

PROPAGATION OF GERBERA PLANTS THROUGH TISSUE CULTURE

**BY
OMAR NABIL KAMAL EMAM**

B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 2000

A thesis submitted in partial fulfillment
of
the requirements for the degree of
MASTER OF SCIENCE
in
**Agricultural Science
(Ornamental Plants)**

**Department of Horticulture
Faculty of Agriculture
Ain Shams University
2005**

Approval Sheet

PROPAGATION OF GERBERA PLANTS THROUGH TISSUE CULTURE

**BY
OMAR NABIL KAMAL EMAM**

B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 2000

This thesis for M. Sc. degree has been approved by:

Prof. Dr. Gamal El-Deen Fahmy Ahmed -----
Prof. of Ornamental plants, Fac. Agric.,
Cairo University

Prof Dr. Sohair El-Sayed Mohamed -----
Prof. of Ornamental plants, Fac. Agric.,
Ain Shams University

Prof. Dr. Mahmoud El-Sayed Hashem -----
Prof. of Ornamental plants , Fac. Agric.,
Ain Shams University

Date of examination: 18 / 6 /2005

PROPAGATION OF GERBERA PLANTS THROUGH TISSUE CULTURE

**BY
OMAR NABIL KAMAL EMAM**

B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 2000

Under the supervision of:

Prof. Dr. Mahmoud El-Sayed Hashem

Prof. of Ornamental Plants, Dept. of Horticulture, Fac.
Agric., Ain Shams University (Principal supervisor)

Dr. Ahmad Abdel-Hameed Hasan

Assistant Prof. of Pomology, Dept. of Horticulture, Fac.
Agric., Ain Shams University

Dr. Faisal Mohamed Abdel-Aleam Saadawy

Researcher, Horticulture Research Institute, Agriculture
Research Center

إكثار نباتات الجربيرا عن طريق زراعة الأنسجة

رسالة مقدمة من

عمر نبيل كمال إمام

بكالوريوس علوم زراعية (بساتين) ، جامعة عين شمس ، 2000

للحصول على

درجة الماجستير في العلوم الزراعية

(زينة)

قسم البساتين

كلية الزراعة

جامعة عين شمس

2005

صفحة الموافقة على الرسالة

إكثار نباتات الجربيرا عن طريق زراعة الأنسجة

رسالة مقدمة من

عمر نبيل كمال إمام

بكالوريوس علوم زراعية (بساتين) ، جامعة عين شمس ، 2000

للحصول على

درجة الماجستير في العلوم الزراعية
(نباتات الزينة)

وقد تمت مناقشة الرسالة و الموافقة عليها

اللجنة:

أ. د. / جمال الدين فهمي أحمد
أستاذ نباتات الزينة ، كلية الزراعة ، جامعة القاهرة

أ. د. / سهير السيد محمد
أستاذ نباتات الزينة ، كلية الزراعة ، جامعة عين شمس

أ. د. / محمود السيد هاشم
أستاذ نباتات الزينة ، كلية الزراعة ، جامعة عين شمس

تاريخ المناقشة 18 / 6 / 2005

جامعة عين شمس
كلية الزراعة

رسالة ماجستير

اسم الطالب : عمر نبيل كمال إمام

عنوان الرسالة : إكثار نباتات الجريبيرا عن طريق زراعة الأنسجة
اسم الدرجة : ماجستير فى العلوم الزراعية (زينة)

لجنة الإشراف :-

أ. د. محمود السيد هاشم

أستاذ نباتات الزينة، قسم البساتين ، كلية الزراعة ، جامعة عين شمس (المشرف
الرئيسى)

د. أحمد عبد الحميد حسن

مدرس الفاكهة، قسم البساتين، كلية الزراعة ، جامعة عين شمس

د. فيصل محمد عبد العليم سعداوى

باحث ، قسم بحوث نباتات الزينة ، معهد بحوث البساتين ، مركز البحوث الزراعية

تاريخ البحث 2001 / 9/10

الدراسات العليا

أجيزت الرسالة بتاريخ

2005 / 6 / 18

ختم الإجازة

موافقة مجلس الجامعة

2005 / /

موافقة مجلس الكلية

2005 / /

Contents	Page
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	4
3. MATERIALS AND METH	17
4. RESULTS AND DISCUSSION	22
I. Establishment Stage	22
I-1. Effect of Germination Pretreatment on Number of Days to Germinate	22
I-2. Effect of Sterilization Method on Survival percentage	23
I-3. Effect of Sterilization Method on Contamination percentage	24
I-4. Effect of Sterilization Method on Death percentage	25
I-5. Effect of Sterilization Treatment on Survival Percentage	26
I-6. Effect of Sterilization Treatment on Contamination percentage	29
I-7. Effect of Sterilization Treatment on Death percentage	32
II. Multiplication Stage	33
II-1. Effect of Cytokinin Type and Concentration on Shoots Number /explant	33
II-2. Effect of Cytokinin Type and Concentration on Shoot Length	43
II-3. Effect of Cytokinin Type and Concentration on Shoots Fresh Weight	48
II-4. Effect of Cytokinin Type and Concentration on Shoots Diameter	51
II-5. Effect of Extra NH_4NO_3 on Shoots Number	56
II-6. Effect of Extra NH_4NO_3 on Shoots Length	58
II-7. Effect of Extra NH_4NO_3 on Shoots Fresh Weight	60
II-8. Effect of Extra NH_4NO_3 on Shoots Diameter	61

II-9. Effect of Extra NH_4NO_3 on Total Chlorophyll Content	62
III. Rooting Stage	63
III-1. Effect of Auxin Type and Concentration on Roots Number	63
III-2. Effect of Auxin Type and Concentration on Roots Length	67
III-3. Effect of Auxin Type and Concentration on Roots Diameter	70
III-4. Effect of Auxin Type and Concentration on Roots Fresh Weight	73
IV. Acclimatization Stage	77
IV-1. Effect of Acclimatization Media on Survival percentage	77
IV-2. Effect of Acclimatization Media on Leaves Number	80
IV-3. Effect of Acclimatization Media on Shoots Length	81
IV-4. Effect of Acclimatization Media on Plant Weight	82
5. SUMMARY AND CONCLUSION	86
6. RECOMMENDATIONS	90
7. REFERENCES	91
8. ARABIC SUMMARY	

List of Tables

Page

Table (I-1)	Effect of germination pretreatment on number of days to germinate	22
Table (I-2)	Effect of sterilization method on survival %	23
Table (I-3)	Effect of sterilization method on contamination %	25
Table (I-4)	Effect of sterilization method on death %	25
Table (I-5)	Effect of sterilization treatment on survival % ..	27
Table (I-6)	Effect of sterilization treatment on contamination %	30
Table (I-7)	Effect of sterilization treatment on death	32
Table (II-1)	Effect of cytokinin type and concentration on shoots number	38
Table (II-2)	Effect of cytokinin type and concentration on shoots length (cm)	46
Table (II-3)	Effect of cytokinin type and concentration on shoots fresh weight (g)	51
Table (II-4)	Effect of cytokinin type and concentration on shoots diameter (mm)	54
Table (II-5)	Effect of extra NH_4NO_3 on shoots number	56
Table (II-6)	Effect of extra NH_4NO_3 on shoots length (cm) .	58
Table (II-7)	Effect of extra NH_4NO_3 on shoot fresh weight (g)	60
Table (II-8)	Effect of extra NH_4NO_3 on shoot diameter (mm)	61
Table (II-9)	Effect of extra NH_4NO_3 on total Chlorophyll content (mg/g fresh weight)	62
Table (III-1)	Effect of auxin type and concentration on roots number	66
Table (III-2)	Effect of auxin type and concentration on roots length (cm)	69

Table (III-3)	Effect of auxin type and concentration on roots diameter (mm)	73
Table (III-4)	Effect of auxin type and concentration on roots fresh weight (g)	76
Table (IV-1)	Effect of acclimatization media on survival % .	77
Table (IV-2)	Effect of acclimatization media on survival % .	80
Table (IV-3)	Effect of acclimatization media on shoots length (cm)	81
Table (IV-4)	Effect of acclimatization media on plant weight (g)	82

	List of Figures	Page
Fig.(I-1).	Effect of germination pretreatment on number of days to Germinate.....	22
Fig.(I-2).	Effect of sterilization method on survival %	24
Fig.(I-3).	Effect of sterilization method on contamination %	25
Fig.(I-4).	Effect of sterilization method on death %.....	26
Fig.(I-5).	Effect of sterilization treatment on survival %	27
Fig.(I-6).	Effect of sterilization treatment on contamination %	30
Fig.(I-7).	Effect of sterilization treatment on death %	33
Fig.(II-1-a).	Effect of cytokinin type on shoots number/explant	34
Fig.(II-1-b).	Effect of cytokinin concentration mean on shoots number /explant	36
Fig.(II-1-c).	Effect of cytokinin type and concentration on shoots number/explant.....	38
Fig.(II-2-a).	Effect of cytokinin type on shoots length (cm) ..	44
Fig.(II-2-b).	Effect of cytokinin concentration mean on shoots length (cm)	45
Fig.(II-2-c).	Effect of cytokinin type and concentration on shoots length (cm)	46
Fig.(II-3-a).	Effect of cytokinin type on shoots fresh weight (g)	49
Fig.(II-3-b).	Effect of cytokinin concentration mean on shoots fresh weight (g)	49
Fig.(II-3-c).	Effect of cytokinin type and concentration on shoot fresh weight (g).....	50
Fig.(II-4-a).	Effect of cytokinin type on shoot diameter (mm)	52
Fig.(II-4-b).	Effect of cytokinin concentration mean on shoot diameter (mm)	53

Fig.(II-4-c).	Effect of cytokinin type and concentration on shoot diameter (mm)	53
Fig.(II-5).	Effect of extra NH_4NO_3 on shoots number	56
Fig.(II-6).	Effect of extra NH_4NO_3 on shoots length (cm) ..	59
Fig.(II-7).	Effect of extra NH_4NO_3 on shoots fresh weight (g)	60
Fig.(II-8).	Effect of extra NH_4NO_3 on shoots diameter (mm)	61
Fig.(II-9).	Effect of extra NH_4NO_3 on total chlorophyll	62
Fig.(III-1-a).	Effect of auxin type on roots Number	63
Fig.(III-1-b).	Effect of auxin concentration mean on roots Number	64
Fig.(III-1-c).	Effect of auxin type and concentration on roots Number	65
Fig.(III-2-a).	Effect of auxin type on roots length (cm)	67
Fig.(III-2-b).	Effect of auxin concentration mean on roots length (cm)	68
Fig.(III-2-c).	Effect of auxin type and concentration on roots length (cm)	69
Fig.(III-3-a).	Effect of auxin type on roots diameter (mm)	71
Fig.(III-3-b).	Effect of auxin concentration mean on roots diameter (mm)	71
Fig.(III-3-c).	Effect of auxin type and concentration on roots diameter (mm)	72
Fig.(III-4-a).	Effect of auxin type on roots fresh weight (g)	73
Fig.(III-4-b).	Effect of auxin concentration mean on roots fresh weight (g)	74
Fig.(III-4-c).	Effect of auxin type and concentration on roots fresh weight (g)	75
Fig.(IV-1).	Effect of acclimatization media on survival % ..	77
Fig.(IV-2).	Effect of acclimatization media on leaves Number	80

Fig. (IV-3).	Effect of acclimatization media on shoots length (cm)	81
Fig.(IV-4).	Effect of acclimatization media on plant weigh .	83

	List of Plates	Page
Pl. (1)	Germination pretreatment	23
Pl. (2)	Sterilization method	24
Pl.(3)	Effect of cytokinin concentration on multiplication stage	55
Pl.(4)	Effect of extra NH_4NO_3	57
Pl.(5)	Effect of auxin type and concentration in rooting stage	76
Pl.(6)	Effect of acclimatization media (peat + erm.) .	83
Pl.(7)	matization media (peat + per.)	84
Pl.(8)	Effect of acclimatization media (peat + sand) .	84

ABBREVIATIONS:

MS:	Murashige and Skoog medium
ppm:	part per million
BA, BAP:	Benzyl adenine
Kin, KI :	Kinetin
IAA:	Indol-3-acetic acid
IBA:	Indol-3-butyric acid
NAA:	Naphthalene acetic acid
Mc :	Mercuric chloride
8-HQS:	8-Hhydroxyquinoline sulphate