بسم الله الرحمن الرحيم

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بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

EFFECT OF SELENIUM AND SILICON ON VEGETATIVE GROWTH AND SEED YIELD OF COMMON BEAN

By

WATHIQ MANSOUR HMOOD

B.Sc. Agric. Sc. (Horticulture), Baghdad University, 1999

A Thesis Submitted in Partial Fulfillment
Of
the Requirements for the Degree of

MASTER OF SCIENCE
in
Agricultural Sciences
(Vegetable Crops)

Department of Horticulture
Faculty of Agriculture
Ain Shams University

2022

Approval Sheet

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ABSTRACT

Wathiq Mansour Hmood: Effect of Selenium and Silicon on Vegetative Growth and Seed Yield of Common Bean. Unpublished M.Sc. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2022.

Recently, the importance of the beneficial elements for humans, animals, and plants has been clarified. The beneficial elements promote plant growth in many plant species which comprise selenium, silicon, cobalt, and sodium. Nowadays, evaluating of the impact of beneficial elements such as selenium and silicon on the growth and productivity of various plant species has become a research trend. An experiment in a completely randomized block design in three replicates was conducted to evaluate the effect of foliar application of selenium in form of sodium selenite at 10, 20 and 30 µM, and silicon in form of sodium silicate at 0.5, 1 and 2 mM plus water as control treatment on vegetative growth, chlorophyll, mineral content of leaves and seeds, seed yield and quality of common bean (*Phaseolus vulgaris* L.) plants cv. Nebraska during two successive seasons of 2020 and 2021 at the Experimental Field of Horticulture Department, Faculty of Agriculture, Ain Shams University, Qalubia Governorate, Egypt. Results showed that all foliar applications of selenium and silicon significantly enhanced all the vegetative growth parameters, i.e., plant length, number of branches/plant, number of leaves/plant, vegetative growth fresh and dry weights and leaf area, yield and yield quality attributes such as pods yield weight/plant and 100 seed weight, mineral contents in leaves, i.e., N, P, K and Ca, also Se and Si in seeds as compared with control treatment. However, the selenium and silicon foliar applications had no significant influence on SPAD readings, Mg percentage in leaves, and N, P, K and protein percentage in seeds, and shelling percentage parameters. The highest significant values were obtained with Si 2 mM or 20 µmol. In conclusion, the foliar spraying of common bean (*Phaseolus vulgaris* L.) plants cv. Nebraska with Si at 2 mM or Se at 20 µmol might be a novel approach to enhance the growth,

yield and quality of the plants and improve the elements fortification at the food chain to humans.

Keywords: *Phaseolus vulgaris* L., Fabaceae, Beneficial elements and Elements fortification

ACKNOWLEDGEMENT

I'm deeply indebted to **Professor Dr. Mohamed Emam Ragab,** Professor Emeritus of Vegetable Crops and Former Vice Dean for Community Service and Development of Environment Affairs, Faculty of Agriculture, Ain Shams University for suggesting the current study, supervision and continuous guidance. Also, I would like to thank him for his kind support and revision of the manuscript of this thesis.

I'm deeply indebted to **Professor Dr. Sabry Mousa Soliman Youssef** Professor of Vegetable Crops, Faculty of Agriculture, Ain Shams University for his kind supervision, patriotic patience, energetic guidance, valuable advice in preparing, writing and revision of the manuscript. I will always remember his generous help.

I'm grateful to **Dr. Amr Abdel Fattah Hamed Ahmed Metwally,** Lecturer of Vegetable Crops, Faculty of Agriculture, Ain Shams University for his supervision, great support for writing and revision of the manuscript.

I'm deeply indebted to the **Al-Muthanna governorate, Republic of Iraq** and **Agriculture Directorate of Al-Muthanna** for their continuous encouragement and subsidization.

Also I wish to express my deep thanks to my **wife** and my **children** for their kind encouragement and sincere help.

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