PROPAGATION OF *MORINGA OLEIFERA* IN VITRO AND EFFECT OF LASER RADIATION ON GROWTH IN VIVO

By

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B.Sc. Agric. Sci. (Ornamental Horticulture), Fac. Agric., Cairo Univ., 2009
M.Sc. Agric. Sci. (Ornamental Horticulture), Fac. Agric., Cairo Univ., 2013

THESIS

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SUPERVISION SHEET

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Name of Candidate: Nada Atef Mohamed Zakaria Sarhan **Degree:** Ph.D.
Title of Thesis: Propagation of *Moringa oleifera* In Vitro and Effect of Laser Radiation on Growth In Vivo
Supervisors: Dr.Azza Mohamed Saed Arafa
Dr.Mona Ahmed Darwish
Department: Ornamental Horticulture
Approval: / /

ABSTRACT

The present study was carried out at the Experimental Nursery of the Ornamental Horticulture Department, and Plant Tissue Culture Laboratory of Vegetable Crops Department, Faculty of Agriculture, Cairo University and , Cairo university, to study the micro propagation behavior and investigate the effect of helium neon laser radiation on stimulation of vegetative growth and anatomical structure of *Moringa oleifera* seeds by using different power levels (5, 10 and 15) with different time exposure (1, 3 and 5 min.). The results showed that the best survival rate of sterilized seeds was obtained when using 1.5% NaOCl with 30 min. soaking period. 1/2 MS-medium supplemented with 3 mM BA and1 mM Kin treatment produced the highest number of shoots. The greatest rooting percentage was recorded on medium supplemented with 2.5NAA mM without adding IBA. The combination treatment between 0.5 mM IBA and 2.5 mM NAA achieved the largest number of roots. Treating the moringa seeds by He-Ne laser to 5min. time exposure led to the best results in number of branches and leaves for both seasons. 15mW at 3 min. gave the highest value of root length. Treatment that was not exposed to He Ne laser, produced the best shoot parameters (plant height, leaves fresh weight and stem diameter) which it might have benefit in dwarfing of moringa trees. Exposing *Moringa oleifera* seeds to He-Ne laser at 5 mW power in the first and second season resulted in significantly highest mean values in Chlorophyll a and total carbohydrates percentage. The maximum percentage of phosphorus and potassium were obtained when using 15 mW power of helium neon laser in two seasons. All He Ne laser treatments caused increment in leaf anatomical structure of moringa. The highest values of thickness of lamina, thickness of palisade tissue and thickness of spongy tissue were recorded by treated seeds with 15mw He-Ne laser power combined with 5 min. time exposure. Whereas Expose seeds to 5 mW laser power for 5 min. time exposure led to the highest value of thickness of midvein and midvein bundle (length width).

Key words: *Moringa oleifera*, In vitro, Laser radiation, Vegetative growth, Chemical composition, Anatomical structure.

DEDICATION

I dedicate this work to Whom my heart felt thanks, my dearest father and mother, my sisters, Noha and Nesma for their patience and help as well as to my friends Samah and Omnya for the support they lovely offered to me.

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LIST OF ABBREVIATIONS

BA **:** Benzyl adenine

IAA **:**Indole-3-acetic acid

IBA : Indole butyric acid

NAA **:**Naphthalene acetic acid

Kin **:** Kinetin

M **:** Molar

µM **:**1/1000 mM

µm **:**Micrometer

min. **:**Minute

mM **:**1/1000 M

MS **:**Murashige and Skoog medium

PEG **:**Polyethylene glycol

TDZ **:**Thidiazuron

Var. **:**Variety

mW **:**Milliwatt

He-Ne **:**Helium - Neon laser

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