

## Selenium and iodine enrichment of sweet basil and lettuce plants grown in two different hydroponic systems

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The goal of this study, conducted on sweet basil and baby-leaf lettuce, was to investigate the effects of two hydroponic techniques (floating system and aeroponics) and the addition of potassium iodide (KI) and sodium selenate ( $\text{Na}_2\text{SeO}_4$ ) to the nutrient solution, on plant growth, iodine and selenium content and leaf quality attributes, including the content of pigments, phenols, nitrates, and the antioxidant capacity. Plants of basil and lettuce were supplemented with 50.7 or 8.9  $\mu\text{M}$  of sodium selenate, respectively, and with 20  $\mu\text{M}$  of potassium iodide. Our data revealed that 20  $\mu\text{M}$  of I plus 50.7  $\mu\text{M}$  of Se were not toxic to basil plants in both cultivation system, but 20  $\mu\text{M}$  of I plus 8.9  $\mu\text{M}$  of Se resulted in toxic effects to lettuce plants, reducing the biomass production. Thus, 20  $\mu\text{M}$  of I plus 50.7  $\mu\text{M}$  of Se in the nutrient solution appeared suitable for biofortification of basil, avoiding possible toxic effects. Sweet basil resulted a better candidate for I and Se biofortification in view of the higher I and Se accumulated in the leaves and the lack of plant biomass reduction. The results highlighted that I biofortification was more effective in aeroponics compared to floating system in both species. Se biofortification was more effective in aeroponics only for lettuce plants, since no difference between cultivation system were detected in sweet basil. The consumption of 5 g of leaves of sweet basil grown with 20  $\mu\text{M}$  KI and 50.7  $\mu\text{M}$  of  $\text{Na}_2\text{SeO}_4$  in the nutrient solution, cultivated with the protocol described in the present experiments, might represent a good I and Se dietary supplement. As for lettuce plants grown with 20  $\mu\text{M}$  KI and 8.9  $\mu\text{M}$  of  $\text{Na}_2\text{SeO}_4$ , the consumption of 50 g of enriched leaves may be considered a good Se dietary supplement, but it provide a I amount higher than the Recommended Dietary Allowance, even though still below the toxic threshold.

**Keywords:** biofortification, dietary supplement, leafy vegetables, aeroponics, floating system.