RESULTS AND DISCUSSION

4-RESULTS AND DISCUSSION

4.I. *Cordyline terminals* L.

4.1.1.Establishment stage:

4.1.1.a- Effect of medium type and explant kind

Table (1) showed the effect of different medium types and explants kinds on explant development parameters of *Cordyline terminals* L. plants. It is clear from **Table**(1-A) and Photo(1)that Murashige and Skoog modified medium was superior for increasing explant development , callus production , direct regeneration, and browning in comparison with the other two media types under investigation . However , the refers were true when necrosis and browning parameters were concerned .

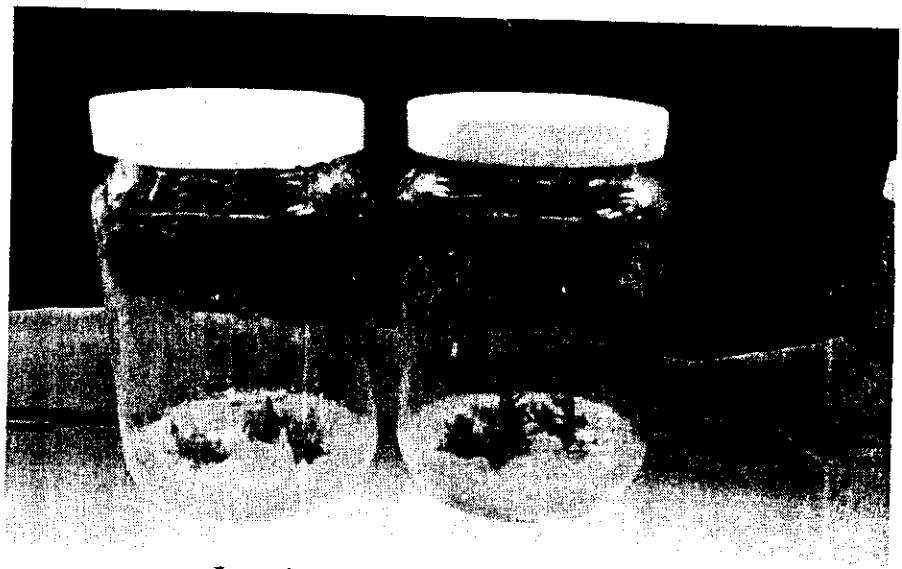
Table (1): Effect of medium type and explant kind on explant development parameters of *Cordylina terminals* L.

Table. (1-A) Effect of medium type

Parameters / Medium type	Necrosis (scores)	Browning (scores)	Explant development (scores)	Callus production (scores)	Direct regeneration (scores)	Greening (scores)
MS	1.91b	1.76b	3.35b	1.16b	3.39b	2.17b
MS modified	1.24c	1.11c	3.59a	1.42a	4.01a	2.24a
Lepriove	5.00a	4.84a	1.00c	1.00c	1.00c	1.00c

Means of medium type followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Table (1-B) reflects that shoot tip explant surpassed other explants as significantly increased explant development, direct regeneration, and greening while significantly reduced necrosis and browning .



Lepriove MS modified

Photo (1): Development of shoot-tips of *Cordyline terminals* on MS modified medium and Lepriove

Table (1-B) Effect of explant kind

Parameters Explant Kind	Necrosis (scores)	Browning (scores)	Explant development (scores)	Callus production (scores	Direct regeneration (scores	Greening
Shoot tip	2.56b	2.35b	2.73a	1.24a	2.87a	2.61a
One node cutting	2.59a	2.73a	2.23b	1.15b	2.72b	1.00b

Means of explant kind followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Regarding the interaction between medium type and explant kind, it is cleare from **Table** (1-C)that culturing of shoot tips on Murashige and Skoog modified medium significantly encouraged explant development, callus production, direct regeneration and greening, while decreased necrosis and browning.

Table (1-C) Effect of the interaction between medium type and explant kind

Parameters	Necrosis (scores)		Browning (scores)		Explant development (scores)		Callus production (scores		Direct regeneration (scores		Greening	
Explant	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.
Medium type MS	1.36c	1.46b	1.14c	2.21b	3.34b	2.37c	1.21c	1.11d	3.61b	3.17c	3.35b	1.00c
MS modified	1.16d	1.33c	1.11d	1.11d	3.87a	3.31b	1.51a	1.34b	4.01a	4.01a	3.48a	1.00c
Lepriove	5.00a	5.00a	4.81a	4.87a	1.00d	1.00d	1.00e	1.00e	1.00d	1.00d	1.00c	1.00c00

S.T.=Shoot tip O.N.C.=One –node cuttings

Means of the interaction between medium type and explant kind followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Generally, the aforementioned results recommended culturing of shoot tip explant on modified Murashige and Skoog medium for the best direct regeneration parameters. These results may be due to the structure of shoot tip which included meristematic cells and number of leaf primordia with axillary

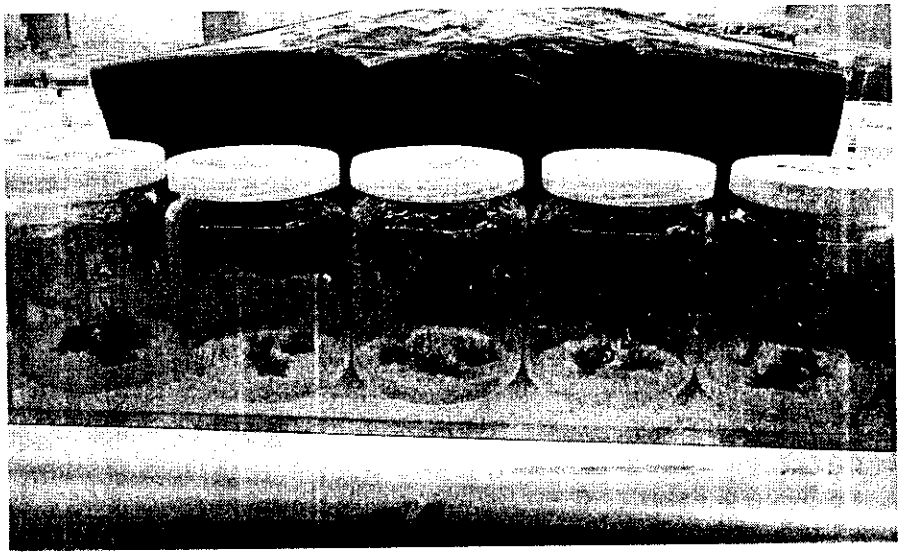
buds which developed directly into plantlets. These results are in general agreement with the findings of **Podwysyska** (1992) on *Aglaonema* cv. Silver Queen and **Youssef(2003)** on *Yucca elephantipes &Philodendron scandens*. They reported that culturing shoot tips on Murashige and Skoog modified medium gave the highest number of shoots per explant.

4.I.1.b.Effect of colchicine in the medium

Table (2) and Photo (2) reflected the effect of supplementation the culture medium with different colchicine concentrations on growth and rooting parameters of *Cordylina terminals* L. plantlets. It is obvious that supplementation of the medium with 0.06% colchicine induced significant increase in plantlets height and callus production, while addition of colchicine at 0.08% significantly increased number of shoots and number of leaves per shoot compared with the other treatments. However, control treatments surpassed other treatment significantly in increasing greening and callus production .

Table (2) Effect of colchicine concentration on growth and rooting parameters of *Cordyline terminals* L.

Parameters / Additives of colchicine (%)	Plant height (cm)	Number of shoots plant	Number of leaves	Greening (Scores)	Callus production (scores)
Control	2.03ab	35.33bc	5.69b	3.83a	3.00a
0.02	1.46b	26.67c	4.00c	2.37c	1.00b
0.04	2.33ab	56.00ab	7.00a	3.00b	2.66a
0.06	2.40a	38.67bc	6.03b	3.16b	2.16a
0.08	2.13ab	78.67a	6.66a	3.33ab	1.00b



Control **2%** **4%** **6%** **8%**

Photo (2) Effect of colchicine supplemented to the culture medium on growth parameters of ***Cordyline terminals*** .

4.I.2.Proliferation stage:

Table (3) and Photo(3) clarified the effect of different cytokinin types with different concentrations on growth and proliferation parameters. It is clear from **Table**(3-A) that 2-ip induced significant effect on improving most growth parameters as it reduced necrosis while improved both growth and greening parameters. Meanwhile, BAP was significantly effective on maximizing callus production and proliferation parameters as compared with the other cytokinin types.

Table (3):Effect of ctyokinin types with different concentrations on growth and proliferation parameters of *Cordylina terminals* L.

Table(3-A):Effect of cytokinin type:

Parameters Cytokinin type	Necrosis (scores)	Callus production (scores)	Growth (scores)	Greening (scores)	Number of shoots
KI	2.32a	2.15b	3.09b	3.25b	2.81c
BAB	1.82b	2.21a	3.06b	3.29b	3.48a
2-ip	1.56c	1.60c	3.17a	3.54a	2.98b

KI= kinetin BAb = 6- benzylaminopurine

2-ip= 2 isopentenylaerenine

Means of cytokinin type followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

However **Table** (3-B) showed that supplementation of the cultured medium with 0.50mg/l induced significant reduction of necrosis while significantly enhanced the growth and greening parameters to the highest recads in relation to the other concentrations .However, addition of 2.mg/l encouraged the highest callus production and number of shoots produced as compared with the other concentrations.

Table (3-B): Effect of cytokinin concentration

Measurement Concentrations (mg/L)	Necrosis (Scores)	Callus production (Scores)	Growth (Scores)	Greening (Scores)	Number of shoots
0.00	1.13d	1.00c	2.46c	2.80d	1.40c
0.05	1.27c	1.73b	3.36a	3.90a	3.40b
1.00	1.99b	2.62a	3.33a	3.52b	3.48b
2.00	2.82a	2.61a	3.24b	3.23c	3.84a

Means of cytokinin concentration followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Meanwhile, **Table** (3-C) cleared that necrosis was the lowermost significant when 0.05 mg/l kinetin or 1.0mg/l 2-ip were used instead of the other interactions .Meanwhile, using of 2.0mg/l BAP induced significant increase in callus production. Moreover, 0.05 mg/l BAP improved greening significantly. However, kinetin at 1.0 mg/l significantly enhanced growth in comparison with the other interactions. On the other hand, number of shoots parameter was significantly maximized by using either 1.0 mg/l BAP or 2.0mg/l 2-ip.

Table (3-C): Effect of the interaction between cytokinin type and concentration

Parameters	Necrosis (scores)				Callus production (scores)			
Concentration (mg/l)	0.00	0.5	1.00	2.00	0.00	0.5	1.00	2.00
Cytokinin type KI	1.13de	1.60c	2.2b	3.20a	1.00f	2.03f	2.96b	2.63c
BAB	1.13de	1.03e	2.13b	3.06a	1.00f	2.16e	3.20a	2.50d
2-ip	1.13de	1.20d	1.66c	2.20b	1.00f	1.00h	1.70g	2.70c
	Growth (scores)				Greening (scores)			
Concentration (mg/l)	0.00	0.5	1.00	2.00	0.00	0.5	1.00	2.00
cytokinin type KI	2.46g	3.60ab	3.50abc	2.80f	2.80g	3.70c	3.40e	3.13f
BAB	2.46g	3.30cde	3.10e	3.30cde	2.80g	4.40a	3.46de	2.50h
2-ip	2.46g	3.20de	3.40bcd	3.63a	2.80g	3.60cd	3.70c	4.06b
	Number of shoots / plants							
Concentration (mg/l)	0.00	0.5	1.00	2.00				
Cytokinin type KI	1.40g	2.36f	3.16e	3.53d				
BAB	1.40g	4.43b	4.10c	4.00c				
2-ip	1.40g	2.33f	3.20e	5.00a				

Means of interaction between cytokinin type and concentration followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Control =0.00 BAP 2ip Ki

Photo (3): Effect of cytokinin type on proliferation and growth of *Cordyline terminals* L **plantlets.**

The above mentioned results concluded that BAP is preferred than either 2-ip or kinetin for increasing of number of shoots. Also, 2.0mg/l is the best concentration for the highest number of shoots. These results in harmony with the findings of **El-Emery (2001)** on *Yucca elephantipes* and **Youssef (2003)** on *Yucca elephantipes &Philodendron scandens* .

4.I.3.Rooting stage :

4.I.3.a.Shoot elongation:

4.I.3.a.1.Effect of GA3 concentration:

Table (4) indicated the effect of different GA3 concentrations on growth and rooting parameters .It is clear that supplementation of the medium with 2.0mg/l GA3 induced significant increase in plant height in relation to the other GA3

concentrations. However, control treatment significantly increased the number of shoots, and rooting over the other treatment.

Table (4): Effect of different GA3 concentrations on growth and rooting parameters of *Cordyline terminals* L.

Parameters / GA3 concentrations(mg/l)	Plant height (cm)	Number of shoots/ plantes	Rooting (scores)
0.00	2.30 c	2.13a	2.24a
2.00	4.16a	1.40b	1.00b
4.00	2.66b	1.00c	1.00 b
6.00	2.13d	1.00c	1.00 b

Means of GA3 concentrations followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

The aforementioned results indicated that GA3 is valuable in shoot elongation only. These results may be due the role of GA3 in increasing cell elongation and reflected in increasing of shoot height . These results are somewhat in agreement with the findings of **Hassan (1998)** on *Morus* spp and **Youssef (2003)** on *Yucca elephantipes &Philodendron scandens* .

4.I.3.b Root formation

Data in **Table** (5) cleared the effect of auxin type and concentrations on rooting .**Table**(5-A)showed that IBA surpassed both NAA and IAA in increasing rooting parameters .while , growth and greening parameters were significantly increased as IAA was used in relation to the other auxin types. On the other hand ,NAA significantly reduced all parameters under study.

Table (5): Effect of auxin type on growth and rooting parameters of *Cordyline terminals* L.

Table(5-A)Effect of auxin type

Parameters / Auxin type	Necrosis (scores)	Growth (scores)	Greening (scores)	Rooting (scores)
IBA	1.99a	2.43c	2.47c	2.91a
NAA	1.67c	2.95b	3.09b	2.09b
IAA	1.77b	3.67a	3.38a	1.94b

Means of auxin type followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

However, **Table** (5-B) cleared that addition of auxin to the culture medium with either 0.5 or 1.0mg/l induced significant increase in both growth and greening parameters. However, rooting parameter was significantly increased when 2.0 mg/l auxin was used in comparison with other auxin concentrations.

Table (5-B): Effect of auxin concentration on growth and rooting parameters of C.t.

Parameters / Concentrations (mg/L)	Necrosis (scores)	Growth (scores)	Greening (scores)	Rooting (scores)
0.00	1.41c	2.42c	2.20c	2.46c
0.50	1.22d	3.29a	3.33a	1.52c
1.00	1.64b	3.26a	3.39a	2.23b
2.00	2.95a	2.56b	2.99b	3.06a

Means of auxin concentrations followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Table (5-C) showed that addition of 1.0mg/L of IAA significantly improved both growth and greening parameters as compared with the other interaction. Meanwhile, rooting parameter was statistically increased by using either 1.0 or 2,0mg/l of IBA as compared with the other interactions. On the other hand, necrosis was reduced when lower concentrations of the three auxin types were used.

Table(5-C): Effect of the interaction between auxin type and concentrations on growth and rooting of C.t.

Parameters	Necrosis (scores)				Growth (scores)			
Concentration (mg/l)	0.00	0.5	1.00	2.00	0.00	0.5	1.00	2.00
Auxins type IBA	1.41ef	1.24gh	1.91d	3.40a	2.42d	3.05c	2.32d	1.92e
NAA	1.41ef	1.11h	1.51e	2.64c	2.42d	3.42b	3.02c	2.42d
IAA	1.41ef	1.31fg	1.51e	2.83b	2.42d	3.42b	4.28a	3.32b
	Greening (scores)				Rooting (scores)			
Concentration (mg/l)	0.00	0.5	1.00	2.00	0.00	0.5	1.00	2.00
Auxins type IBA	2.20f	3.20cd	2.43e	2.06f	2.46d	2.10de	3.46ab	3.63a
NAA	2.20f	3.40c	3.76b	3.00d	2.46d	1.30f	1.63ef	3.03bc
IAA	2.20f	3.40c	4.00a	3.93ab	2.46d	1.16f	1.60ef	2.53cd

Means of interaction between auxins and concentrations followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

The aforementioned results concluded that IBA at litter 1.0 or 2.0 mg/l level was effective on rooting .This may be due to that IBA is more active than IAA and NAA in inducing rooting .These results are in general agreement with the findings of **Mohamed, Zeinab** (1997) on *Philodendron erubescens* and

P. scandens and **Youssef(2003)** on *Yucca elephantipes &Philodendron scandens.*

4.II. Spathiphyllum L.

4.II.1.Establishment stage :

4.II.1.a-Effect of medium type and explant kind

Table(6)indicated the effect of medium type and explant kind on explant development parameters of *Spathiphyllum* plants. It is obvious from **Table** (6-A) and Photo(4)that Murashige and Skoog modified was superior for increasing explant development ,callus production ,and direct regeneration in comparison with the other two media under investigation. while, the referse was true when necrosis and browning parameters were concerned .

Table (6): Effect of medium type and explant kind on explant development parameters of *Spathiphylum wallissii* L.

Table(6-A)Effect of medium type

Parameters Medium type	Necrosis (scores)	Browning (scores)	Explant development (scores)	Callus production (scores	Direct regeneration (scores	Greening
MS	1.38b	1.80c	4.06b	1.10b	3.85b	4.16a
MS modified	1.29c	2.01b	4.63a	1.18a	4.58a	3.69b
Lepriove	5.00a	4.98a	1.00c	1.00c	1.00c	1.00c

Means of medium type followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

However, **Table** (6-B) showed that shoot tip explant significantly increased explant development, direct regeneration and greening, but significantly reduced necrosis and browning

Table(6-B) Effect of explant kinds

Parameters Explant Klad	Necrosis (scores)	Browning (scores)	Explant development (scores)	Callus production (scores	Direct regeneration (scores	Greening
Shoot tip	2.47b	2.46b	3.32a	1.18b	3.30a	3.32a
One node cutting	2.64a	3.43a	3.14b	1.44a	2.98b	2.55b

Means of explant kinds followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

On the other hand, data of the interaction between medium type and explant kind are tabulated in **Table** (6-C). It is clear that culturing of shoot tips on Murashige and Skoog modified medium significantly increased explant development, callus production, direct regeneration and greening while reduced necrosis and browning.

Generally, the aforementioned results recommended, culturing of shoot tip explant on modified Murashige and Skoog medium for the best direct regeneration parameters.

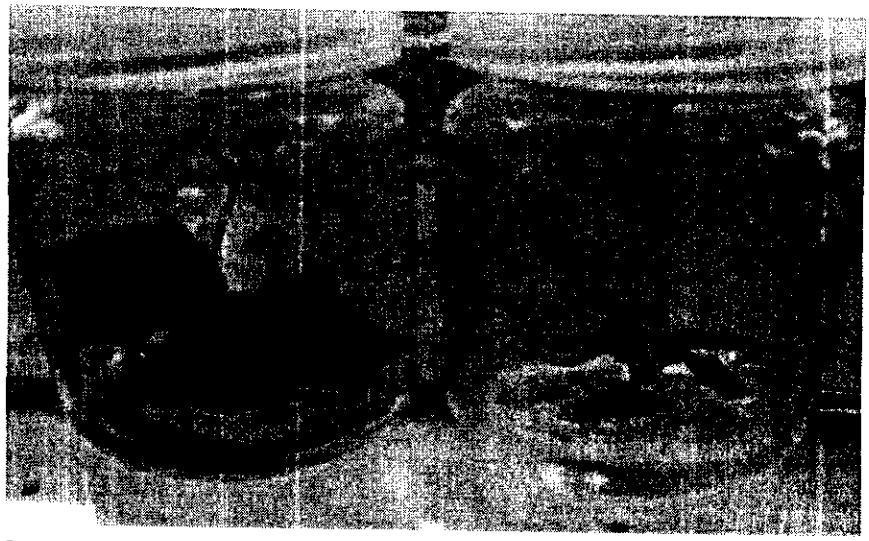


Photo (4):Shoot-tips development on MS modified and Lepriove medium of ***Spathiphyllum*** plants.

Table (6-C): Effect of the interaction between medium type and explant kind

Parameters	Necrosis (scores)		Browning (scores)		Explant development (scores)		Callus production (scores)		Direct regeneration (scores		Greening (scores)	
Explant	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.	S.T	O.N.C.
Medium type MS	1.26 c	1.50b	1.20d	2.40c	4.20b	2.37d	1.20a	1.00c	4.10 c	3.60d	4.40 b	3.93c
MS modified	1.16 d	1.43b	1.20d	2.83b	4.76a	3.31c	1.23a	1.13b	4.80 a	4.36b	4.56 a	2.73d
Lepriove	5.00 a	5.00a	4.98a	4.98a	1.00e	1.00e	1.00c	1.00c	1.00 e	1.00e	1.08e	1.00e

S.T.=Shoot tips Onc= one-node cuttings

Means of interaction between medium type and explant kind followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

These results are in agreement with the findings of **Sayed (2007)** on *Soildago altiema* L and **Youssef (2003)** on *Yucca elephantipes & Philodendron scandens*. They stated that culturing shoot tips on Murashige and Skoog modified medium gave the highest number of shoots per explant.

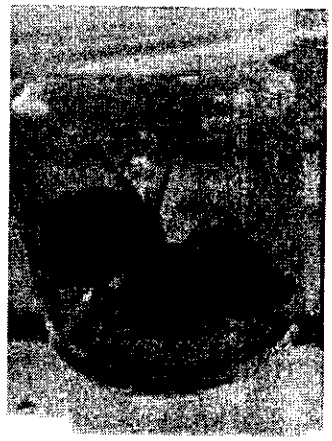
4.II.1.b.Effect of colchicine in medium on growth parameters.

Data in **Table** (7) and Photo (5) reflected the effect of supplementation of the culture medium with different additives of colchicine on growth rooting parameters of *Spathiphyllum wallissii* plantlet. It is clear that supplementation of the medium with colchicine at all concentrations had no effect on plant height, number of leaves and callus production parameters. However, the maximum number of shoots was (5.00) achieved with colchicine at 0.08%.

Table (7): Effect of colchicine concentration in the medium on gowth and rooting parameters of *Spathiphyllum wallissii.L*

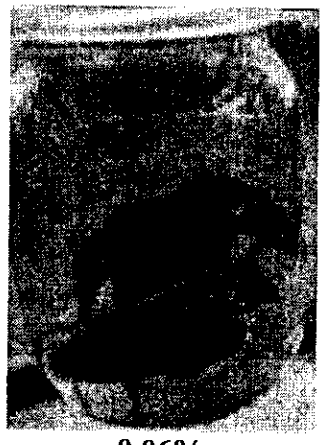
Parameters / Additives of colchicines (%)	Plant height (cm)	Number of shoots plant let	Number of leaves	Greening (scores)	Callus production (scores)
Control	1.83a	2.00b	3.33b	3.66d	1.00a
0.02	1.50a	1.00 c	5.00a	4.00c	1.00a
0.04	1.83a	1.0 0c	5.66a	4.00c	1.00a
0.06	1.33a	2.00b	6.00a	4.20b	1.00a
0.08	1.83a	5.00a	6.00a	4.66a	1.00a

Control



0.02%

0.04%



0.06%

0.08%

Photo (5) Effect of colchicine on growth of *Spathiphyllum*

4.II.2. Proliferation stage:

Table (8) showed the effect of different cytokinin types with different concentrations on growth and proliferation parameters. It is clear from **Table** (8-A)that 2-ip significantly improved growth comparing with other cytokinines . Mean time, callus production and number of shoots were significantly maximized with BAP. However, kinetin significantly reduced necrosis and callus production in comparison with other types of cytokinines.

Table(8): Effect of different ctyokinin type with different concentrations on growth and proliferation parameters of *SpathiphyLlum wallissii.L*

Table(8-A):Effect of cytokinin type:

Parameters	Necrosis (scores)	Callus production (scores)	Growth (scores)	Greening (scores)	Number of shoots
KI	1.89c	1.34c	3.42a	3.47a	2.91b
BAB	2.31b	2.35a	3.15b	2.96c	3.45a
2-ip	2.40a	1.54b	3.38a	3.39b	2.79c

Means of cytokinin type followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

However, **Table** (8-B) pointed out that control treatment (medium free cytokinins) or that supplemented with 0.50 mg/l induced significant decrease of necrosis, while significantly enhanced greening parameter in relation to the other concentrations. A similar effect was occurred with growth when the medium was supplemented with 0.50 or 1.00 mg/l in comparison with the other concentrations. However, addition 2.0mg/l encouraged the highest callus production ., while using 1.0mg/l induced significant increase in number of shoots as compared with the other concentrations .

Table (8-B): Effect cytokinin concentration

Parameters Concentration (mg/l)	Necrosis (scores)	Callus production (scores)	Growth (scores)	Greening (scores)	Number of shoots/ plantlet
0.00	1.4d	1.00d	3.06c	3.40b	2.36b
0.50	1.24c	1.55c	3.49b	3.63a	3.27c
1.00	3.53a	1.87b	3.82a	3.00c	3.45a
2.00	3.12b	2.52a	2.90d	2.94d	3.13d

Means of cytokinin concentration followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

Moreover, **Table** (8-C) indicated that the lowermost significant necrosis was occurred when the low concentrations of the different cytokinin types were used flowers, using of 1.0

&2.0 mg/l BAP induced significant increase in callus production parameters. While all concentrations of 2-ip or control and BAP significantly reduced greening. Meanwhile, kinetin at 1.0mg/l significantly enhanced growth in comparison with the other interactions. On the other hand , number of shoots parameter was significantly maximized by using 0.5&1.0 mg/l BAP .

Table (8-C): Effect of the interaction between cytokinin type and concentration

Parameters	Necrosis (scores)				Callus production (scores)			
Concentrations (mg/l)	0.00	.50	1.00	2.00	0.00	.50	1.00	2.00
Cytokinin type KI	1.40c	1.23cd	2.43b	2.53b	1.00e	1.20e	1.3de	2.06c
BAP	1. 40c	1.10d	3.43a	3.33a	1.00e	2.26c	2.80b	3.16a
2-ip	1. 40c	1.40c	3.30a	3.5 a	1.00e	1.30de	1.53d	2.36c
	Growth (scores)				Greening (scores)			
Concentrations (mg/l)	0.00	.50	1.00	2.00	0.00	.50	1.00	2.00
Cytokinin type KI	3.06e	3.30d	4.13a	3.20de	3.40cd	3.73a	3.20e	3.30de
BAP	3.06e	3.36cd	3.80b	2.40f	3.40cd	3.66ab	2.50f	2.30g
2-ip	3.06e	3.83b	3.53c	3.10e	3.40cd	3.50bc	3.30de	3.36cde

Parameters / Concentrations	Number of shoots / plantly			
Cytokinin type	0.00	.50	1.00	2.00
KI	2.36f	3.10bcd	3.23bc	2.96cde
BAP	2.36f	3.93a	4.20a	3.33b
2-ip	2.36f	2.80e	2.93de	3.10bcd

Means of the interaction between cytokinin type and concentration followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

The above results concluded that BAP is preferred than either 2-ip or kinetin in increasing number of shoots. Also, 1.0mg/l is the best concentration for the highest number of shoots. These results are in harmony with the findings of **El- Emery (2001)** on *Yucca elephantipes*, **Sayed (2007)** on *Soildago altissima* and **Youssef(2003)** on *Yucca elephantipes &Philodendron scandens*. They found that cytokinine increased the number of shoots per plantlet

4.II.3.Rooting stage:

4.II.3.a.Root formation

4.II.3.a.1. Effect of GA3 concentrations:

Data in **Table** (9) and Photo (6) explain the effect of different concentrations of GA3. Addition of GA3 at 2.0 mg/l was most significantly effective in increasing plant height compared with other concentrations. On the other hand, medium free from GA3 (control) significantly increased number of shoots and rooting parameters.

Table (9): Effect of different GA3 concentrations on shoot elongation and rooting parameters of *Spathiphyllum wallissii L.*

Parameters / GA3 concentrations (mg/L)	Plant height (cm)	Number of shoots	Rooting (Scores)
0.00	2.00 ab	1.53a	2.10a
2.00	2.73a	1.03c	1.46b
4.00	2.10ab	1.23 b	1.20 c
6.00	1.93b	1.06c	1.20 c

Means of GA3 concentrations followed by the same letter within each column are not significantly different from each other at 1% level according to Duncan's multiple range test.

4.II.3.b.Root formation

4.II.3.b.1.Effect of auxin concentrations:

Data presented in **Table(10)** pointed out the effect of different auxin types with different concentrations on growth and rooting parameters. It is clear from **Table(10-A)**that necrosis parameter was the lowermost significant when either NAA or IAA was used .The referse was true when greening parameter was concerned . On contrary, IAA was significantly effective in increasing growth parameter in comparison with the other auxin types. Meanwhile, NAA was statistically surpassed other auxin type in maximizing rooting parameter .

Table (10): Effect of different auxin types on growth and rooting parameters of *Spathiphylum wallissii .L*

Table (10-A): Effect of auxin types

Parameters / Auxin types	Necrosis (scores)	Growth (scores)	Greening (scores)	Rooting (scores)
IBA	2.44a	2.48c	2.54c	2.68c
NAA	1.81b	2.68b	2.83a	3.27a
IAA	1.82b	3.08a	2.67b	2.83b

Means of auxin types followed by the same letter within each column are not significantly different from each other at 1% level.

Meanwhile, **Table**(10-B)clear that supplementation of the cultured medium with 0.5 mg/L induced significant decrease in necrosis, while significantly increased growth , greening and rooting parameters in comparsion with other auxin concentrations.

Table (10-B): Effect of auxin concentration

Parameters / Concentration mg/L	Necrosis (scores)	Growth (scores)	Greening (scores)	Rooting (scores)
0.00	1.50c	2.35c	2.66c	3.00b
0.50	1.23d	3.41a	3.31a	3.59a
1.00	1.68b	2.99b	3.16b	3.49a
2.00	3.69a	2.24d	1.97d	1.99c

Means of auxin concentration followed by the same letter within each column are not significantly different from each other at 1% level.

Table (10-C) indicated that addition 1.0mg/L of IAA significantly improved growth, However greening was significantly increased with both 0.5 or 1.0 mg/L NAA., Also, rooting was significantly improved when 0.5 mg/L of IBA was used .On the other hand , necrosis was the lowest when lower concentrations of the three auxin types were used.

Table (10-C): Effect of interaction between auxin types and concentrations

Parameters	Necrosis (Scores)				Growth (Scores)			
Concentration mg/l	0.00	0.5	1.00	2.00	0.00	0.5	1.00	2.00
Auxins type IBA	1.50d	1.226d	2.43c	4.60a	2.35f	3.19cd	2.58de	1.52g
NAA	1.50d	1.20d	1.23d	3.33d	2.35f	3.69ab	2.39f	2.32f
IAA	1.50d	1.23d	1.40d	3.16b	2.35f	3.35bc	3.75a	3.89e
	Greening (Scores)				Rooting (Scores)			
Concentration mg/l	0.00	0.5	1.00	2.00	0.00	0.5	1.00	2.00
Auxins type IBA	2.66c	3.16b	2.66c	1.70d	3.00cd	4.66a	3.06c	1.00f
NAA	2.66c	3.60a	3.53a	1.53d	3.00cd	3.10c	3.80b	2.93cd
IAA	2.66c	3.23b	3.30b	2.50c	3.00cd	2.63d	3.63b	2.06e

Means of interaction between auxin types and concentrations followed by the same letter within each column are not significantly different from each other at 1% level.

The aforementioned results concluded that IBA at 0.5mg/L was effective in rooting. These results are in harmony with the findings of **Sayed(2007)** on *Soildago altissema* L and **Youssef(2003)** on *Yucca elephantipes &Philodendron scandens.*

SDS-Protein electrophoresis in *Cordyline terminalis* leaves:

The electrophoretic banding patterns of proteins extracted from leaves of the cultivar *Cordyline terminalis* and two treatments of colchecine are shown in Figure (1). Their densitometric analyses are illustrated in Table (11). The presence and absence of bands were assessed with (1) and (0), respectively. The results of leaves SDS-PAGE revealed a total number of 17 bands with molecular weights (MW) ranging from about 11.0 to 98kDa. The analysis of data showed 6 common bands (monomorphic), while the remaining 11 bands were polymorphic with 35 % polymorphisms. In which all of them were absent in treatment no.2 (0.08%) in compared with control and treatment no.1 (0.04%) markers at 95.0, 89.0, 57.0, 51.0, 38.0, 22.0, 21.0, 20.0 and 11.0 KDa, respectively.

SDS-Protein electrophoresis in *Spathiphylum* leaves:

The electrophoretic banding patterns of proteins extracted from leaves of the cultivar *Spathiphylum.* and two treatments of colchecine cultivars are shown in Figure (2). Their densitometric analyses are illustrated in Table (12). The presence and absence of bands were assessed with (1) and (0), respectively. The results of leaves SDS-PAGE revealed a total number of 13 bands with molecular weights (MW) ranging from about 19.0 to 111kDa. The analysis of data showed 8 common bands (monomorphic), while the remaining 5 bands were polymorphic with 38 %

polymorphisms. In which all of them were absent in treatment no.1 (0.04%) in compared with control and treatment no.2 (0.08%) markers at 67.0, 57.0, 54.0, 23.0 and 19.0 KDa, respectively.

Cordyline terminalis	*Spathiphylum*

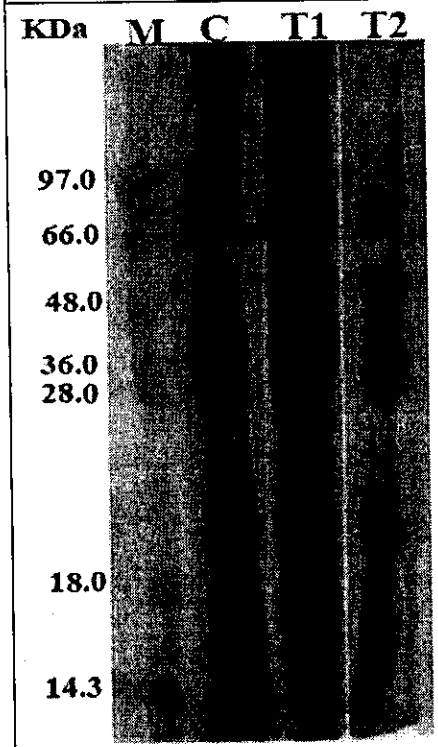
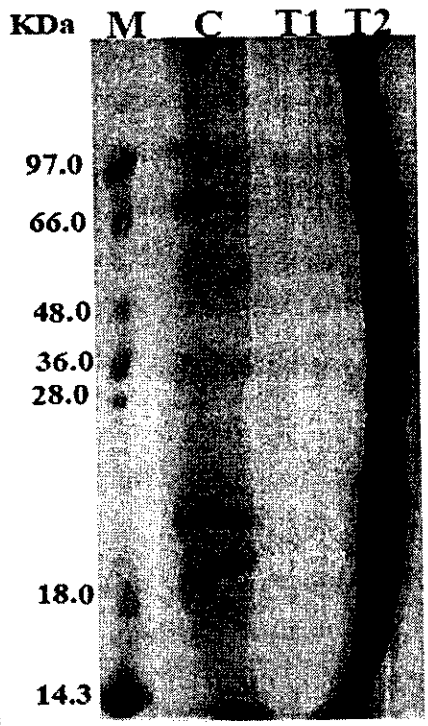

	

Figure (1): SDS-protein banding patterns of leaf proteins for for control and two treatments of colchicin of *Cordyline terminalis* ..	**Figure (2): SDS-protein banding patterns of leaf proteins for for control and two treatments of colchicin of *Spathiphylum*.**
Table (11)	**Table (12)**

Identification based on Isozymes banding patterns

Peroxidase banding patterns in *Cordyline terminalis* leaves:

Table (13) and Fig. (3) represent Peroxidase electrophoretic banding patterns among examined fresh leaf samples of cultivar *Cordyline terminalis* and two treatments of colchecine. A total of four bands were characterized for the studied cultivars, which were present in some cultivars and absent in others. Bands no. 4 was present in treatments (t1 and t2) and absent in control. While, band no.1 was high density in both treatments in compared with control. On the other hand, there were increase in density in bands no. 1 and 2 of the two treatments compared with the control.

Peroxidase banding patterns in *Spathiphylum* leaves:

Table (14) and Fig. (4) represent Peroxidase electrophoretic banding patterns among examined fresh leaf samples of cultivar *Spathiphylum* and two treatments of colchecine. A total of four bands were characterized for the studied cultivars, which were present in some cultivars and absent in others. Bands no. 2 was present in treatments (t1 and t2) and absent in control. While, bands no.3 and 4 were high density in both control and t1 in compared with t2. On the other hand, there were increase in density of band no. 1in t2 compared with the control and t1.

PolyPhenyle Oxidase banding patterns in *Cordyline terminalis* leaves:

Table (15) and Figure (5) demonstrate Polyphenyl Oxidase (PPO) banding patterns among leaf samples cultivar *Cordyline terminalis* and two treatments of colchecine. The

obtained patterns exhibited three bands, which were present in both of control and each of two treatments. On the other hand, there were differences in density of bands in band no. 2 control was low density compared with the two treatments and also band no. 3 the treatment no.2was highly density compared with control and the first treatment.

PolyPhenyle Oxidase banding patterns in *Spathiphylum* leaves:

Table (16) and Figure (6) demonstrate Polyphenyl Oxidase (PPO) banding patterns among leaf samples from cultivar ***Spathiphylum*** and two treatments of colchecine. The obtained patterns exhibited three bands, which were present in some cultivars and absent in others. Treatment no. 1 was absent in all bands compared with control and treatment no. 2 were present. On the other hand, band no. 1 was high density compared with control.

Cordyline terminalis	*Spathiphylum*

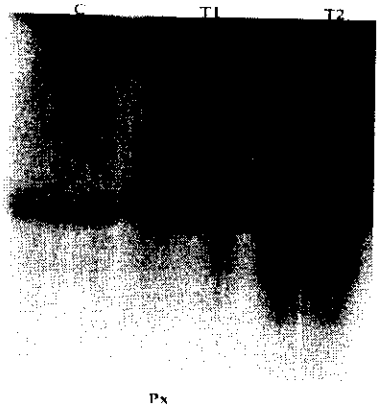
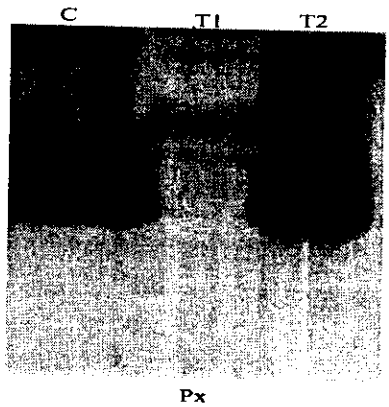

	

Figure (3): Peroxidase isozyme banding patterns for control and two treatments of colchicin of *Cordyline terminalis* .	**Figure (4): Peroxidase isozyme banding patterns for control and two treatments of colchicin of *Spathiphylum*.**

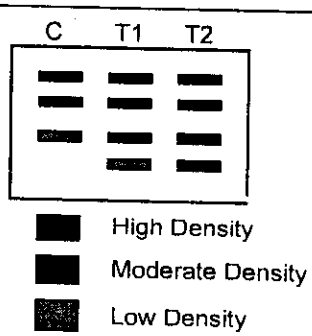
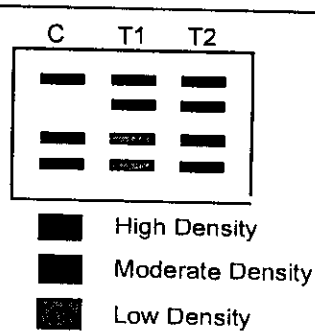
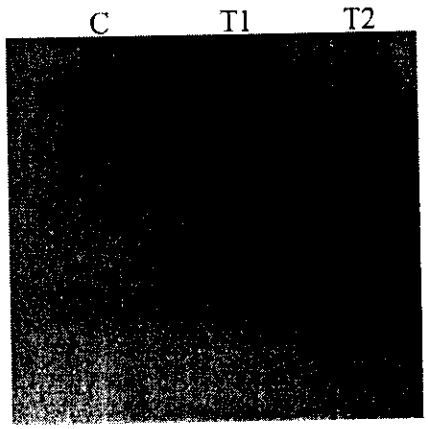
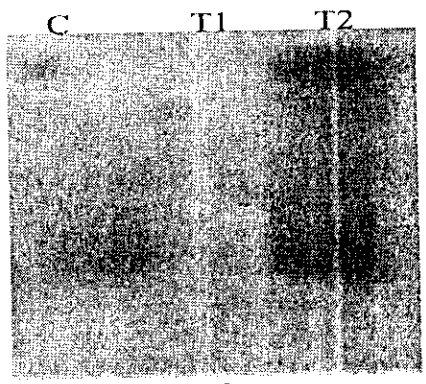

	

Table (13): Edeogram analysis for Peroxidase isozyme banding patterns for control and two treatments of colchicin of *Cordyline terminalis* ..	**Table (14): Edeogram analysis for Peroxidase isozyme banding patterns for control and two treatments of colchicin of *Spathiphylum*.**



PPO

Figure (5): Poly phenyl oxidase isozyme banding patterns for control and two treatments of colchicin of *Cordyline terminali.*



PPO

Figure (6): Poly phenyl oxidase isozyme banding patterns for control and two treatments of colchicin of *Specifelium* .

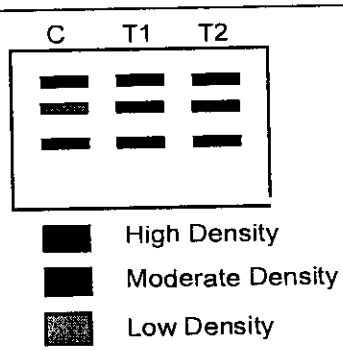


Table (15): Edeogram analysis for Poly phenyl oxidase isozyme banding patterns for control and two treatments of colchicin of *Cordyline terminali.*

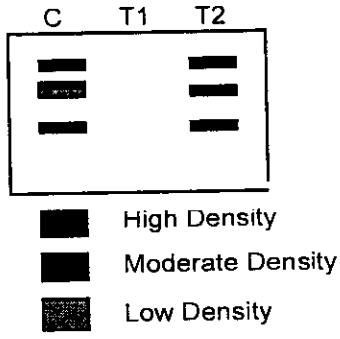


Table (16): Edeogram analysis for Poly phenyl oxidase isozyme banding patterns for control and two treatments of colchicin of *Spathiphylum*