Name of Candidate: Tarek Mohamed Noor El-Deen **Degree:** Ph. D.
Title of Thesis: Reproduction of *Polygala myrtifolia* L. Plants by Tissue Culture Technique.
Supervisors: Dr. Atef Mohamed Zakaria Sarhan
Dr. Effat Ismail El-Maadawy
Dr. Faisal Mohamed Abd El-Aleam Saadawy
Department: Ornamental Horticulture
Approval: 26/١/٢٠١١

ABSTRACT

This study was carried out at Dept. of Ornamental Hort. Fac. Agric., Cairo Univ., and the applied part was carried out at the Tissue Culture Laboratory, Horticulture Research Institute, Agriculture Research Center, during 2007-2009 seasons to develop an efficient protocol of *Polygala myrtifolia* L. propagation by tissue culture technique. Different disinfection agents (sodium hypochlorite and ethanol), explant types (apical, middle and basal), cultural seasons (summer, autumn, spring and winter), plant growth regulators (BA, kin, NAA, IAA and IBA), MS medium strengths ($^1/_4$, ½ and ¾), commercial fertilizer (Nofatrein) concentrations as well as supporting agents (agar, gelrite and filter paper bridge) and acclimatization medium substrates (peatmoss, vermiculite and sand) were employed in these experiments. Important results could be summarized as follows: To produce aseptic cultures, soaking apical explants in 20% Clorox (sodium hypochlorite) solution either for 10 or 15 minutes without presoaking in 70% ethyl alcohol was the best in producing the lowest contamination percentage, the highest survival% and the lowest mortality%. During establishment stage, apical explants cultured during spring season recorded the highest survival%, while middle explants were more successful in other parameters, i.e. number of shoots/explant, shoot length and number of leaves/shoot, when they were cultured during autumn season. Multiplication experiments showed that the highest survival% was obtained either by BA at 1 mg/l or kin at 2 mg/l without NAA addition or by BA at 1 mg/l with NAA at 0.5 mg/l. BA at 1 mg/l without NAA addition presented the highest number of shoots/explant. In the same regard, Nofatrein at 1 mg/l with ¾ MS medium strength gave the highest number of shoots/explant and leaves/shoot. This was accompanied by an increase in survival%. Results of rooting experiments demonstrated that IBA at 1 mg/l when applied as a presoaking solution presented the highest rooting% and number of roots/plantlet, while IBA at 1.5 mg/l added to the medium presented the longest roots. On the other hand, IBA free medium solidified with agar+gelrite produced the highest survival% and rooting%. Number of roots reached the maximum value by using IBA at 1 mg/l with agar. IBA at 1 mg/l with filter paper bridge presented the longest roots, the highest carotenoids, the highest phenols and the highest total soluble sugars content. Peatmoss+vermiculite (1:1, v/v) was superior in increasing most characteristics as survival%, plant height, number of leaves/plantlet, leaf area, number of roots, plantlet fresh weight, total chlorophylls, total indoles and total soluble sugars during acclimatization stage.

Key words: *Polygala myrtifolia*, *in vitro*, sterilization, multiplication, rooting, plant growth regulators, agar, gelrite, filter paper bridge.

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Approval: 26/١/٢٠١١

ABSTRACT

This study was carried out at Dept. of Ornamental Hort. Fac. Agric., Cairo Univ., and the applied part was carried out at the Tissue Culture Laboratory, Horticulture Research Institute, Agriculture Research Center, during 2007-2009 seasons to develop an efficient protocol of *Polygala myrtifolia* L. propagation by tissue culture technique. Different disinfection agents (sodium hypochlorite and ethanol), explant types (apical, middle and basal), cultural seasons (summer, autumn, spring and winter), plant growth regulators (BA, kin, NAA, IAA and IBA), MS medium strengths ($^1/_4$, ½ and ¾), commercial fertilizer (Nofatrein) concentrations as well as supporting agents (agar, gelrite and filter paper bridge) and acclimatization medium substrates (peatmoss, vermiculite and sand) were employed in these experiments. Important results could be summarized as follows: To produce aseptic cultures, soaking apical explants in 20% Clorox (sodium hypochlorite) solution either for 10 or 15 minutes without presoaking in 70% ethyl alcohol was the best in producing the lowest contamination percentage, the highest survival% and the lowest mortality%. During establishment stage, apical explants cultured during spring season recorded the highest survival%, while middle explants were more successful in other parameters, i.e. number of shoots/explant, shoot length and number of leaves/shoot, when they were cultured during autumn season. Multiplication experiments showed that the highest survival% was obtained either by BA at 1 mg/l or kin at 2 mg/l without NAA addition or by BA at 1 mg/l with NAA at 0.5 mg/l. BA at 1 mg/l without NAA addition presented the highest number of shoots/explant. In the same regard, Nofatrein at 1 mg/l with ¾ MS medium strength gave the highest number of shoots/explant and leaves/shoot. This was accompanied by an increase in survival%. Results of rooting experiments demonstrated that IBA at 1 mg/l when applied as a presoaking solution presented the highest rooting% and number of roots/plantlet, while IBA at 1.5 mg/l added to the medium presented the longest roots. On the other hand, IBA free medium solidified with agar+gelrite produced the highest survival% and rooting%. Number of roots reached the maximum value by using IBA at 1 mg/l with agar. IBA at 1 mg/l with filter paper bridge presented the longest roots, the highest carotenoids, the highest phenols and the highest total soluble sugars content. Peatmoss+vermiculite (1:1, v/v) was superior in increasing most characteristics as survival%, plant height, number of leaves/plantlet, leaf area, number of roots, plantlet fresh weight, total chlorophylls, total indoles and total soluble sugars during acclimatization stage.

Key words: *Polygala myrtifolia*, *in vitro*, sterilization, multiplication, rooting, plant growth regulators, agar, gelrite, filter paper bridge.

Name of Candidate: Rasha Nagi Mohamed Arafa **Degree:** Ph.D.
Title of Thesis: Studies on Propagation of Some Ornamental Plants and *Phoenix dactylifera* by Tissue Culture
Supervisors: Dr. Atef Mohamed Zakaria Sarhan
Dr. Tarek Abou Dahab Mohamed
Dr. Abd El-Monem El-Banna
Department: Ornamental Horticulture **Approval:** 8/1/2011

ABSTRACT

This study was performed at the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University. These experiments were done in Plant Biotechnology Research Lab., Faculty of Agriculture, Cairo University during 2005 to 2009.

Ginkgo biloba, several explants were used as microcuttings and *in vitro*-produced leaves. The highest percentage of surviving of microcuttings was recoded by using 20% NaOCl. The best concentration of sucrose was 30 g/l. Shoots multiplication were resulted in added BA at 5.0 mg/l or using 0.5 mg/l NAA + 1.0 mg/l BA. Shoots elongation were recorded by using GA_3 at 8.0 mg/l. The highest callus percentage was noticed with 20.0 mg/l 2,4-D. All concentrations of IBA failed to induce any roots. NAA was very effective factor for rooting. Only 50% of the transplanted plantlets survived when transplanted on mixture composed of washed sand, peat moss and perlite at ration 1:1:1. Total flavonoids were the highest in *in vitro* leaves sample.

Date palm, the highest percentage of surviving of shoot tip explants was achieved by using 1.0 g/l MC + NaOCl at 60%. The highest percentage of surviving of inflorescence explants was achieved by using 1.0 g/l MC.

The shoot tip explants recorded the highest callus percentage with BA at 3.0 mg/l + 2,4-D at 10.0 mg/l. The highest percentage of callus formation from inflorescences in stage 1 (spikes 5 cm long) was recorded by using 3.0 mg/l 2ip + 10.0 mg/l 2,4-D.

The shoot tip explants resulted in embryogenic callus (torpedo stage formation) with BA at 3.0 mg/l + 2ip at 3.0 mg/l + 2,4-D at 40.0 mg/l. Using BA at 3.0 mg/l + 2ip at 3.0 mg/l + 2,4-D at 20.0 mg/l resulted in 1.33% torpedo. The torpedo formation from floral bud explants in stage (1) was noticed by using NAA at 5.0 mg/l + 2ip at 10.0 mg/l or using NAA at 10.0 mg/l + 2,4-D at 1.0 mg/l.

Using 2,4-D at 0.5 mg/l + kin at 2.0 mg/l resulted in the highest number of somatic embryos from shoot tip explants. Inflorescence in stage (1) induced somatic embryos by using NAA at 0.1 mg/l compared with the stage (2) of inflorescence.

Sucrose at 30.0 or 50.0 g/l recorded the highest number of leaves from embryos. Using BA at 2.0 mg/l + NOA at 2.0 mg/l or IAA at 0.5 mg/l + BA at 10.0 resulted in development of somatic embryos.

BA at 3.0 mg/l + 30.0 g/l sucrose resulted in the highest shoots number or using 0.1 mg/l NAA + 1.0 mg/l 2ip. Shoots formed roots with NAA at 0.1 mg/l. Only 20% of transplanted plantlets were surviving after acclimatization in peat moss: vermiculite: sand (1:1:1, v/v).

Key words: *Ginkgo biloba*, *Phoenix dactylifera* cv. Sewi, *in vitro*, plant growth regulators, callus formation, microcutting, shoot tip, inflorescence, total flavonoids.

Name of Candidate: Evon Atef Khella Garas **Degree: Ph.D.**
Title of Thesis: Effect of Growing Media, Irrigation Rates and Grafting on Growth and Flowering of *Hibiscus* spp. Plants
Supervisors: Dr. Hamdy Mohamed Ali EL-Bagory
Dr. Mona Ahmed Darweesh
Dr. Alfred Messiha Ibrahim
Department: Ornamental Horticulture
Approval: / /2011

ABSTRACT

Two separate filed experiments were conducted at the nursery of Horticulture Research Institute, Giza throughout two successive seasons (2007/2008 and 2008/2009) with the aim of investigating the possibility of using grafting for the propagation of *Hibiscus rosa-sinensis* L. and *Hibiscus syriacus* plants as well as determining the most suitable irrigation level and growing media for producing plants of a high quality of *Hibiscus rosa-sinensis* L.

The results emphasized that cleft grafting was the best in most cases for improving most plant traits. 'Fire Truck' stock proved its mastery in improving most of plant traits in both seasons. 'Cooperi Alba' and 'Fire Truck' scion were the best in most cases for improving most of plant morphological traits. Similarly, improvements in chemical constituents of the plant were also observed due to using 'Fire Truck' scion followed by that of either 'Charles September' or 'Cooperi Alba' scions.

The interactions revealed the superiority of the combined effect between 'Fire Truck' as a rootstock and either 'Cooperi Alba' or 'Fire Truck' scions for improving most plant traits studied. Likewise, the results of bud grafting method behaved about the same direction for its effects on plant morphological traits and chemical constituents with the superiority of cleft grafting in this concern.

The results cleared that applying the moderate irrigation level (0.75 L/pot) was the best for improving plant morphological traits and inducing the earliest flowering, but with the exception of using the highest level (1 L/pot) which gave highest number of branches and leaves/plant. Meanwhile, the lowest irrigation level (0.50 L/pot) or the moderate one (0.75 L/pot) were the best for raising the accumulation rate of plant chemical constituents. Using the mixture of peatmoss + perlite + 10% compost proved its mastery in improving plant morphological traits with producing early flowering.

The interactions, proved that growing plants in the mixture of peatmoss + perlite + 10% compost with applying either the moderate irrigation level (0.75 L/pot) or the highest one (1L/pot) gave the utmost high values of plant morphological traits. Likewise, growing plants in the mixture of peatmoss + 10% compost and supplied with the moderate irrigation level(0.75 L/pot) proved their prevalence in raising some chemical constituents of the plants in the two seasons.

From the aforementioned results, it could be recommend to use grafting in propagation with using 'Fire Truck' as a rootstock and the same cv. or 'Cooperi Alba' as scions for cleft grafting. In addition, using the mixture of peatmoss + perlite + 10% compost for growing plants with supplying them the moderate (0.75 L/pot) irrigation level (0.75 L/pot) for producing plants of good quality of superior morphological traits and chemical constituents.

Key words: Types of grafting, growing media, irrigation levels, *Hibiscus rosa-sinensis* L., *Hibiscus syriacus* L.

Name of Candidate: Eman Mohamed Mostafa Zayed **Degree:** Ph.D.
Title of Thesis: Propagation of *Phoenix dactylifera* L., *Chamaerops humilis* L. and *Hyophorbe verschaffeltii* L. Palms by Using Tissue Culture Technique.
Supervisors: Dr. Mohamed Abd El-Kahlek El-Kahteeb
Dr. Azza Mohamed Said Arafa
Dr. Abd El Monem El-Bana
Department: Ornamental Horticulture
Approval: 3 /4 / 2011

ABSTRACT

This study was conducted to investigate the ability to produce whole plantlets related to palmaceae family by micropropagation through tissue culture technique for date palm trees (Bartamuda and Sakkoty cvs.) by studying the effect of culture media and GA_3 concentrations 0.0, 0.1,0.5, and 1.0 mg/l), effect of culture media and ABA concentrations (0.0, 0.1,0.5, 1,0 and 2.0 mg/l) and effect of different nitrogen sources on friable callus production stage which derived from shoot tips explants, also in rooting stage studying of the ability for rooting by using treatments of pulsed on different NAA and IBA concentrations (1.0, 3.0 and 5.0 mg/l) and studying for the ability to promote the growth and development of roots to produce healthy whole plantlets for acclimatization by using different different sucrose concentrations (0.0, 10.0 and 20.0 g/l) and MS salt strength (½ MS, ¼ MS, ⅛ MS and $^1/_{16}$ MS strength). Also, this study procedure the produce whole plantlets from shoot tips of *Chamaerops humilis*. Also, this study procedure the produce plant regeneration from female inflorescences for date palm trees (Sewy cv.) and Spindle palm.

Key words: Palmaceae, GA_3, ABA , inflorescences

اسم الطالب: هاجر سيد مصطفي حسين **الدرجة:** دكتوراه الفلسفة

عنوان الرسالة: تأثير أوساط الزراعة والتسميد والملوحة على النمو والتركيب الكيماوي لنباتات *Ceiba pentandra* L. و*Oroxylum indicum* L. و*Dipladenia sanderi* L.

المشرفون : دكتور: محمد عبد الخالق الخطيب

دكتور: أمل عبده نصر

دكتور: علي نبيه فهمي

قسم: الزينة **فرع:** - **تاريخ منح الدرجة: ٢٠١١/٣/٢٧**

المستخلص العربي

شملت الدراسة ثلاثة نباتات إقتصادية هامة *Oroxylum indicum, Ceiba pentandra, Dipladenia sanderi* خلال موسمي الزراعة (٢٠٠٦/٠٧ ، ٢٠٠٧/٠٨) بمشتل قسم بساتين الزينة بكلية الزراعة جامعة القاهرة بهدف دراسة مدي إمكانية نجاح هذه النباتات حين زراعتها في المناطق الجديدة والساحلية وتبعا لذلك تم معاملة النباتات بالمعاملات التالية: ١. (أ) تأثير بيئات النمو على نبات *Oroxylum indicum* L. أوضحت النتائج التأثير الجيد لإستخدام بيئة الرمل والطمي (١:١) حجما متبوعا بتأثير بيئة الرمل والطمي (٢:١) حجما على النتائج المتحصل عليها حيث أدت تلك البيئات إلى زيادة إرتفاع النبات وعدد الأوراق والفروع للنبات الواحد ومساحة الوريقات والأوراق المركبة وسمك الساق ووزنه الطازج والجاف وطول الجذر ووزنه الطازج والجاف وفي نفس الوقت أدى استخدام بيئة الرمل والطمي (١:١) حجما إلى زيادة محتوى الأوراق من الاندولات والفينولات والنيتروجين والكلورفيل (أ) والكاروتينيدات. بينما أدى إستخدام بيئة الرمل والطمي (٢:١) حجما تفوقا واضحا في زيادة محتوي الأوراق والسوق من الكربوهيدرات الكلية وزيادة محتوى الأوراق من الكاروتينيدات والفوسفور والبوتاسيوم. ١. (ب) تأثير بيئات النمو على نبات *Dipladenia sanderi* L. أوضحت النتائج تأثيرات جيدة على معظم الخصائص المورفولوجية التي تم دراستها حين إستخدام بيئة الرمل والطمي (١:١) حجما والرمل والبيت موس (١:١) حجما في كلا موسمي الزراعة وبالمثل أدي إستخدام نفس البيئات إلى زيادة محتوى الأوراق من الكلورفيل (أ، ب) والكاروتينيدات في الأوراق بالإضافة إلى زيادة محتوى البوتاسيوم في السوق. في نفس الوقت أدى إستخدام بيئة الرمل والطمي (١:١) حجما إلى زيادة محتوى الأوراق من الاندولات ومحتوى الأوراق والسوق من النيتروجين وكذلك محتوى السوق من الفوسفور والبوتاسيوم. هذا وقد أدى إستخدام بيئة الرمل والبيت موس (١:١) حجما إلى زيادة محتوى الأوراق من الكربوهيدرات الكلية والفوسفور وكذلك البوتاسيوم في السوق. **٢.**(أ) تأثير الماء المالح على نبات *Oroxylum indicum L.* حيث أدى استخدام الماء المالح بتركيز ٣٠٠٠ جزء في المليون إلى زيادة محتوى الأوراق من الكربوهيدرات الكلية بينما كان لإستخدام التركيز الأدني (١٥٠٠ جزء في المليون) أثرا في زيادة نفس المكون في السوق. إزداد محتوى الأوراق من الكلورفيل (أ) زيادة . إستعمال التركيز المنخفض منها (١٥٠٠ جزء في المليون) كذلك إزداد محتوى الأوراق من الكلورفيل (ب) والكاروتينيدات (ب) تأثير الملوحة على نبات *Ceiba pentandra,* L. حيث أدي إستخدام التركيزات المنخفضة ١٥٠٠، ٣٠٠٠ جزء في المليون إلى تأثيرات جيدة على الخصائص المورفولوجية في حين كان لاستخدام التركيزات العالية (٤٥٠٠، ٦٠٠٠ جزء في المليون) تأثيرات مثبطة. أدي إستخدام التركيزات المنخفضة (١٥٠٠، ٣٠٠٠ جزء في المليون) الي زيادة محتوى السوق والأوراق من الكربوهيدرات الكلية وعناصر النيتروجين والفوسفور والبوتاسيوم. ٣.تأثير مخلوط نسب عناصر النيتروجين والفوسفور والبوتاسيوم على نبات *Dipladenia sanderi,* L. أوضحت النتائج أن معظم نسب مخاليط عناصر النيتروجين والفوسفور والبوتاسيوم كانت ذات تأثير منشط على الخصائص المورفولوجية للنبات في معظم الحالات وكذلك بالنسبة للمحتوى الكيماوي للنبات. ففي هذا المجال كان أكثر المخاليط تأثيرا هو استخدام مخلوط العناصر (١:١: ٣) حجما أو (١:١: ٢) حجما حيث أدت إلى زيادة الصفات المورفولوجية للنبات وكذلك بالنسبة للمحتوى الكيماوي للنبات حين الوضع في الاعتبار محتوى الأوراق من الكلورفيل (أ، ب) والكربوهيدرات الكلية بالإضافة إلى محتوى السوق والأوراق من النيتروجين والفوسفور التي زادت نتيجة للمعاملات السابقة.

الكلمات الدالة: *Oroxylum indicum, Ceiba pentandra, Depladenia sanderi* ، الملوحة ، البيئات، مخاليط النيتروجين والفوسفور والبوتاسيوم

Name of Candidate: Abla Hassan Hussein Dorgham **Degree:** Ph.D.
Title of Thesis: Effect of Chemical Fertilization, Growing Media and Growth Stimulants on Growth and Chemical Composition of *Calia Secundiflora* Acut. and *Ochna Serrulata* Walp. Plants
Supervisors:. **Dr**. Mohamed Abd El-Kahlek El-Kahteeb
Dr. Amal Abdou Mohamed Nasr
Dr. Ali Nabih Fahmy
Department: Ornamental Horticulture
Approval: 7 / 6 / 2011

ABSTRACT

This study was carried out to investigate the following.: Effect of GA_3 and biostimulants and growing media on growth and chemical constituents of *Calia secundiflora* - Effect of NPK and humic acids on growth and chemical constituents of *Ochna serrulata* plants.

The results can be summarized in the following:

Effect of GA_3 and growth biostimulants on growth and chemical composition of *Calia secundiflora* plants. GA_3 significantly increased plant height and stem diameter.Humic acid, algae and mycorrhiza significantly increased the plant height. Algae extract and mycorrhiza gave the thickest stems. Maximum leaf formation and number of branches with mycorrhiza. Humic, algae and mycorrhiza treatments were the most effective on increasing fresh and dry weights of leaves. Humic acid and mycorrhiza increased root growth., the content of carbohydrates

Effect of growing media on Calia plants: clay + peatmoss followed by sand+ peatmoss +perlite mixtures gave the tallest plants. Highest leaves fnumber with sand + peatmoss. Media containing vermiculite decreased formation of leaves. Media containing perlite increased branching. Using a mixture containing sand + peatmoss+ perlite increased fresh and dry weight of leaves. a mixture of clay +peatmoss + perlite gave the tallest roots. Growing the plants in clay+peat+vermiculite increased the content of carbohydrates.

Effect of NPK and humic acids on Ochna plants: NPK 112+ HA increased plant height. NPK at 111 or at 112 HA increased stem diameter. All NPK enhanced the formation of branches and leaves as well as leaf area NPK with high level of N gave the largest leaves. NPK at 112 +HA resulted in the heaviest dry weight of leaves. NPK with or without humic acid increased the root length. NPK 211+HA and NPK 111+ HA produced the highest value of chlorophyll-a. All NPK treatments increased the leaves N- content.

Key words: *Calia, Ochna,* GA_3 biostimulant, perlite and NPK

Name of Candidate: Mahmoud AbdEl-Fattah El-Sayed **Degree:** Ph.D.
Title of Thesis: Effect of Some Postharvest Treatments on Carnation Flowers Quality.
Supervisors: Dr. Abou Dahab Mohamed Abou Dahab
Dr. Afaf Mahmoud El-Sayed Habib
Dr. Faisal Mohamed Abd El-Aleam Saadawy
Department: Ornamental Horticulture **Approval:** 6 / ٦ /٢٠١١

ABSTRACT

A laboratory study in two replicated experiments was carried out in the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University and the Ornamental Plants and Landscape Design Research Department, Horticulture Research Institute, Agricultural Research Center, Giza, Egypt during the period of 2009 and 2010 with the aim of investigating the effect of pulsing STS applications and the effect of certain preservative solutions on cut carnation flowers (*Dianthus caryophyllus* L. 'Domingo', previously stored either at 4°C or at 0 °C for two weeks, or fresh flowers, and the combinations of these factors.

The employed preservative solutions were distilled water only (PS1), solution of 70 g sucrose/liter (PS2), 70 g sucrose + 150 mg citric/liter (PS3), 70 g sucrose + 200 mg 8-Hydroxy Quinoline sulfate (8-HQS)/ liter (PS4), 70 g sucrose + 10 ml lime juice/liter (PS5), 70 g sucrose + 0.1 ml Clorox/liter (PS6), 70 g sucrose + 150 mg CA + 200 mg 8-HQS/liter (PS7), 70 g sucrose + 0.1 ml Clorox + 10 ml lime juice/liter (PS8), 70 g sucrose + 10 ml lupin extract + 10 ml lime juice/liter (PS9) and 70 g sucrose + 10 ml clove extract + 10 ml lime juice/liter (PS10). Obtained results showed that keeping fresh flowers in 70 g sucrose + 10 ml lime juice/liter +STS recorded the longest vase life and the second degree level of flower diameter in the two experiments. On the other hand, keeping fresh flowers in 70 g sucrose/liter + pulsing in STS recorded the highest level of number of days from star stage to full opening stage in the first and second experiments. Number of bacterial cells reaches the lowest values by keeping fresh flowers pulsed in STS and kept in solution 70 g sucrose + 0.1 ml Clorox + 10 ml lime juice/liter or sucrose + 10 ml lupin extract + 10 ml lime juice/liter in the first and second experiments.

It is recommended in case of flowers of carnation 'Domingo' when cold storage is inevitable, to store flowers at 0°C during transportation and to advice consumers to keep their flowers in a solution containing sucrose+lupin+lime in the vase to enjoy their flowers as long as possible and to avoid using chemicals that may harm the environment. When cold storage is unnecessary, it is recommended to keep fresh flowers in vases supplied with sucrose+clove+lime as it will be cheaper than chemical preservatives.

Key words: *Dianthus caryophyllus* L., cut flowers, preservative solutions, STS, lupin extract, clove extract, lemon juice, clorox.

Name of Candidate: Khaled Ismail Ibrahim Hashish **Degree:** Ph.D.
Title of Thesis: Effect of Chemical and Biofertilizer on Growth of Paulownia Seedlings
Supervisors: Dr. Mohamed Abd-El-Khalek El-Khateeb
Dr. Ahmed Salama El-Leithey
Dr. Mahmoud Mohamed Farahat
Department: Ornamental Horticulture

Approval: / /2011

ABSTRACT

Three separate field experiments were carried out on *Paulownia kawakamii* T.Ito seedlings at the Research and Production Station of National Research Center at Nubaria and Fac. Agric., Cairo Univ., during two successive seasons 2006/2007 and 2007/2008.The first experiment was designed to investigate the effect of NPK fertilizer rates on growth and chemical composition of *Paulownia kawakamii* seedlings .The treatments of NPK fertilizer were:NPK (1:1:1),(1:2:1),(1:1:2),(2:1:1),(2:2:1),(2:1:2),(3:1:1),(3:2:2) as well as control (without fertilization).The second experiment was planned to study the effect of some microelements (Fe, Zn and Mn at 50 and 100 ppm for each element) on growth and chemical composition.The third experiment was carried out to study the effect of biofertilizer (liquid or powder) and NPK fertilizers on growth and chemical constituents. The treatments were(NPK 1:1:1, microbein liquid, microbein liquid+25 g NPK, microbein liquid+50 g NPK , microbein liquid+75g NPK, microbein peat moss, microbein peat moss+25g NPK, microbein peat moss+50g NPK, microbein peat moss+75g NPK , as well as control). The main results could be summarized as follows:The vegetative growth and chemical composition responded positively to all NPK rates compared to control seedlings. Also, application of NPK fertilizer at (3:1:1) gave significant increases in all parameters. Stem fresh and dry weights, plant height, stem diameter affected by spraying the seedling with Fe at 50 ppm.Leaves fresh and dry weight increased by application of Mn at 50 ppm.Root fresh and dry weights, root number/plant, root diameter significantly increased with Zn at 100 ppm. Number of leaves and leaf area increased by Fe at 100ppm. The highest value of chlorophyll a,b and carotenoid contents were obtained with Zn at 50 ppm.The highest value of carbohydrates percentage in leaves, stems and roots were obtained with Fe at 50 ppm.Nitrogen percentage in leaves, stems and roots was high at Fe 50 ppm , phosphorus percentage in stem was high at Mn 100 ppm in both seasons.The highest value of potassium percentage was recorded with leaves at Fe 50 ppm, in stems at Zn 50 ppm and in roots at Fe 100 ppm in both seasons. Fe, Mn and Zn contents in leaves, stems and roots increased by their foliar application. All bio and NPK fertilizers improved growth parameters compared to control. The best results in regarding to leaf area and leaves fresh and dry weight were obtained from microbein liquid +75 NPK.The thickest stems and stems fresh and dry weights were obtained when Paulownia seedlings received microbein liquid +25 NPK.Microbein peat moss +75 NPK increased roots fresh and dry weights, root diameter and leaves number of seedlings.The plant height gave the highest values with application of NPK fertilizer alone at the rate of 100g.Application of biofertilizer at microbein peat moss + 75 NPK significantly increased carbohydrates and nitrogen percentage in leaves ,stems and roots. Potassium percentage in leaves and roots increased by using microbein peat moss + 75 NPK.Potassium percentage in stems responded positively to application of microbein peat moss + 50 NPK.Chlorophyll a,b and carotenoides contents of leaves were increased by application of microbein peat moss + 50 NPK in both seasons.

Keyword: *Paulownia kawakamii*, NPK fertilizer, Biofertilizer, Micronutrient, Vegetative growth,

Name of Candidate: Ramadan Attia Mohamed Hassanein **Degree:** Ph.D.
Title of Thesis: Chemical and Biological Studies on Cumin Fruits Irradiated by Gamma Rays for Conservation
Supervisors: Dr. Atef Mohamed Zakria Sarhan
Dr. Mohamed Sayed Hanafy
Dr. Abdullah Abdullah El-Sayed
Department: Ornamental Horticulture
Approval: 4 /10/ 2011

ABSTRACT

This study was carried out at the Ornamental Hort. Dept., Fac. Agric., Cairo Univ. and the National Center for Radiation Res. and Tech., Nasr City, Cairo, Egypt and the Central Laboratory, Hort. Res. Inst., A.R.C., Giza, Egypt from 2008/2010 seasons. The aim of this study was to investigate the effect of different doses of gamma irradiation (0, 5, 10 and 15 KGy) and different storage periods (0, 3 and 6 months) in different package materials (cotton or polyethylene bags) on essential oil quality and chemical composition of cumin (*Cuminum cyminum*) fruits. On the other hand antimicrobial activity of treated cumin fruits essential oil and its extracts at 0, 5000, 10000, 20000 and 40000 ppm were investigated. Results showed that the highest essential oil% was obtained from fruits stored for 3 months in cotton bag without gamma irradiation. Concerning the effect of essential oil as antimicrobial agent, the highest antibacterial activity was obtained by essential oil isolated from irradiated polyethylene packed fruits at 5 KGy then stored for 3 months (*Staphylococcus aureus*) or irradiated polyethylene packed ones at 15 KGy without storage (*Salmonella typhimurium*). On the other hand, the highest antifungal activity against *Asperigillus niger* and *Penicillium digitatum* was obtained by essential oil isolated from unirradiated packed in polyethylene fruits then stored for 6 months. Non-stored packed in cotton bag fruits irradiated with gamma rays at 10 KGy produced essential oil with highest antiyeastal activity. Cumin fruits extract at 40000 ppm when combined with different treatments presented the highest antimicrobial activity (represents as inhibition zone) against all studied microbes except with *P. digitatum.* Cumin extract at 40000 ppm when extracted from irradiated packed fruits in polyethylene bags with gamma rays at 5 KGy without storage or with 6 months storage or irradiated at 15 KGy of packed fruits in cotton bag with storage for 3 months presented the highest significant inhibition zones against *S. aureus*. The same concentration of extracted cumin from uniradiated packed in cotton bag fruits and storage for 6 months presented the highest inhibition zone of *S. typhimurium*. Also, with the same concentration, extracted cumin from irradiated at 10 KGy of packed in cotton bag fruits without storage or in polyethylene and stored for 3 months presented the highest inhibition zones of *A. niger*. Cumin extract at 5000 ppm when extracted from irradiation at 10 KGy of packed in cotton bag fruits and stored for 3 months presented the highest values of *P. digitatum*. On the other hand, the superior concentration of cumin extract (40000 ppm) presented the highest antiyeastal effect when extracted from irradiated packed in polyethylene fruits at 10 KGy and stored for 6 months.

Key words: Cumin fruits, *Cuminum cyminum*, Irradiation, storage periods, package materials, cotton, polyethylene, antimicrobial, essential oil.

Name of Candidate: Rasha Nagi Mohamed Arafa **Degree:** Ph.D.
Title of Thesis: Studies on Propagation of Some Ornamental Plants and *Phoenix dactylifera* by Tissue Culture
Supervisors: Dr. Atef Mohamed Zakaria Sarhan
Dr. Tarek Abou Dahab Mohamed
Dr. Abd El-Monem El-Banna
Department: Ornamental Horticulture **Approval:** 8/1/2011

ABSTRACT

This study was performed at the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University. These experiments were done in Plant Biotechnology Research Lab., Faculty of Agriculture, Cairo University during 2005 to 2009.

Ginkgo biloba, several explants were used as microcuttings and *in vitro*-produced leaves. The highest percentage of surviving of microcuttings was recoded by using 20% NaOCl. The best concentration of sucrose was 30 g/l. Shoots multiplication were resulted in added BA at 5.0 mg/l or using 0.5 mg/l NAA + 1.0 mg/l BA. Shoots elongation were recorded by using GA_3 at 8.0 mg/l. The highest callus percentage was noticed with 20.0 mg/l 2,4-D. All concentrations of IBA failed to induce any roots. NAA was very effective factor for rooting. Only 50% of the transplanted plantlets survived when transplanted on mixture composed of washed sand, peat moss and perlite at ration 1:1:1. Total flavonoids were the highest in *in vitro* leaves sample.

Date palm, the highest percentage of surviving of shoot tip explants was achieved by using 1.0 g/l MC + NaOCl at 60%. The highest percentage of surviving of inflorescence explants was achieved by using 1.0 g/l MC.

The shoot tip explants recorded the highest callus percentage with BA at 3.0 mg/l + 2,4-D at 10.0 mg/l. The highest percentage of callus formation from inflorescences in stage 1 (spikes 5 cm long) was recorded by using 3.0 mg/l 2ip + 10.0 mg/l 2,4-D.

The shoot tip explants resulted in embryogenic callus (torpedo stage formation) with BA at 3.0 mg/l + 2ip at 3.0 mg/l + 2,4-D at 40.0 mg/l. Using BA at 3.0 mg/l + 2ip at 3.0 mg/l + 2,4-D at 20.0 mg/l resulted in 1.33% torpedo. The torpedo formation from floral bud explants in stage (1) was noticed by using NAA at 5.0 mg/l + 2ip at 10.0 mg/l or using NAA at 10.0 mg/l + 2,4-D at 1.0 mg/l.

Using 2,4-D at 0.5 mg/l + kin at 2.0 mg/l resulted in the highest number of somatic embryos from shoot tip explants. Inflorescence in stage (1) induced somatic embryos by using NAA at 0.1 mg/l compared with the stage (2) of inflorescence.

Sucrose at 30.0 or 50.0 g/l recorded the highest number of leaves from embryos. Using BA at 2.0 mg/l + NOA at 2.0 mg/l or IAA at 0.5 mg/l + BA at 10.0 resulted in development of somatic embryos.

BA at 3.0 mg/l + 30.0 g/l sucrose resulted in the highest shoots number or using 0.1 mg/l NAA + 1.0 mg/l 2ip. Shoots formed roots with NAA at 0.1 mg/l. Only 20% of transplanted plantlets were surviving after acclimatization in peat moss: vermiculite: sand (1:1:1, v/v).

Key words: *Ginkgo biloba*, *Phoenix dactylifera* cv. Sewi, *in vitro*, plant growth regulators, callus formation, microcutting, shoot tip, inflorescence, total flavonoids.

Name of Candidate: Evon Atef Khella Garas **Degree: Ph.D.**
Title of Thesis: Effect of Growing Media, Irrigation Rates and Grafting on Growth and Flowering of *Hibiscus* spp. Plants
Supervisors: Dr. Hamdy Mohamed Ali EL-Bagory
Dr. Mona Ahmed Darweesh
Dr. Alfred Messiha Ibrahim
Department: Ornamental Horticulture
Approval: / /2011

ABSTRACT

Two separate filed experiments were conducted at the nursery of Horticulture Research Institute, Giza throughout two successive seasons (2007/2008 and 2008/2009) with the aim of investigating the possibility of using grafting for the propagation of *Hibiscus rosa-sinensis* L. and *Hibiscus syriacus* plants as well as determining the most suitable irrigation level and growing media for producing plants of a high quality of *Hibiscus rosa-sinensis* L.

The results emphasized that cleft grafting was the best in most cases for improving most plant traits. 'Fire Truck' stock proved its mastery in improving most of plant traits in both seasons. 'Cooperi Alba' and 'Fire Truck' scion were the best in most cases for improving most of plant morphological traits. Similarly, improvements in chemical constituents of the plant were also observed due to using 'Fire Truck' scion followed by that of either 'Charles September' or 'Cooperi Alba' scions.

The interactions revealed the superiority of the combined effect between 'Fire Truck' as a rootstock and either 'Cooperi Alba' or 'Fire Truck' scions for improving most plant traits studied. Likewise, the results of bud grafting method behaved about the same direction for its effects on plant morphological traits and chemical constituents with the superiority of cleft grafting in this concern.

The results cleared that applying the moderate irrigation level (0.75 L/pot) was the best for improving plant morphological traits and inducing the earliest flowering, but with the exception of using the highest level (1 L/pot) which gave highest number of branches and leaves/plant. Meanwhile, the lowest irrigation level (0.50 L/pot) or the moderate one (0.75 L/pot) were the best for raising the accumulation rate of plant chemical constituents. Using the mixture of peatmoss + perlite + 10% compost proved its mastery in improving plant morphological traits with producing early flowering.

The interactions, proved that growing plants in the mixture of peatmoss + perlite + 10% compost with applying either the moderate irrigation level (0.75 L/pot) or the highest one (1L/pot) gave the utmost high values of plant morphological traits. Likewise, growing plants in the mixture of peatmoss + 10% compost and supplied with the moderate irrigation level(0.75 L/pot) proved their prevalence in raising some chemical constituents of the plants in the two seasons.

From the aforementioned results, it could be recommend to use grafting in propagation with using 'Fire Truck' as a rootstock and the same cv. or 'Cooperi Alba' as scions for cleft grafting. In addition, using the mixture of peatmoss + perlite + 10% compost for growing plants with supplying them the moderate (0.75 L/pot) irrigation level (0.75 L/pot) for producing plants of good quality of superior morphological traits and chemical constituents.

Key words: Types of grafting, growing media, irrigation levels, *Hibiscus rosa-sinensis* L., *Hibiscus syriacus* L.

Name of Candidate: Eman Mohamed Mostafa Zayed **Degree:** Ph.D.
Title of Thesis: Propagation of *Phoenix dactylifera* L., *Chamaerops humilis* L. and *Hyophorbe verschaffeltii* L. Palms by Using Tissue Culture Technique.
Supervisors: Dr. Mohamed Abd El-Kahlek El-Kahteeb
Dr. Azza Mohamed Said Arafa
Dr. Abd El Monem El-Bana
Department: Ornamental Horticulture
Approval: 3 /4 / 2011

ABSTRACT

This study was conducted to investigate the ability to produce whole plantlets related to palmaceae family by micropropagation through tissue culture technique for date palm trees (Bartamuda and Sakkoty cvs.) by studying the effect of culture media and GA_3 concentrations 0.0, 0.1,0.5, and 1.0 mg/l), effect of culture media and ABA concentrations (0.0, 0.1,0.5, 1,0 and 2.0 mg/l) and effect of different nitrogen sources on friable callus production stage which derived from shoot tips explants, also in rooting stage studying of the ability for rooting by using treatments of pulsed on different NAA and IBA concentrations (1.0, 3.0 and 5.0 mg/l) and studying for the ability to promote the growth and development of roots to produce healthy whole plantlets for acclimatization by using different different sucrose concentrations (0.0, 10.0 and 20.0 g/l) and MS salt strength (½ MS, ¼ MS, ⅛ MS and $^1/_{16}$ MS strength). Also, this study procedure the produce whole plantlets from shoot tips of *Chamaerops humilis*. Also, this study procedure the produce plant regeneration from female inflorescences for date palm trees (Sewy cv.) and Spindle palm.

Key words: Palmaceae, GA_3, ABA , inflorescences

اسم الطالب: هاجر سيد مصطفي حسين **الدرجة:** دكتوراه الفلسفة

عنوان الرسالة: تأثير أوساط الزراعة والتسميد والملوحة على النمو والتركيب الكيماوي لنباتات *Ceiba pentandra* L. و*Oroxylum indicum* L. و*Dipladenia sanderi* L.

المشرفون : دكتور: محمد عبد الخالق الخطيب

دكتور: أمل عبده نصر

دكتور: علي نبيه فهمي

قسم: الزينة **فرع:** - **تاريخ منح الدرجة: ٢٠١١/٣/٢٧**

المستخلص العربي

شملت الدراسة ثلاثة نباتات إقتصادية هامة *Oroxylum indicum, Ceiba pentandra, Dipladenia sanderi* خلال موسمي الزراعة (٢٠٠٦/٠٧ ، ٢٠٠٧/٠٨) بمشتل قسم بساتين الزينة بكلية الزراعة جامعة القاهرة بهدف دراسة مدي إمكانية نجاح هذه النباتات حين زراعتها في المناطق الجديدة والساحلية وتبعا لذلك تم معاملة النباتات بالمعاملات التالية: ١. (أ) تأثير بيئات النمو على نبات *Oroxylum indicum* L. أوضحت النتائج التأثير الجيد لإستخدام بيئة الرمل والطمي (١:١) حجما متبوعا بتأثير بيئة الرمل والطمي (٢:١) حجما على النتائج المتحصل عليها حيث أدت تلك البيئات إلى زيادة إرتفاع النبات وعدد الأوراق والفروع للنبات الواحد ومساحة الوريقات والأوراق المركبة وسمك الساق ووزنه الطازج والجاف وطول الجذر ووزنه الطازج والجاف وفي نفس الوقت أدى استخدام بيئة الرمل والطمي (١:١) حجما إلى زيادة محتوى الأوراق من الاندولات والفينولات والنيتروجين والكلورفيل (أ) والكاروتينيدات. بينما أدى إستخدام بيئة الرمل والطمي (٢:١) حجما تفوقا واضحا في زيادة محتوي الأوراق والسوق من الكربوهيدرات الكلية وزيادة محتوى الأوراق من الكاروتينيدات والفوسفور والبوتاسيوم. ١. (ب) تأثير بيئات النمو على نبات *Dipladenia sanderi* L. أوضحت النتائج تأثيرات جيدة على معظم الخصائص المورفولوجية التي تم دراستها حين إستخدام بيئة الرمل والطمي (١:١) حجما والرمل والبيت موس (١:١) حجما في كلا موسمي الزراعة وبالمثل أدي إستخدام نفس البيئات إلى زيادة محتوى الأوراق من الكلورفيل (أ، ب) والكاروتينيدات في الأوراق بالإضافة إلى زيادة محتوى البوتاسيوم في السوق. في نفس الوقت أدى إستخدام بيئة الرمل والطمي (١:١) حجما إلى زيادة محتوى الأوراق من الاندولات ومحتوى الأوراق والسوق من النيتروجين وكذلك محتوى السوق من الفوسفور والبوتاسيوم. هذا وقد أدى إستخدام بيئة الرمل والبيت موس (١:١) حجما إلى زيادة محتوى الأوراق من الكربوهيدرات الكلية والفوسفور وكذلك البوتاسيوم في السوق. **٢.**(أ) تأثير الماء المالح على نبات *Oroxylum indicum L.* حيث أدى استخدام الماء المالح بتركيز ٣٠٠٠ جزء في المليون إلى زيادة محتوى الأوراق من الكربوهيدرات الكلية بينما كان لإستخدام التركيز الأدني (١٥٠٠ جزء في المليون) أثرا في زيادة نفس المكون في السوق. إزداد محتوى الأوراق من الكلورفيل (أ) زيادة . إستعمال التركيز المنخفض منها (١٥٠٠ جزء في المليون) كذلك إزداد محتوى الأوراق من الكلورفيل (ب) والكاروتينيدات (ب) تأثير الملوحة على نبات *Ceiba pentandra,* L. حيث أدي إستخدام التركيزات المنخفضة ١٥٠٠، ٣٠٠٠ جزء في المليون إلى تأثيرات جيدة على الخصائص المورفولوجية في حين كان لاستخدام التركيزات العالية (٤٥٠٠، ٦٠٠٠ جزء في المليون) تأثيرات مثبطة. أدي إستخدام التركيزات المنخفضة (١٥٠٠، ٣٠٠٠ جزء في المليون) الي زيادة محتوى السوق والأوراق من الكربوهيدرات الكلية وعناصر النيتروجين والفوسفور والبوتاسيوم. ٣.تأثير مخلوط نسب عناصر النيتروجين والفوسفور والبوتاسيوم على نبات *Dipladenia sanderi,* L. أوضحت النتائج أن معظم نسب مخاليط عناصر النيتروجين والفوسفور والبوتاسيوم كانت ذات تأثير منشط على الخصائص المورفولوجية للنبات في معظم الحالات وكذلك بالنسبة للمحتوى الكيماوي للنبات. ففي هذا المجال كان أكثر المخاليط تأثيرا هو استخدام مخلوط العناصر (١:١: ٣) حجما أو (١:١: ٢) حجما حيث أدت إلى زيادة الصفات المورفولوجية للنبات وكذلك بالنسبة للمحتوى الكيماوي للنبات حين الوضع في الاعتبار محتوى الأوراق من الكلورفيل (أ، ب) والكربوهيدرات الكلية بالإضافة إلى محتوى السوق والأوراق من النيتروجين والفوسفور التي زادت نتيجة للمعاملات السابقة.

الكلمات الدالة: *Oroxylum indicum, Ceiba pentandra, Depladenia sanderi* ، الملوحة ، البيئات، مخاليط النيتروجين والفوسفور والبوتاسيوم

Name of Candidate: Abla Hassan Hussein Dorgham **Degree:** Ph.D.
Title of Thesis: Effect of Chemical Fertilization, Growing Media and Growth Stimulants on Growth and Chemical Composition of *Calia Secundiflora* Acut. and *Ochna Serrulata* Walp. Plants
Supervisors:. **Dr**. Mohamed Abd El-Kahlek El-Kahteeb
Dr. Amal Abdou Mohamed Nasr
Dr. Ali Nabih Fahmy
Department: Ornamental Horticulture
Approval: 7 / 6 / 2011

ABSTRACT

This study was carried out to investigate the following.: Effect of GA_3 and biostimulants and growing media on growth and chemical constituents of *Calia secundiflora* - Effect of NPK and humic acids on growth and chemical constituents of *Ochna serrulata* plants.

The results can be summarized in the following:

Effect of GA_3 and growth biostimulants on growth and chemical composition of *Calia secundiflora* plants. GA_3 significantly increased plant height and stem diameter.Humic acid, algae and mycorrhiza significantly increased the plant height. Algae extract and mycorrhiza gave the thickest stems. Maximum leaf formation and number of branches with mycorrhiza. Humic, algae and mycorrhiza treatments were the most effective on increasing fresh and dry weights of leaves. Humic acid and mycorrhiza increased root growth., the content of carbohydrates

Effect of growing media on Calia plants: clay + peatmoss followed by sand+ peatmoss +perlite mixtures gave the tallest plants. Highest leaves fnumber with sand + peatmoss. Media containing vermiculite decreased formation of leaves. Media containing perlite increased branching. Using a mixture containing sand + peatmoss+ perlite increased fresh and dry weight of leaves. a mixture of clay +peatmoss + perlite gave the tallest roots. Growing the plants in clay+peat+vermiculite increased the content of carbohydrates.

Effect of NPK and humic acids on Ochna plants: NPK 112+ HA increased plant height. NPK at 111 or at 112 HA increased stem diameter. All NPK enhanced the formation of branches and leaves as well as leaf area NPK with high level of N gave the largest leaves. NPK at 112 +HA resulted in the heaviest dry weight of leaves. NPK with or without humic acid increased the root length. NPK 211+HA and NPK 111+ HA produced the highest value of chlorophyll-a. All NPK treatments increased the leaves N- content.

Key words: *Calia, Ochna,* GA_3 biostimulant, perlite and NPK

Name of Candidate: Mahmoud AbdEl-Fattah El-Sayed **Degree:** Ph.D.
Title of Thesis: Effect of Some Postharvest Treatments on Carnation Flowers Quality.
Supervisors: Dr. Abou Dahab Mohamed Abou Dahab
Dr. Afaf Mahmoud El-Sayed Habib
Dr. Faisal Mohamed Abd El-Aleam Saadawy
Department: Ornamental Horticulture **Approval:** 6 / ٦ /٢٠١١

ABSTRACT

A laboratory study in two replicated experiments was carried out in the Ornamental Horticulture Department, Faculty of Agriculture, Cairo University and the Ornamental Plants and Landscape Design Research Department, Horticulture Research Institute, Agricultural Research Center, Giza, Egypt during the period of 2009 and 2010 with the aim of investigating the effect of pulsing STS applications and the effect of certain preservative solutions on cut carnation flowers (*Dianthus caryophyllus* L. 'Domingo', previously stored either at 4°C or at 0 °C for two weeks, or fresh flowers, and the combinations of these factors.

The employed preservative solutions were distilled water only (PS1), solution of 70 g sucrose/liter (PS2), 70 g sucrose + 150 mg citric/liter (PS3), 70 g sucrose + 200 mg 8-Hydroxy Quinoline sulfate (8-HQS)/ liter (PS4), 70 g sucrose + 10 ml lime juice/liter (PS5), 70 g sucrose + 0.1 ml Clorox/liter (PS6), 70 g sucrose + 150 mg CA + 200 mg 8-HQS/liter (PS7), 70 g sucrose + 0.1 ml Clorox + 10 ml lime juice/liter (PS8), 70 g sucrose + 10 ml lupin extract + 10 ml lime juice/liter (PS9) and 70 g sucrose + 10 ml clove extract + 10 ml lime juice/liter (PS10). Obtained results showed that keeping fresh flowers in 70 g sucrose + 10 ml lime juice/liter +STS recorded the longest vase life and the second degree level of flower diameter in the two experiments. On the other hand, keeping fresh flowers in 70 g sucrose/liter + pulsing in STS recorded the highest level of number of days from star stage to full opening stage in the first and second experiments. Number of bacterial cells reaches the lowest values by keeping fresh flowers pulsed in STS and kept in solution 70 g sucrose + 0.1 ml Clorox + 10 ml lime juice/liter or sucrose + 10 ml lupin extract + 10 ml lime juice/liter in the first and second experiments.

It is recommended in case of flowers of carnation 'Domingo' when cold storage is inevitable, to store flowers at 0°C during transportation and to advice consumers to keep their flowers in a solution containing sucrose+lupin+lime in the vase to enjoy their flowers as long as possible and to avoid using chemicals that may harm the environment. When cold storage is unnecessary, it is recommended to keep fresh flowers in vases supplied with sucrose+clove+lime as it will be cheaper than chemical preservatives.

Key words: *Dianthus caryophyllus* L., cut flowers, preservative solutions, STS, lupin extract, clove extract, lemon juice, clorox.

Name of Candidate: Khaled Ismail Ibrahim Hashish **Degree:** Ph.D.
Title of Thesis: Effect of Chemical and Biofertilizer on Growth of Paulownia Seedlings
Supervisors: Dr. Mohamed Abd-El-Khalek El-Khateeb
Dr. Ahmed Salama El-Leithey
Dr. Mahmoud Mohamed Farahat
Department: Ornamental Horticulture

Approval: / /2011

ABSTRACT

Three separate field experiments were carried out on *Paulownia kawakamii* T.Ito seedlings at the Research and Production Station of National Research Center at Nubaria and Fac. Agric., Cairo Univ., during two successive seasons 2006/2007 and 2007/2008.The first experiment was designed to investigate the effect of NPK fertilizer rates on growth and chemical composition of *Paulownia kawakamii* seedlings .The treatments of NPK fertilizer were:NPK (1:1:1),(1:2:1),(1:1:2),(2:1:1),(2:2:1),(2:1:2),(3:1:1),(3:2:2) as well as control (without fertilization).The second experiment was planned to study the effect of some microelements (Fe, Zn and Mn at 50 and 100 ppm for each element) on growth and chemical composition.The third experiment was carried out to study the effect of biofertilizer (liquid or powder) and NPK fertilizers on growth and chemical constituents. The treatments were(NPK 1:1:1, microbein liquid, microbein liquid+25 g NPK, microbein liquid+50 g NPK , microbein liquid+75g NPK, microbein peat moss, microbein peat moss+25g NPK, microbein peat moss+50g NPK, microbein peat moss+75g NPK , as well as control). The main results could be summarized as follows:The vegetative growth and chemical composition responded positively to all NPK rates compared to control seedlings. Also, application of NPK fertilizer at (3:1:1) gave significant increases in all parameters. Stem fresh and dry weights, plant height, stem diameter affected by spraying the seedling with Fe at 50 ppm.Leaves fresh and dry weight increased by application of Mn at 50 ppm.Root fresh and dry weights, root number/plant, root diameter significantly increased with Zn at 100 ppm. Number of leaves and leaf area increased by Fe at 100ppm. The highest value of chlorophyll a,b and carotenoid contents were obtained with Zn at 50 ppm.The highest value of carbohydrates percentage in leaves, stems and roots were obtained with Fe at 50 ppm.Nitrogen percentage in leaves, stems and roots was high at Fe 50 ppm , phosphorus percentage in stem was high at Mn 100 ppm in both seasons.The highest value of potassium percentage was recorded with leaves at Fe 50 ppm, in stems at Zn 50 ppm and in roots at Fe 100 ppm in both seasons. Fe, Mn and Zn contents in leaves, stems and roots increased by their foliar application. All bio and NPK fertilizers improved growth parameters compared to control. The best results in regarding to leaf area and leaves fresh and dry weight were obtained from microbein liquid +75 NPK.The thickest stems and stems fresh and dry weights were obtained when Paulownia seedlings received microbein liquid +25 NPK.Microbein peat moss +75 NPK increased roots fresh and dry weights, root diameter and leaves number of seedlings.The plant height gave the highest values with application of NPK fertilizer alone at the rate of 100g.Application of biofertilizer at microbein peat moss + 75 NPK significantly increased carbohydrates and nitrogen percentage in leaves ,stems and roots. Potassium percentage in leaves and roots increased by using microbein peat moss + 75 NPK.Potassium percentage in stems responded positively to application of microbein peat moss + 50 NPK.Chlorophyll a,b and carotenoides contents of leaves were increased by application of microbein peat moss + 50 NPK in both seasons.

Keyword: *Paulownia kawakamii*, NPK fertilizer, Biofertilizer, Micronutrient, Vegetative growth,

Name of Candidate: Ramadan Attia Mohamed Hassanein **Degree:** Ph.D.
Title of Thesis: Chemical and Biological Studies on Cumin Fruits Irradiated by Gamma Rays for Conservation
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ABSTRACT

This study was carried out at the Ornamental Hort. Dept., Fac. Agric., Cairo Univ. and the National Center for Radiation Res. and Tech., Nasr City, Cairo, Egypt and the Central Laboratory, Hort. Res. Inst., A.R.C., Giza, Egypt from 2008/2010 seasons. The aim of this study was to investigate the effect of different doses of gamma irradiation (0, 5, 10 and 15 KGy) and different storage periods (0, 3 and 6 months) in different package materials (cotton or polyethylene bags) on essential oil quality and chemical composition of cumin (*Cuminum cyminum*) fruits. On the other hand antimicrobial activity of treated cumin fruits essential oil and its extracts at 0, 5000, 10000, 20000 and 40000 ppm were investigated. Results showed that the highest essential oil% was obtained from fruits stored for 3 months in cotton bag without gamma irradiation. Concerning the effect of essential oil as antimicrobial agent, the highest antibacterial activity was obtained by essential oil isolated from irradiated polyethylene packed fruits at 5 KGy then stored for 3 months (*Staphylococcus aureus*) or irradiated polyethylene packed ones at 15 KGy without storage (*Salmonella typhimurium*). On the other hand, the highest antifungal activity against *Asperigillus niger* and *Penicillium digitatum* was obtained by essential oil isolated from unirradiated packed in polyethylene fruits then stored for 6 months. Non-stored packed in cotton bag fruits irradiated with gamma rays at 10 KGy produced essential oil with highest antiyeastal activity. Cumin fruits extract at 40000 ppm when combined with different treatments presented the highest antimicrobial activity (represents as inhibition zone) against all studied microbes except with *P. digitatum.* Cumin extract at 40000 ppm when extracted from irradiated packed fruits in polyethylene bags with gamma rays at 5 KGy without storage or with 6 months storage or irradiated at 15 KGy of packed fruits in cotton bag with storage for 3 months presented the highest significant inhibition zones against *S. aureus*. The same concentration of extracted cumin from uniradiated packed in cotton bag fruits and storage for 6 months presented the highest inhibition zone of *S. typhimurium*. Also, with the same concentration, extracted cumin from irradiated at 10 KGy of packed in cotton bag fruits without storage or in polyethylene and stored for 3 months presented the highest inhibition zones of *A. niger*. Cumin extract at 5000 ppm when extracted from irradiation at 10 KGy of packed in cotton bag fruits and stored for 3 months presented the highest values of *P. digitatum*. On the other hand, the superior concentration of cumin extract (40000 ppm) presented the highest antiyeastal effect when extracted from irradiated packed in polyethylene fruits at 10 KGy and stored for 6 months.

Key words: Cumin fruits, *Cuminum cyminum*, Irradiation, storage periods, package materials, cotton, polyethylene, antimicrobial, essential oil.