Effects of Hydroponic Growth on Antioxidant Levels of Lactuca sativa

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The purpose of this research was to determine if hydroponically or soil-grown lettuce would produce higher levels of antioxidants. Antioxidants are an important substance found in many nutritious foods that combat cell damage. For this experiment, lettuce was grown in both soil and hydroponic conditions. Next, the lettuce leaves were frozen, then crushed and made into a solution with distilled water. Then, nano-cerac paper sensors were created using Cerium IV oxide and filter paper. A control was created using a known antioxidant, gallic acid, in order to compare results. Next, the gallic acid and lettuce tests were conducted by creating serial dilutions using a micropipette and a 96 well plate. The dilutions were deposited on the sensor paper and then the sensor papers were scanned on a color scanner. Next, using a computer application, the amount of blue index was recorded for each dilution. The results of this experiment were then graphed and compared against the control. The soil-grown lettuce had a quarter of the antioxidants as the known control and the hydroponic lettuce had less than that at a level of 0.21. The hypothesis was supported by the evidence indicating the lettuce grown in the soil medium produced 4% more antioxidants than the lettuce grown in the hydroponic growing medium.

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