Iodine Biofortification of Lactuca sativa var. longifolia in an Ebb and Flow Hydroponic System

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Iodine deficiencies are a major problem around the world, especially in developing nations where people do not get all the nutrients they need from their diets. Currently, iodized salt is the main solution to this problem, but it does not fully resolve the issue. This study examines the effect of two forms of iodine on the concentration of iodine in Romaine lettuce when grown in a hydroponic system. It also evaluates whether or not the medium in which the plant is grown has any effect on this process. The choice to grow the lettuce plants in a hydroponic system was made because of its application to developing nations where water is scarce and funds are low. Hydroponics uses less water and is generally a more efficient method. Romaine lettuce plants were grown for 5 weeks and later were harvested and tested for the concentration of iodine using atomic absorption spectrophotometry and the Beer-Lambert Law. To do this, a graph was made using known concentrations of potassium iodide/ iodate treated with 4 drops of bleach and 2 drops of starch solution, analyzing them in a spectrophotometer, and relating a specific concentration to its corresponding absorption value. The lettuce leaves were analyzed in the same way, and the experimental data was compared to that graph to determine a concentration. These steps were repeated twice, with both iodide and iodate. The control group contained an average of 0.0015 M iodide, while the first trial contained 84.6% more iodide, containing an average of 0.0037 M iodide. The second trial containing iodate contained an average of 0.0015, indicating that the lettuce did not absorb any additional iodine. This is significant because adding iodine to foods on a large scale could help combat iodine deficiencies.

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