A Comparison of Growth in Solanum iycopersicum and Brassica oleracea Planted in Aquaponic and Hydroponic Systems

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Our research focused on the idea of growing plants without soil, leading to our question: Do plants grown in hydroponics- using a synthetic fertilizer- or aquaponics- using fish fertilized water- have a statistically significant difference between them? To establish universality between the two methods, independent variables, except the fertilizers, were kept the same. We germinated kale and tomato seeds due to their hardiness and rapid growth rate. The juvenile plants were placed into pots where they grew in either goldfish, bluegill, tilapia or synthetically fertilized water, pumped in periodically by a dosing pump. From that point forward, the only difference between each set of plants was the type of water being cycled through each system. The plants were then left to grow and mature. We took records of each plant's height, stem width, and root length after they cycled through the system for two months. The plants in fish water generally had larger plant heights, wider stems, and longer roots as compared to the plants in the synthetic fertilizer. Analysis of the fish fertilized plants after running an ANOVA showed p-values of .0001 for height, 2.1153*10^-7 for root length, and 2.7852*10^-5 for stem width, all of which were less than .05 when compared individually to the synthetically fertilized plants, indicating a statistically significant difference between the measured parameters. In conclusion, plants grown in the aquaponic system did significantly better than those grown in the hydroponic system, with the goldfish system showing the best results. These ideas can be applied to smaller-scale aquaponic systems used for common plant growth in home-based gardens that provide compact and easily accessible food sources in your backyard.

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