



University of Zabol
Graduate school
Faculty of Agriculture
Department of Horticulture and Landscape

The Thesis Submitted for the Degree of M.Sc (in the field of Horticulture Science)

**Evaluation of horticultural and nutritional characteristics of Cinnamon Basil
(*Ocimum basilicum* cv. 'Cinnamon') under supplemental blue lighting and
biofortification with Selenium and Iodine**

Supervisors:

Dr. M. Rahimi
Dr. D. Ramezan

Advisors:

Dr. Z. Mohkami
Dr. Y. Farrokhzad

By:

A. Nourzaei

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Abstract

The iodine (I) and selenium (Se) deficiencies affect approximately 30% and 15%, respectively, of the global population. There are different strategies to deal with micronutrient deficiency. Biofortification with micronutrients in human food is increasing the concentration of micronutrients and their bioavailability in food, which seems to be the most sustainable and economical approach to prevent the lack of micronutrients in the human body. In this regard, in order to evaluation of horticultural and nutritional characteristics of Cinnamon Basil (*Ocimum basilicum* cv. 'Cinnamon') under supplemental blue lighting and biofortification with Selenium and Iodine, a three-factor factorial experiment (selenium, iodine and blue light) based on a randomized complete block design with three repetitions was performed in the research greenhouse of Zabol University. The results of the experiment showed that the morphological and phytochemical traits were affected by the treatment factors. According to the results, the combined treatment of 6 mg/l of selenium along with 6 and 4 mg/l of iodine without the presence of LED light provided the greatest increase in morphological traits. In traits related to length (stem length, internode length and root length), the presence of LED light was at the top of the experimental treatments and increased the length. The presence of LED light and the concentration of 4 mg/l of iodine alone and also with 6 mg/l of selenium also increased the content of soluble carbohydrates. Also, the concentration of 4 mg/liter of iodine in the presence of LED light improved and increased the phytochemical characteristics and the content of phosphorus element in this research compared to other tested concentrations. In general, considering the role and effect of 4 mg/l iodine treatment and the presence of LED light in improving the quality of cinnamon basil, this treatment is recommended for further studies.

Keywords: Essential oil composition, biomass, Nutritional elements, Yield