

Brine Shrimp Integration in Hydroponics: The Role of Brine Shrimp in Nutrient Optimization

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Abstract

This research investigates the potential benefits of integrating brine shrimp (Artemia spp.) into hydroponic systems to enhance plant growth through increased nitrogen availability. Over a 30-day simulation, plants were monitored for growth patterns with brine shrimp supplementation. Findings indicate that brine shrimp, containing 71% protein, significantly contributed to nitrogen levels when converted by fish, resulting in a cumulative growth of 12 cm, with a notable 50% increase in the second half of the study. This study highlights the potential of using brine shrimp to optimize hydroponic systems and suggests further exploration into sustainable aquaponic practices.

Introduction

• **Background Information:** Hydroponics is a method of growing plants without soil, relying on nutrient solutions. Integrating aquatic organisms like brine shrimp can enhance nutrient profiles and promote plant health.

• **Research Question:** How does the addition of brine shrimp affect plant growth in hydroponic systems?

• **Objectives:** To determine the impact of brine shrimp on nitrogen availability and overall plant growth in a hydroponic environment.

Literature Review

• Existing research shows that nitrogen is vital for plant growth, often sourced from organic matter or fertilizers.

• Studies have explored various aquatic organisms in hydroponics but rarely focus on the specific benefits of brine shrimp.

• This research aims to fill the gap in understanding how brine shrimp can optimize nutrient delivery in hydroponic systems.

Methodology

- **Study Design:** Experimental study utilizing a hydroponic system with controlled variables.
- **Participants:** Hydroponic plants grown in a system supplemented with brine shrimp and fish.
- **Data Collection:** Growth measurements were taken bi-weekly, tracking height increase.

• Analysis: Comparative analysis of growth rates before and after brine shrimp addition, focusing on nitrogen impact.

Results

• Growth Measurements:

- First 15 Days: Plant growth averaged **4 cm**.
- Next 15 Days: Plant growth averaged **8 cm**.

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- Total growth over 30 days: 12 cm, indicating a 50% increase in growth rate in the latter half.
 Nutritional Content:
- Brine shrimp: **71% protein**.
- Fish food: **35% protein**.

Discussion

• **Interpretation of Results:** The integration of brine shrimp effectively enhanced nitrogen levels, supporting increased plant growth.

• Limitations: Factors such as environmental conditions and specific plant species may influence results.

• **Implications:** This study suggests that brine shrimp can be a valuable addition to hydroponic systems, potentially improving sustainability and yield.

Conclusion

The research demonstrates that incorporating brine shrimp into hydroponic systems can significantly enhance plant growth through increased nitrogen availability. Future studies should explore the long-term effects of brine shrimp and the optimization of aquaponic systems.

References

Aquaculture of Brine shrimp research project by wikepedia

Appendices

Protein amount in fish food of 35 % by Taiyo Aini fish food