HISTOCHEMICAL STUDIES ON REGENERATION OF DATE PALM *VIA* DIRECT ORGANOGENESIS

By

KARAM MOSTAFA SHAHAT ALI

B.Sc. Agric. Sci. (Agric. Prod. Division), Fac. Agric., South Valley Univ., 2011.

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

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In

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SUPERVISION SHEET

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SUPERVISION COMMITTEE

Dr. MOHAMED KHALIL KHALIL
Professor of Plant Physiology, Fac. Agric., Cairo University.

Dr. ALI MAHMOUD SABBOUR
Professor of Agriculture Botany, Fac. Agric., Cairo University.

Dr. ABDEL-HALIM SEIF EL-DIN ALI
Head Research Plant Diseases, Central Laboratory for Date Palm Researches and Development, ARC.

Name of Candidate: Karam Mostafa Shahat Ali **Degree:** M.Sc.
Title of Thesis: Histochemical Studies on Regeneration of Date Palm *via* Direct Organogenesis.
Supervisors: Dr. Mohamed Khalil Khalil
Dr. Ali Mahmoud Sabbour
Dr. Abdel-Halim Seif El-Din Ali
Department: Agricultural Botany **Branch:** Plant Physiology
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ABSTRACT

This work was carried out in the Biotechnology Dept. Central Laboratory for Date Palm Research and Development, ARC. Giza, and Botany Dept. plant physiology branch, Faculty of Agriculture, Cairo University through 2013-2016. This study aimed to study effect of NAA with different types of cytokinins (BA, Kin, and 2iP) added alone or combined at 1 mg l^{-1} and another experiment the effect of 2,4-D at 0.1, 0.5 and 1 mg l^{-1} on growth character and morphogenesis of date palm (Siwy) *via* direct organogenesis. The obtained results indicated that highest percentage of responsive explants (36.36%) was observed on a medium containing 1 mg l^{-1} NAA combined with 1 mg l^{-1} each of BA, Kin, and 2iP whereas 9.20 shoots per explant formed after 32 weeks of culture and 22.22% was observed on a medium containing 1 mg l^{-1} 2,4-D where 7.3 shoots per explant. In contrast, the medium containing 1 mg l^{-1} NAA combined with 1 mg l^{-1} of only one cytokinin enhanced root formation but completely inhibited shoot development. Typically, overt organogenesis is preceded by the appearance of meristemoids. These meristemoids are considered as a key of the morphological feature of *de novo* organogenesis.

Therefore, biochemical and histological analyses were studied to increase our knowledge about date palm direct organogenesis. Biochemical analysis showed that, the ratio of auxin/cytokinin affected by factors such as total indoles and total phenols concentrations as well as peroxidase and polyphenoloxidase activities affected on the budding directly from shoot tips. Histological observation showed that shoots were originated from the ground tissue, mainly from tissue surrounding the vascular tissue in the explant. Then the vascular cylinder of the newly shoots connected with the neighboring vascular bundle of the explant by developing some tracheal elements, and thereafter shoots were elongated in the following sixteen weeks.

Key words: Histochemical, Regeneration, Organogenesis, Date Palm

DEDICATION

Every challenging work needs self-efforts as well as guidance of elders especially those who were very close to our heart.

My humble effort I dedicate this work to my sweet and loving father & mother whose affection, love, encouragement and prays of day and night make me able to get such success and honor and I dedicate this work to my respected Teachers.

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LIST OF ABBREVIATIONS AND INITIALS

PGRs	Plant growth regulators
Viz.	*videlicet* (namely)
EDTA	Ethylenediaminetetraacetic acid
CKs	Cytokinins
PATS	Polar auxin transport stream
TIBA	2,3,5-triiodobenzoic Acid
IAA	Indole-3-acetic acid
MS	Murashige and Skoog basal medium
NAA	α-naphthaleneacetic acid
NOA	Naphthoxy acetic acid
2ip	2-isopentenyladenine
BA	benzyladenine
TDZ	Thidiazuron
2,4-D	2,4-Dichlorophenoxy acetic acid
cv.	Cultivar
c.a.	Cited after
ROS	Reactive oxygen species
ASF	Adventitious shoot formation
POD	Peroxidase
PPO	Polyphenol oxidase
PVP	Polyvinylpyrrolidone
FW	Fresh weight
Kin	6-furfurylaminopurine
GA_3	Gibberellic acid
ABA	Abscisic acid
HPLC	High performance liquid chromotography

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