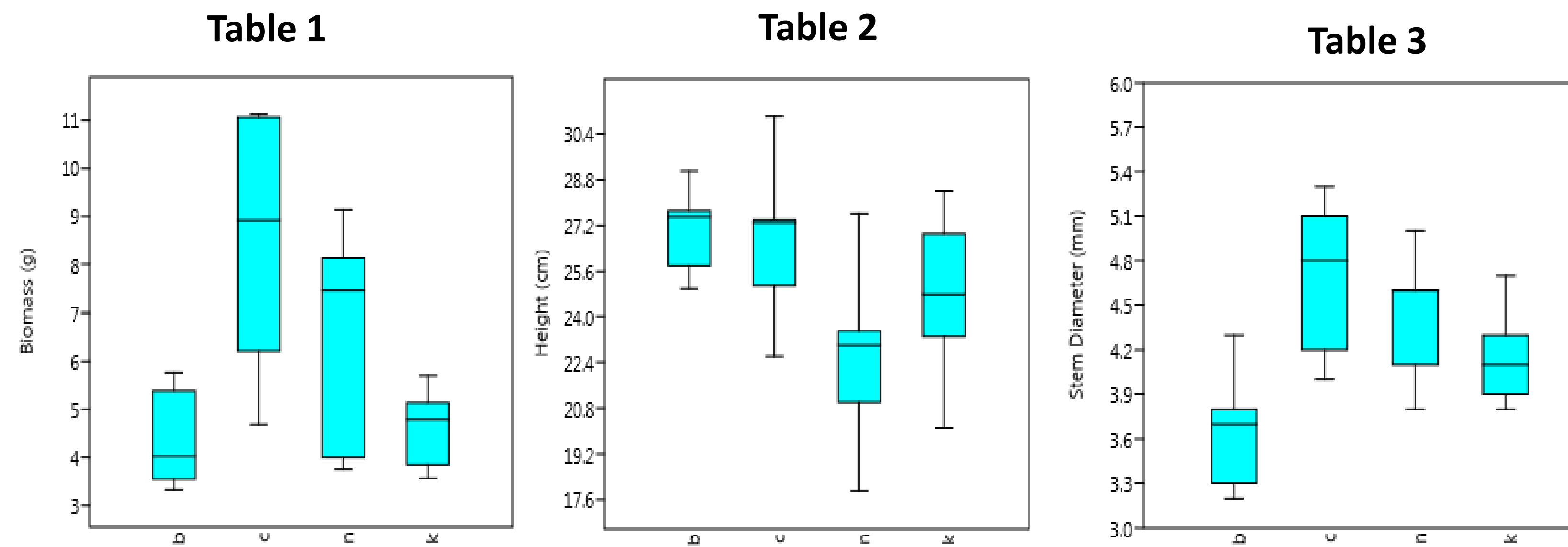


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Introduction

- Our experiment aims to either prove or disprove the fable that one should throw a banana peel outdoors under the impression that it will help the plants that it lands in.
- A banana peel is 42% Potassium—this is extremely high when compared to manure at 0.5%, wood ash at 10%, and cantaloupe rinds at 12% (Reed 2016).
- Potassium is needed for enzyme activation, which is essential for chemical reactions to take place within the plants. It promotes movement of water and nutrients between cells as well as cell elongation (“Potassium in Plants” 1998).
- In a study, added potassium resulted in increased root biomass, length and root tip count (Lixia et al 2016).
- In another study, soil that was treated with potassium showed greater growth and higher yield of maize as opposed to the control group with no added potassium (Amanullah et al 2016).
- Biomass yield, head diameter, head length, head weight and seed yield were the greatest in the sunflowers (*Helianthus annuus*) given the highest amount of potassium (Chhrajro et al 2014).
- We hypothesize the inclusion of a banana peel within the soil of a seedling will lead to the greatest plant growth due to the abundance of the macronutrient potassium that is essential for cell elongation.

Picture 1



| Stem Diameter (mm) | |
|--------------------|---------|
| c | k |
| b | 0.00198 |
| | 0.0258 |

| Height (cm) | |
|-------------|---------|
| n | |
| b | 0.04784 |
| c | 0.08173 |

| Biomass (g) | |
|-------------|---------|
| c | k |
| b | 0.01273 |
| c | 0.0215 |

Table 1 shows the results of stem diameters after week 4. The chart below shows the statically significant p-values.

Table 2 shows the results of height measurements after week 4. The chart below shows the statically significant p-values.

Table 3 shows the results of biomass weight after week 4. The chart below shows the statically significant p-values.

KEY: Banana-b, Cantaloupe-c, Control-n, Potassium-k

Results

Using Tukey’s comparison t-test, with an alpha of 0.05, the data displays the correlation between the four experimental groups. The null hypothesis states that there was no correlation between plant height growth and banana fertilizer. Due to the p-value between banana (b) and control (n) being statistically significant, we gathered enough evidence to reject the null hypothesis. This being said, when comparing banana and cantaloupe (c) in stem diameter and biomass the cantaloupe group was significantly higher than the banana. But, the cantaloupe group, in regards to height, did not show enough evidence when in comparison to the control group since the p-value was greater than .05. Also measured was the leaf width, length, and count but these displayed no significant data.

Week #2 Treatment applied to plants.
 From left to right: Control, cantaloupe, banana , potassium

Materials & Methods

Overall Process

- During the second and third week of incubation, we added 10 milliliters of potassium fertilizer (complete nutrition), potassium deficient fertilizer, and 2.5 grams of banana peel grinds, and cantaloupe grinds to the appropriate sections.
 - Throughout the four week period, we measured height (cm), leaf length (mm), leaf width (mm), number of leaves, biomass (grams), and stem diameter (mm).
 - During the fourth week, we cut the plant at ground level using a razor blade and then measured its biomass from shoot to tip.
- ### Drying Process
- After the banana peels and cantaloupe rinds were dried in the oven, they were placed separately in a blender and then grinded up into a powdery substance during week two and three.
 - We placed 2.5 grams of banana and cantaloupe, and 10 milliliters of potassium fertilizer into their appropriate sections.
 - We placed 10 milliliters of potassium deficient fertilizer on all 20 plants throughout the four-week period.

Discussion/Conclusion

Our data concluded that the *Helianthus annuus* banana trial group had a greater mean height measurement in comparison to the control group. However, the banana group also had the smallest stem diameter and biomass measurement. With the combination of stem diameter and biomass, we have to question whether or not the banana is the real winner. The cantaloupe fertilizer had insignificant height growth, but much larger biomass and stem diameter. This could be due to the lower percentages of potassium creating a greater space for other nutrients that resulted in these areas of growth. To even greater prove this theory, the potassium only fertilizer produced no significant results; so other nutrients must be necessary for optimal plant growth. Due to the statistical evidence of the banana group and control in regards to height gives evidence to prove our hypothesis.

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