

Peptides: It's Role on Plant Growth and Soil Bacteria



Presenter:  
Anna Krzyzanowski

**Background:** As the world population continues to grow, the need for suitable food sources grows with it. The farming industry continues to explore new ways to grow food faster to combat this problem effectively. The goal of this experiment is to test the effectiveness of peptide additives in the growth of plants.

- Methods:**
1. Corn, wheat, tomatoes, soybeans, and bell peppers were planted in a self watering container.
  2. High (10mL) and low dose (5mL) of amino acids were added to the plant soil.
  3. The plant height and number of leaves were measured twice a week.
  4. After 15 days soil samples were collected from each plant and a 5-fold serial dilution performed on all samples. The  $10^3$  and the  $10^5$  dilution were plated to observe individual colony morphology.
  6. These procedure was repeated at 30 days after planting.



Figure 1: Plant setup

The addition of amino acids to the soil does not affect plant growth or the type of soil bacteria produced.

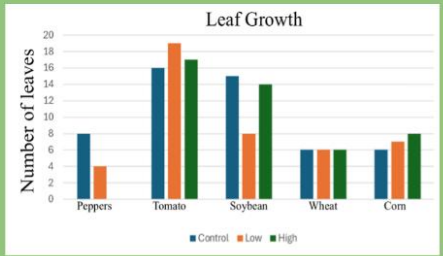


Table 1: Number of plant leaves

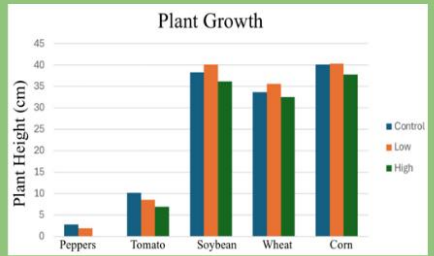


Table 2: Plant height

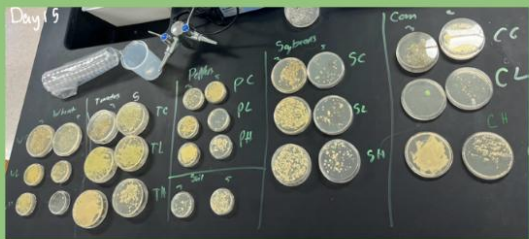


Figure 2: Day 15 plates

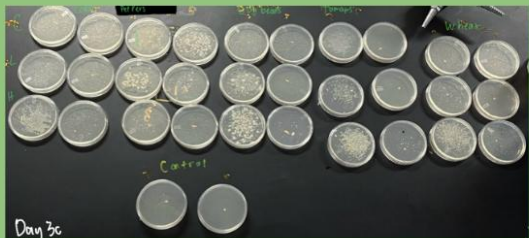


Figure 3: Day 30 plates



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- Discussion:**
- In regard to the soil bacteria, there was no difference between the control, low, and high dose in the number of bacteria colonies present in any of the plants. Along with this, there was no difference in the morphology between the control, low, and high dose plates. All plates showed the same morphological change throughout the dilutions. The day 15 plates showed the circular yellow bacteria replaced by punctiform white colonies by day 30. This implies that the change in morphology is likely not a direct correlation to the addition of the peptides.
  - This change in soil bacteria is assumed to be because of the symbiotic relationship between the soil bacteria and the plant as different types of bacteria may be needed through the developmental stages (Hayat, R., et al., 2010).
  - In regard to plant height, there was no difference between the control, low, and high dose in any of the plants.
  - Current literature supports that amino acids should make plants emerge faster because of the increased energy source and improved photosynthesis rates and chlorophyll biosynthesis (Warke, V. G., et al., 2023).
  - Future studies should focus on the growth of bacteria using different concentrations of amino acids.

**References:** Hayat, R., Ali, S., Amara, U. *et al.* Soil beneficial bacteria and their role in plant growth promotion: a review. *Ann Microbiol* 60, 579–598 (2010). <https://doi.org/10.1007/s13213-010-0117-1>  
 R. S., S., Warke, V. G., Mahajan, G. B., & Annapure, U. S. (2023). Effect of amino acids on growth, elemental content, functional groups, and essential oils composition on hydroponically cultivated coriander under different conditions. *Industrial Crops and Products*, 197, 116577. <https://doi.org/10.1016/j.indcrop.2023.116577>  
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