

University of Zabol Management of graduate education Faculty of Agriculture Department of Horticulture and Green Space Sciences Dissertation for obtaining a master's degree in the field of horticulture and green spaces

Title:

Investigation of edible sprouts and microgreens of cilantro, sorrel and leek plants under enrichment with iodine, selenium, blue and violet light

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Abstract:

One of the new ways to deal with the lack of nutrients for humans is biological enrichment of plants. This method is one of the global priorities for adding vitamins and minerals. Iodine and selenium are essential elements for human health, and their deficiency is common in most societies. Fruits and vegetables are poor sources of iodine and selenium. The purpose of this research is to investigate the edible sprouts and microgreens of sorrel, cilantro, and salamander plants enriched with iodine and selenium under blue and violet light radiation to increase the nutritional value of these vegetables. For this purpose, two separate factorial experiments were conducted in the form of a completely random design with two factors of blue light (first factor) and iodine and selenium elements (\cdot , $\lambda\Delta$ and $\nabla \cdot$ micromol), and

seven treatments of nutrients including three concentrations of iodine (β , β and γ mg

per liter), three concentrations of selenium (\mathcal{F} , \mathcal{F} and \mathcal{T} mg per liter) and distilled water (control) was done and in the second experiment in order to investigate microgreens, seedlings were grown under three blue light treatments (zero, \mathcal{V} and

r• micromol) and at the two-leaf stage iodine solution was sprayed at three levels (r,

 \mathfrak{F} and \mathfrak{F} ml gram per liter) and selenium at three levels (\mathfrak{T} , \mathfrak{F} and \mathfrak{F} mg per liter) and the control treatment (spraying distilled water) was applied. This experiment was carried out in \mathfrak{T} repetitions in the form of seed cultivation containers and microgreen production in the research greenhouse of the Faculty of Agriculture of Zabul University. The duration of the exposure period in this experiment is \mathfrak{I} hours and

the duration of darkness is Λ hours. After the end of testing the indicators; Vitamin (C), total protein, total sugar, total anthocyanin, total carotenoid, antioxidant capacity, total phenol, total flavonoid, chlorophyll, dry weight of the plant and mineral elements including iodine, selenium, potassium, phosphorus, nitrogen and Calcium was measured. The results indicated that during the application of blue and violet lights, the amount of investigated traits such as protein, anthocyanin, phenol, flavonoid, antioxidant activity, photosynthetic pigments, vitamin C and the amount of elements iodine, selenium, potassium and Nitrogen increased in both growth stages of sorrel, cilantro, and salmathera plants compared to the control level, so that the highest amount of the above traits was observed during the application of blue light. On the other hand, during the treatment of iodine and selenium micronutrients, it was found that during the application of concentrations of Υ , \mathfrak{F} and

ho mg/liter of the above micronutrients, the amount of investigated traits increased, so that the highest amount of protein, anthocyanin, phenol, flavonoid, antioxidant activity, photosynthetic pigments, vitamin C and the amount of iodine, selenium, phosphorus, potassium and nitrogen elements were obtained during the application of selenium concentration of ho mg/liter.

Keywords: Bio-agronomical enrichment, Iodine, Light emitting diodes, Microgreens