SOME PHYSIOLOGICAL STUDIES ON DATE PALM MICROPROPAGATION USING DIRECT SOMATIC EMBRYOGENESIS

By

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APPROVAL SHEET

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Title of Thesis: Some Physiological Studies on Date Palm Micropropagation Using Direct Somatic Embryogenesis
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ABSTRACT

Date palm direct somatic embryos cultures were obtained from culturing the shoot tip explants isolated from off-shoots of semi dry cv. Siwy. Meanwhile, indirect somatic embryos and direct organogenesis were obtained from culturing the explants isolated from immature female inflorescence of date palm soft cv. Zaghloul. The aim of this investigation to study in two separated parts the influence of different physical and chemical factors, inducing combinations of auxins and cytokinins as well as other experiments conditions on the initiation, formation, and germination of direct somatic embryos induced from shoot tip explants of semi dry Siwy cultivar as well as from immature female inflorescence explants of soft Zaghloul cultivar date palm (*Phoenix dactylifera* L.). The obtained results in first part indicated that highest percentage of free contamination and survival explants were obtained with treatment C (70% ethanol, 1 min + 20% Clorox, 15 min + 0.1% $HgCl_2$, 20 min). In addition, S3 treatment containing 2, 4-D and NAA each at 0.25 mg/l as well as 2iP and BAP each at 2.5 mg/l gave the highest value of pro-embryonic mass. The direct somatic embryos formation was significantly increased in treatment F3 supplemented with NOA and NAA each at 0.25 mg/l as well as 2iP and BAP each at 2.5 mg/l. Moreover, repetitive embryos have significantly improved by using treatment T2 supplemented with 2, 4-D and NAA each at 0.125 mg/l as well as 2iP and BAP each at 0.05 mg/l. Improved maturation of normal embryos was significantly increased in M4 treatment supplemented with 0.4 mg/l ABA after 12 weeks of culture period. The root length recorded a significant increase with treatment R4 supplemented with NAA and IBA each at 0.5 mg/l and free of cytokinins. Meanwhile, treatment R8 supplied with NAA and IBA each at 1.0 mg/l as well as 2iP and BAP each at 0.05 mg/l significantly increased number of roots. In part 2, regeneration from immature female inflorescence explants of Zaghloul, the callus was significantly increased when 2, 4-D and NAA were each added at 0.25 mg/l, whereas 2iP and BAP were each added at 0.1 mg/l (treatment E1). Concerning embryo formation, a significant increase was recorded in treatment D3 supplemented with NOA and NAA each added at 0.25 mg/l whereas 2iP and BAP were each added at 2.5 mg/l. on the other hand,, the favorable effects on produced embryos were also supported by higher concentration of their total soluble proteins and higher activity of their POD enzyme. Finally, it could conclude that somatic embryogenesis produced directly or indirectly after exposure of responsive explants depending on the critical concentrations of exogenously supplied plant growth regulators during the initial culture phase. On the contrary, repetitive of the somatic embryos have been optimized on low level of hormone or free-hormone.

Key words: ABA, Auxins, Cytokinins, Date palm, Direct somatic embryos, Inflorescence, Micropropagation, *Phoenix dactylifera* L.

DEDICATION

This thesis would not have been possible without helping from ***Allah****. I dedicate this work to my family for their help and encouragement. To my friends and all people in my life who support me.*

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LIST OF ABBREVIATIONS AND INITIALS

2,4-D	2,4 dichlorophenoxy acetic acid
2iP	N^6-(2- Isopentenyl) adenine
ABA	Abscisic acid
BA or BAP	Benzyl adenin or Benzylaminopurine
Cv.	Cultivar
DW	Dry weight
FW	Fresh weight
GA_3	Gibberellic acid
IAA	Indole-3-acetic acid
IBA	Indole-butyric acid
IEDC	Induced embryogenically determined cells
MS	Murashige and Skoog basal medium
NAA	Naphthalene acetic acid
NOA	Naphthoxy acetic acid
PEDC	Pre-embryogenic determined cells
PEMs	Pre-embryonic mass of cells
PGRs	Plant growth regulators
POD	Peroxidase

CONTENTS