PHYSIOLOGICAL AND BIOTECHNOLOGICAL STUDIES ON CELERY PLANT (*Apium graveolens* L. var.dulce mill.)

By

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B.Sc. Agric. Sci. (Biotechnology), Fac. Agric., Cairo Univ., Egypt, 2001
M.Sc. Agric. Sci. (Plant physiology), Fac. Agric., Cairo Univ., Egypt, 2012

THESIS

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APPROVAL SHEET

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Date: 22 / 12 /2019

SUPERVISION SHEET

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Title of Thesis: Physiological and biotechnological studies on celery plant (*Apium graveolens* L. var.dulce mill.)
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Department: Agricultural Botany
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ABSTRACT

This work was carried out during two successive seasons of 2014/15 and 2015/16 at Biotechnology, Phytochemistry Department and Farm of Applied Research Center of Medicinal Plants affiliated to the National Organization for Drug Control And Research(NODCR).

The present work aimed to study the effect of inoculation *Apium graveolens L*. seeds with biofertilizers [arbuscular mycorrhizal (AM) and/or microbein and/or plants sprayed with Thidiazuron (TDZ) fertilized with half or full dose of NPK on soil microbial activity,plant characteristiecs , chemical composition.as well as seed phytochemical analysis. The most important results could be summarized as follow:

The results in both seasons showed, inoculation of celery seeds with mycorrhiza and microbein under full or half NPK fertilizers increased soil microbial activity (number of AM fungi spores and its colonization % as well as hydrogenase and nitrogenase activies). Also, plant growth characteristics, chemical constituents, photosynthtic pigments, mineral nutrients and non- structural charbohydrates) as well as number of umbel and seedyield / pant were signifcantly increased with the inoculation of celery seeds with mycorrhiza and microbien under full NPK dose. Howerer, the reduction% in seed yield/plant induced from 1/2 NPK inocoulated with mycorrhiza and microbien reached 14.3% comparing with uninocoulated full NPK dose.Morever, the reduction in volatile oil yield reached 11.5% , from SDS-PAGE protein profile, no protein banding was found between 1/2 and full NPK dose. Meanwhile, three protein bands (53, 55 and 57 KDa). were found after inoculation with mycorrhiza. whereas, Two protein bands (20 and 37KDa) were found after inculation with microbein comparing with uninoculated treatments.

Key words. Celery, *Apium graveolens* L., chemical fertilizer, mycorrhizae, microbein, TDZ. Volatil oil.

DEDICATION

I dedicate this work to whom my heartfelt thanks; to my father, mother, wife Saadeya, my sons Moatasem and Shehab, my doughter Youmna and my uncle prof. Abdel Halim Sallam this work dedicated my friends.Dalia Abdel Halim and Nora Ahmed for the support they lovely offered throughout the period of my post graduation.

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LIST OF ABBREVIATIONS

a.i.	Active ingredient
AM	Arbscular Mycorrhiza
Chl. a	Chlorophyll a
Chl. b	Chlorophyll b
DAP	Day after planting
dd	distilled deionized water
DPPH	2,2'-diphenyl,1-picryl hydrazyl
FM or FYM	Farmyard manure
FRAP	Ferric reducing ability of plasma
GA_3	Gibberellic acid
GAE	Gallic acid equivalents
GLC	Gas liqued chromatogrphy
IAA	Indole-3- acetic acid
IBA	Indole-3- butyric acid
KDa	Kilo dalton
Kin.	Kintein
M. W.	Molecular weight
My	Mycorrhiza
Mi	Microbein
NODCAR	National Organization for Drug Control And Research
PGPR	Plants growth promoting rhizobacteria
ppb	Part per billion
ppm	Part per milllion
PSB	Phosphate solublizing bacteria
PTZ	Pentylenentetrazol
RBC	Red blood cells
TDZ	Thiodiazuran
TPF	Triphenyl formazon
TTC	Triphenyltetrazolium chloride
VAM	Vesicular arbscular mycorrhizae

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