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Addition of selenium to the growing substrate for Se enrichment of edible plant parts

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Selenium is an essential micronutrient with multiple roles in the growth and functioning of living cells in higher animals and humans.

Selenium can act as an antioxidant. It has been identified as a cofactor of the enzyme glutathione peroxidase, catalyzer of the reduction of peroxides which can damage cells and tissues. According to the National Academy of Sciences of the United States the recommended levels for selenium supplementation in humans range from 50 to 200 mcg/day. A deficient selenium status can be reversed by selenium supplementation. This has aroused interest in increasing and/or modifying the Se content in plants used for animal or human diets. Since in many Se-enriched plants part of Se is in the organic form, which is more available than the inorganic one, consumption of these plants appears to be beneficial.

Selenate and selenite are the major inorganic forms readily absorbed by plants and can be converted to organic Se, but selenate is the most predominant inorganic form found in both animal and plant tissues.

Results of an experiment conducted on *Solanum lycopersicum* plants, grown in pots and treated with 10 mg Se kg^{-1} added as selenate to the soil, highlighted a reduced growth, a delay in the onset of senescence, and a prolonged vegetative period. A reduced production of ethylene, the hormone that has a primary role in plant senescence, was detected in treated fruit. The enriched Se vegetables may have a longer shelf life and longer-lasting quality because of a lower ethylene production.

Experiments conducted on *Chicorium intybus* L. e *Lactuca sativa* L. var. Acephala plants, grown hydroponically with nutrient solution containing 0.5 mg Se kg^{-1}, showed a longer shelf life and preserved quality in association with lower rates of ethylene biosynthesis in the enriched Se vegetables. Results suggested that the floating system can be used for improving vegetables quality with adequate Se concentration for the human diet.