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شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

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التوثيق الإلكتروني والميكروفيلم

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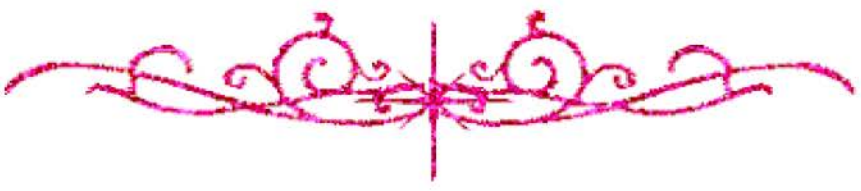

سامية محمد مصطفى

شبكة المعلومات الجامعية

بالرسالة صفحات لم ترد بالأصل

Biotechnological Studies of Date Palm: Micropropagation of Inflorescence, Molecular Biology and Secondary Metabolites

By

Adel Ahmed Mahmoud Ahmed Abo-El-Soaud

B.Sc. Agric., Cairo Univ., 1993
M.Sc. Pomology, Cairo Univ., 1999

Dissertation

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ABSTRACT

The study was performed during the period of 1999 to 2003 in the laboratory of plant tissue culture, Agriculture Development Systems project (ADS), Ministry of Agriculture. The best method to surface sterilize the female spathe of date palm 'Zaghloul' was using $HgCl_2$ solution at 0.1% for 5 min. The morphological survey of different types of buds within the date palm head was carried out. It is recommended that date palm spikes at 2.5 cm in length would be oriented to somatic embryogenesis as a main target. Nutrient medium (¾MS and 40 gm l^{-1} sucrose) supplemented with 2.5 mg l^{-1} 2,4-D + 0.5 mg l^{-1} IBA + 0.2 mg l^{-1} 2ip, some of the small florets which existed on the spikes formed direct shoots or roots. At the same time, some florets swelled and formed ball-like structures. The direct proembryos were formed within these structures. Generally, 73.0 % of spike segments were able to form embryos whether directly or indirectly after subculture 3. In respect to date palm spikes at 7.0 cm in length, it is suspected that they must instruct to direct shoot formation (caulogenesis). Only 33.0 % of middle spikes produced direct shoots (vegetative buds) after subculture 2 when they were cultured onto the basal nutrient medium (MS and 50 gm l^{-1} sucrose) supplemented with 2.5 mg l^{-1} 2,4-D + 0.5 mg l^{-1} IBA+ 0.2 mg l^{-1} 2ip. Also, the same result was obtained with the nutrient medium which contained 0.5 mg l^{-1} 2,4-D + 0.5 mg l^{-1} IBA + 0.2 mg l^{-1} 2ip. Moreover, the majority of spike explants tend to form direct proembryos better than preceding age. Regarding the spikes in late age of growth and development (20.0 cm in length), no considerable response was recorded. Subsequently, it is not preferable to use an inflorescence as a desirable source for explant in date palm micropropagation at later age of growth (29.0 cm in length). All major amplified DNA fragments of date palm cv. Zaghloul, generated by PCR amplification using the random primers OPD2; OPB18 and OPC14, were detected in all samples, to ensure the genetic stability in the three samples (donor mother plant; *in vitro* propagated plantlets and *ex vitro* plants grown in the greenhouse). The growth of embryogenic callus that used to produce the flavonoids was steadily decreased by increasing the flavonoids content as indicated by the increasing value. It is suggested that spraying with particular substances including ethrel and other promoting substances after traditional offshoots separation is beneficial to secrete more amounts of flavonoids and their relative compounds to improve the natural defense within the palm tree against pathogens invading. Administration rats with 40 mg ethanolic extract of flavonoids incorporated into 100 gm of a diet caused considerable responses in the gain of body weight, organs weight, total lipids, total cholesterol, serum glucose level, and liver and kidney functions as a result of increasing the health of hyperglycemic rats.

Key words: *Phoenix dactylifera* L., Inflorescence, Tissue culture, Somatic embryogenesis, Secondary metabolites, Hyperglycemia.

Dedication

To my parents, **you are the unique truth in my life that I love it. You are rare jewels, an ever-flowing river of love, dedication and wisdom. No words can express my feelings towards you. To you I dedicate my love, my life and my work, God blesses you.**

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Abbreviations

A.O.A.C---------- Association of Official Agriculture Chemists.
°C---------- degrees Celsius.
cDNA---------- complementary DNA.
Cm ---------- centimeter.
Conc.---------- concentration.
2,4-D---------- 2,4-dichlorophenoxyacetic acid.
dATP ---------- deoxyribose adenine triphosphate
dCTP---------- deoxyribose citosine triphosphate
dGTP---------- deoxyribose guanine triphosphate
dTTP---------- deoxyribose thiamine triphosphate
DNA---------- deoxyribonucleic acid.
dsDNA ---------- double strands of DNA.
DW---------- dry weight.
EcoR1 ---------- *Echrichia coli* restriction enzyme 1.
Fig---------- figure.
FW ---------- fresh weight.
2ip---------- N^6-(Δ^2- isopentenyl) adenine
g ---------- gram(s).
GLC---------- Gas-liquid chromatography.
h ---------- hour(s).
GA_3 ---------- gibberellic acid.
Kg ---------- kilogram.
l---------- liters.
M---------- molar.
mg---------- milligrams.
min---------- minutes.
ml---------- milliliter.
µg---------- micro gram.
µl ---------- micro liter.
mM---------- millimolar.
MS ---------- Murashige & Skoog (1962).
N---------- normal.
NAA ---------- naphthaleneacetic acid.
ng---------- nano gram.
nm---------- nano meter(10^{-9}).
No ---------- number.
NRE---------- non repeated embryos.
PGRs---------- plant growth regulators.
RAPD---------- Random Amplified polymorphic DNA .
rDNA ---------- ribosomal DNA.
RE---------- repeated embryo.

RFLPs ---------- Restriction Fragment Length Polymorphisms.
RNAs ---------- RNA types.
RNAse ---------- RNA analysis enzyme.
rpm ---------- revolution per minute.
Rt ---------- retention time.
S_1; S_2 and S_3 ---------- subcultures 1;2 and 3.
SDS ---------- sodium dodecyl sulphate.
ssDNA ---------- single strands of DNA.
0.5x TBE buffer ---------- Tris Borate EDTA buffer.
2,4,5-T ---------- 2,4,5-Trichlorophenoxyacetic acid.
Taq ---------- *Thermus aquaticus.*
TBE buffer ---------- Tris borate EDTA.