The Biofortification of Raphanus sativus With Calcium Through Irrigation With Ca2+ Solutions

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Micronutrient deficiencies, also known as hidden hunger, occur when an individual does not receive an adequate amount of an essential vitamin or mineral, and it affects more than two billion people across the globe. Specifically, hypocalcemia, or calcium deficiency, causes a wide-range of symptoms that affect many different body systems. This research addresses the calcium of biofortification of Raphanus sativus through irrigation with Ca2+ solutions. A total of 180 R. sativus plants were grown in a controlled environment and treated with varying concentrations of Ca2+ irrigation water. We hypothesized that increasing the amount of calcium available to the plant would increase the amount of calcium present in the mature plant. If increased calcium in irrigation water significantly increases the calcium content of mature R. sativus plants, this technique could be used to increase the calcium content of other crops in areas with high rates of hypocalcemia. Growth data were collected for all plants in all groups, and the group that received the highest concentration of Ca2+ was significantly smaller than all but one other group. A random sample of four plants from each group was tested for calcium and magnesium content using an atomic absorption spectrophotometer. Leaf sample data revealed no significant difference in Ca or Mg content; however, root sample data proved there to be a significant difference in both Ca and Mg content across several trial groups. These results demonstrate that irrigation with Ca2+ solutions does not increase the calcium content of mature plants.

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