 0.1 and does not embraces the null hypothesis. The 100% solution has a P-value of 0.0017 and the 150% solution had a P-Value of 0.0022. These values are very low, but are less than 0.05 meaning we can reject the null hypothesis.



The graph visualizes the root growth between the different concentrations of potassium. Green is 0% concentration, Blue is 50%, Pink is 100%, and purple is 150%. The X-axis is the number given to the plant and the Y- axis is the total growth over the week.

	0%	50%	100%	150%		
1	4	3	2	3		
2	4	2	2	2		
3	3	1	2	3		
4	6	3	3	4		
5	3	6	3	3	*when compared to control	
6	5	3	2	3	T-test	P-Value
7	3	5	4	2	50%	0.1488575319
8	4	3	2	4	100%	0.001695835113
9	5	3	2	2	150%	0.002202419381
10	6	7	2	3		

*Measured in mm from base of plant

Data table of recorded root growth in millimeters. Data was collected after a week.

Pothos plants were divided, numbers and put into concentrations of potassium. This was the set up of the vials which were then placed in a sunny area to grow for a week.

After a week, the roots were taken out and examined for their root growth. The were still separated and keep numbered for their data.

We checked root growth by how much the major node has grown. This is a clipping that was placed in 0% concentration and has shown growth through the stretch marks and change in length.

As mentioned in the conclusion, there were roots that began to grow to avoid the glass. This root is an example of the phenomena.

Conclusion:

With the results, the water solution was the most effective growth solution for the roots. Each P-Value was out of range and came to the conclusion of potassium not aiding in root growth within Epipremnum aureum.

There are many reasons that could point to these answers such as not allowing the roots time to grow to their full potential as well as space inhibiting growth. One of the roots was seen creating a new root shoot instead of growing into the glass. Another potential reason could be sunlight and having more light on the 0% and 50% solutions. It can also be the fact that the plants were placed in water instead of soil. This can prevent other minerals from being absorbed by the plant and stunt the growth of roots.

Cited Sources:

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Daniel E. Kaiser and Carl J. Rose (2014). . *Potassium for crop production.* https://extension.umn.edu/phosphorus-and-potassium/potassium-crop-production