

BIOCHMICAL STUDIES ON JOJOBA PLANT USING TISSUE CULTURE TECHNIQUES

By

SHIMAA ABD ALLA SALEM

B.Sc. Agric. Sci. (Biochemistry), Fac. Agric., Cairo Univ., 2010

THESIS

**Submitted in Partial Fulfillment of the
Requirements for the Degree of**

MASTER OF SCIENCE

In

**Agricultural Sciences
(Biochemistry)**

**Department of Biochemistry
Faculty of Agriculture
Cairo University
EGYPT**

2018

Format reviewer

Vice Dean of graduate studies

APPROVAL SHEET

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DEDICATION

*This work is dedicated to my kind mother, father, my sweet sister **Hagar**, my lovely brothers (**Mohammed**, **Khaled**) and **Ali**" Allah's mercy upon him.*

*I also dedicate it to my best friend **Naglaa Ezzat** for sincere help.*

ACKNOWLEDGEMENT

*I wish to express my thanks and pay my respect to Dr. **SHERIF HELMY AHMED**, Professor of Biochemistry, Faculty of Agriculture, Cairo University, for his supervision, criticism and all his efforts and his huge contribution to the success of this work.*

*I am grateful to Dr. **OSAMA KONSOWA AHMED**, Professor of Biochemistry, Faculty of Agriculture, Cairo University, for his supervision and guidance.*

*All my regards, thanks and respect to Dr. **FAISEL MOHAMED SADAWI**, Head Research of Ornamental Department, ARC., Giza, for his supervision and sincere advice. He was a father during the course of my study. He was my guiding light.*

*I would like to express my deep gratitude to all respectful members in the Department of Horticulture Research Institute, Agriculture Research Centre., I'm specially grateful to Dr. **Sherif Saied** for his continous help and support*

My deep gratitude to everybody offered me even a little faithful favor in this work to attain a good form.

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| Name of Candidate: Shimaa Abd Alla Salem | Degree: M.Sc. |
| Title of Thesis: Biochemical Studies on Jojoba Plant by Using Tissue Culture Technique | |
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| Department: Agricultural Biochemistry | Branch: Biochemistry |
| Approval: 18 /7/ 2018 | |

ABSTRACT

This work was carried out in the tissue culture laboratory of Zohriya Garden, Department of Ornamental Plant Research, Horticulture Research Institute, Agricultural Research Center, Giza, Egypt during the period from 2013 to 2016. Simmondsin production and its effect on hepatic cancer and breast carcinoma cells was investigated through jojoba tissue culture. Lateral buds were excised from jojoba female plants grown in Zohriya Garden. As clorox was found to be ineffective in a preliminary trial, an experiment was carried out to investigate the effect of mercuric chloride $HgCl_2$ (MC). Three MC concentrations, 0.1, 0.2 and 0.3 g/l were applied. Buds were subjected to each concentration for three different exposure times, i.e. 5, 7 and 9 min. Survived explants that responded positively were used in another trial where they were inoculated on MS medium at different strengths, i.e. quarter, half, 3 quarters and full strength treatments. The best explant on basal media was determined and the physiological effect on various cell line hep, Breast and anti-microbial effect on *Candida albicans*, *Bacillus subtilis*, *Escherichia Coli* were studied. Two growth regulators kinetin and 6-Benzylamino purine (Kin and BAP) at 0.5, 1.0 and 1.5 mg/l were used to proliferate "in vitro shoots" from the established explants on the medium contained 5, 10 and 15 mg/l malt extraction. Callus cultures were induced using pieces of 1cm² *in vitro* leaves of jojoba clone and cultured on MS basal medium supplemented with 0.5, 1.0 and 1.5 mg/l 2,4-Dichlorophenoxyacetic acid, Naphthalin acetic acid individually and with combination. The best growth medium composition was MS salts at full strength in all experiments. Furthermore, multiplication of *in vitro* jojoba shoots number, shootlets length and leaves number could be highly achieved (7.67 shootlets/explants, 4.67 cm and 9.4 leaves) by 1.5 mg/l BAP combined with 15g/l malt extract. 2,4D at 1.5 with 2ip 0.5 mg/l respectively induced callogenesis (98.67 %) with fresh weight 4.4 g while NAA at 1.0 mg/l plus 2ip 1.5 mg/l respectively enhanced callogenesis production. The forming callus from leaves exposed to various elicitor materials (riboflavine, glutamine and $AgNO_3$). Also, the effect of MeOH extract and Oil on cancer cell line were recorded 40.78% and 81.94% for 500mg/l for Hepatocellular carcinoma cancer cell line. While asey at this value (500mg/l) was scored (67.21) and (90.65) for Breast carcinoma cancer cell line.

Key words: Jojoba, tissue culture, callus, *Simmondsia chinensis*.

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