Does Temperature and Oxygenation Method in a Deep-Water Culture Hydroponic System Affect Lactuca sativa Growth?

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The agricultural industry is striving to increase the world's food supply systems to meet future needs, and hydroponics can be a crucial tool in this endeavor. This study aimed to enhance the effectiveness of hydroponics by identifying optimal conditions for hydroponic solutions. The research sought to determine whether there is a link between hydroponic solution temperature and increased usable product by studying solutions maintained at 15°C, 20°C, and 25°C, with each oxygenation method: Diffusion, Bubbler, and Ionization. The hypothesis proposed that temperature would not have any significant impact on plant growth in deep-water culture systems. To conduct the research, permission was granted by an advisor and principal to use a large portion of the high school greenhouse, where nine systems were set up, representing the three temperatures and three oxygenation methods. Each system contained 10 gallons of hydroponic solution and ten plants. The setups remained undisturbed for two weeks, with consistent temperature and oxygenation levels maintained. After two weeks, the plants were harvested, and data was collected. The data was then charted and graphed for analysis and comparison, and a t-test was conducted to test for significant differences. Based on the research findings, the hypothesis was proven false, indicating that temperature plays a crucial role in influencing final plant production. The best outcomes were observed at a temperature of 20°C, and either the Bubbler or Ionizer can be selected based on preference and usage.

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