

تأثير التيار الكهربائي في صفات النمو الخضري والزهرى لنبات

الإقحوان * *Calendula officinalis*

			2005								
(	)		(	6,4,2)	(	10,8,6)					
			3-2								
			%1								
			(RCBD)								
			. 0.05								
			LSD								
57.07	56.39		(	2X	8)						
	\	58.90	.(				6X	10)			
		5.47	(				6X	8)			
\	60.97		(	6X	6)	.%24.68		2 /	483.4		
\	48.10	%27.71	2		1544.75	6.41					
	11.42		(	4X	8)	133.07					
			18.53		%15.99						
\	45.03	10.89	125.43		(				4X	6)	
			2		1051.13	16.73					
							.(			2X	6)

Abstract

The study was conducted in the Lath house of Horticulture Department –College of Agriculture– Baghdad University during fall season 2005 to investigate the effect of electric current on vegetative, flowering growth characters of *Calendula officinalis*. Three levels of electric current severity AC (6,8,10 Ampere) and three duration of electric shock (2,4,6 minutes) were tested plus the control treatment. A special electric apparatus was prepared for this purpose. Sprouted seeds and seedlings were soaked before the treatments for 3hrs in a 1%NaCl solution. Then they soaked in a fresh water for the same period (3hrs) before they planted in the soil. A Randomize Complete Block Design was used with three replicates.

Results can be summarized as follows :

Sprouted seeds was exposed to (8A X 2mins) increased the plant height 56.39cm and 57.07cm when exposed its seedlings to (10A X 6mins). The number of branches/ plant was increased to 58.90 when exposed sprouted seeds (8A X 6mins) which increased the dry matter percentage of vegetative growth to 24.68% , main stem diameter 5.47cm and chlorophyll content 483.40mg/m² . The treatment (6A X 6mins) increased number of branches/ plant 60.97, main stem diameter 6.41cm, leaf area 1544.75cm², dry matter percentage of the vegetative growth 27.71% , number of flowers 48.10 and days number of flowering 133.07 while the treatment (8A X 4mins) increased flower diameter 11.42cm , dry matter percentage for flower 15.99% and vase life 18.53day when exposed its seedlings. *Calendula* sprouted seeds was exposed to (6A X 4m) reduced days number of flowering to 125.43day and exposed was flower diameter 10.89cm , number of flowers 45.03 and vase life 16.73day. While the treatment (6A X 2m) increased the leaf area to 1051.13cm² when sprouted seeds was treated.

Compositae *Calendula officinalis*

) (((

.

.

%30-25

.(1999 Botany

(1992)

1.5-1 220 AC

(2001b)

%39.2

%91.6 %54

(2001a)

.

.(2001 c)

(2000) Nelson

%20-%15

%30-10

% 86

%50

%45-20

(2005) Khan

50 60

(Fe , Zn , Al)

Oligo-enzymes

15-13 .

%1

.

(10)

Clamp meter

(1992)

(6,4,2)

(10,8,6)

.

()

.(1)

.

2005\9\1 15

()

. 2005\10\15

3-2

.2005\10\20

(30)

3:1

(25)

(RCBD)

.

(%5)

(L.S.D)

.(1990

)

(1)

()	()	
0	0	T0
2	6	T1
4	6	T2
6	6	T3
2	8	T4
4	8	T5
6	8	T6
2	10	T7
4	10	T8
6	10	T9

-1

(2)

56.39 T4
 (34.36) T1 %34.26 T0
 %24.44 57.07 (T9)
 38.29 T4
 .(45.86)
 T9 %23.48 (\ 58.90) T6
 . \ 47.70 \ 40.93
 %22.18 \ 60.97 T3
 (\ 41.00) T2 \ 49.90
 .(2)
 4.39 5.47 T6
 . 3.56 T9
 (3.54) T2 (6.41) T3
 . 4.85
² / 483.4 T6
 T8
² / 354.9 ² / 323.7

T6² / 500.9
2 / 324.0² / 337.8
. T9

(² 795.24) T9 T1² 1051.13
. ² 912.12
² 886.53 (² 1044.75) T3
. (2)² 797.87 T2

T9 (%24.68) T6
%23.54 %20.59
(%23.46) T9 %27.71 (T3)
. %25.56

(2)

.(1993)

(IAA-oxidase
(1996)

(2001 b , c)

pot plant
.(1992)

(4) (2)

(1992) ()

(2)

(4) .

(2)

(1965 Frensom).

(4)

(2)

(2000) Nelson

. %30-10

.

(1996) .

(2)

(2000) Nelson

%86

.

(2007)

Ranunculus

.

2 .

Calendula officinalis

%		(°)		2 /		()		\		()			
25.56	23.54	886.53	912.12	337.8	354.9	4.85	4.39	49.90	47.70	45.86	42.00	T0 (0x0)	
27.35	24.51	1031.9	1051.1	495.3	457.6	6.28	5.21	59.13	55.07	45.35	34.36	T1 (2x6)	
23.54	24.41	797.87	1003.7	483.7	468.2	3.54	5.18	41.00	52.87	39.44	37.68	T2 (4x6)	
27.71	23.49	1044.7	969.57	446.5	456.2	6.41	4.87	60.97	48.33	2.455	39.77	T3 (6x6)	
26.61	22.95	970.03	844.84	396.8	434.2	5.26	3.65	.5795	41.27	38.29	56.39	T4 (2x8)	
25.58	22.87	841.26	871.40	373.0	375.2	3.65	4.16	.3774	45.30	49.59	6.523	T5 (4x8)	
26.48	24.68	956.27	1038.6	500.9	483.4	5.74	5.47	.7785	58.90	.0374	35.64	T6 (6x8)	
24.78	21.58	915.38	835.75	47.91	388.8	5.29	4.26	50.53	44.33	.0449	44.50	T7 (2x10)	
24.41	21.76	856.12	822.14	363.9	323.7	4.37	3.79	8.235	41.47	51.35	3.944	T8 (4x10)	
23.46	20.59	827.02	795.24	324.0	337.7	3.84	3.56	43.27	40.93	57.07	54.56	T9 (6x10)	
2.02	1.90	48.42	46.55	47.4	44.4	0.39	0.36	4.05	4.73	3.26	4.14	L.S.D. 0.05	

-2

(3)																	
T9				125.43				T2									
				. 133.67				146.67									
(133.07)T3																	
. 145.53				(146.77) T9													
T4																	
T6				29.78				%12.90									
								. 17.94									
%21.40				27.71				T1									
				.(3) T3				20.63									
				(4.62) T6				(5.55) T2									
5.68				4.85													

T3	4.96	T5
	4.43	
%15.48	(10.89) T2	(3)
8.75	T6	(9.43)
11.42	T5	
9.34	9.61	%18.84
(\ 45.03)	T2	.T3
%26.38		
.(\ 31.17) T8		\ 35.63
\ 48.10	T3	
\ 33.00	(\ 38.23)	
	.(3) T2	
	(%15.45 %15.73) T9 T2	
%15.99	T5	. %14.35
%14.02 T3		
		. %14.66
29.63	T2	
24.10		T6
27.97	T5	. 24.67
T3	24.90	
		. 22.73
(3)		
14.30 13.73		T8 T2
.T6 8.20		8.80
14.53	T5	
T3 10.70		
		. 9.10
		(3)

. (1997 Modern Electrostatics)

(2001 c b)

.

(3)

(4)

(2000)Nelson

%30 – 10

(2001 c)

.

(3)

.

(1996)

.

.(4)

(3)

.

(2)

(4)

.

3 .

Calendula officinalis

()		()				\		()		()		()		()		المعاملات /
9.10	8.80	24.90	24.67	14.66	14.35	38.23	35.63	9.61	9.43	4.96	4.85	27.71	29.78	145.53	133.67	T0 (0x0)
10.53	12.30	23.83	27.80	14.15	15.26	47.10	41.43	9.56	10.48	5.46	5.11	33.64	20.78	134.47	131.20	T1 (2x6)
13.73	13.73	27.00	29.63	15.56	15.73	33.00	45.03	10.26	10.89	5.45	5.55	23.05	21.84	133.80	125.43	T2 (4x6)
10.70	12.20	22.73	27.37	14.02	15.16	48.10	39.23	9.34	10.33	4.43	5.11	20.63	27.64	133.07	145.60	T3 (6x6)
13.90	11.63	25.83	25.03	14.87	14.58	42.93	32.00	9.73	9.81	4.79	4.74	24.50	33.44	133.73	138.87	T4 (2x8)
14.53	13.60	27.97	28.70	15.99	15.39	35.70	36.43	11.42	10.48	5.68	5.26	33.29	30.62	142.53	125.83	T5 (4x8)
13.47	8.20	26.33	24.10	14.74	13.90	41.93	44.57	9.82	8.75	4.75	4.62	21.47	17.94	145.57	132.93	T6 (6x8)
10.87	9.90	24.23	24.33	14.56	14.76	42.30	35.43	9.46	9.43	4.56	4.95	27.18	31.41	145.47	142.67	T7 (2x10)
12.57	14.30	26.40	26.77	14.83	15.29	39.33	31.17	9.91	9.96	5.27	5.23	28.55	32.34	143.93	146.33	T8 (4x10)
13.57	9.47	27.57	24.47	15.66	15.45	33.23	33.77	10.36	10.40	5.35	5.16	32.88	30.66	146.77	146.67	T9 (6x10)
1.57	1.9	1.95	2.10	0.42	0.39	3.85	4.60	0.40	0.46	0.37	0.48	4.19	4.37	2.40	2.74	L.S.D. 0.05

4.
() ()

.26-	.07	.09	_* ** .61	.08	.19	.76**	.52**	.62- **	_* ** .57	_* ** .87	_* ** .82	_* ** .92		
.26	.03-	.14-	.81**	.08-	.07-	_* ** .83	_* ** .51	.69**	.64**	.90**	.87**		.40- *	
.20	.15-	.25-	.84**	.14-	.07-	_* ** .78	_* ** .56	.76**	.62**	.84**		.93**	.40- *	
.26	.09	.16-	.77**	.02	.02-	_* ** .87	_* ** .53	.74**	.76**		.90**	.94**	.42- *	
.31	.26	.25-	.75**	.01-	.13	_* ** .73	_* ** .53	.59**		.67**	.65**	.70**	.31-	
.25	.04-	.15-	.67**	.01-	.09-	_* ** .63	.39- *		.23	.41*	.30	.47**	_* ** .56	
.46- **	.22-	.04-	_* ** .54	.16-	.12-	.46**		.41- *	.34-	_* ** .45	.37- *	.32-	.57**	
.23-	.04	.16	_* ** .82	.02	.03-		.27	.43- *	_* ** .68	_* ** .84	_* ** .80	_* ** .87	.36*	
.49**	.53**	.62**	.23	.65**		.52**	.01	.26-	.37- *	_* ** .49	_* ** .53	_* ** .61	.43*	
.71**	.67**	.81**	.08		.61**	.63**	.21	.33-	.27-	_* ** .63	_* ** .71	_* ** .72	.38*	
.30	.06	.10-		_* ** .54	_* ** .59	_* ** .77	.38- *	.42*	.68**	.82**	.86**	.88**	.36- *	
.64**	.60**		_* ** .82	.81**	.57**	.81**	.28	.44- *	_* ** .45	_* ** .76	_* ** .82	_* ** .84	.28	
.75**		.86**	_* ** .71	.74**	.54**	.52**	.25	.23-	.33-	_* ** .62	_* ** .73	_* ** .70	.21	

	.78**	.74**	-.** .60	.71**	.57**	.51**	.31	.39-*	.40-*	-.** .67	-.** .67	-.** .69	.39*	

%5

*

**

%1

0.34=%5

28

r

0.44=%1

28

r

.2007.

. 38

.*Ranunculus asiaticus*

.117-110

. 1990 .

.480 .

. 1992.

.105-99 . 22

.2001 a.

.145-139 . 32 .

.2001 b.

.96-91 . 32 .

.2001 c.

.107-101 . 32 .

.1996.

. . - . .

.1996.

.599 .

. 1993.

.46-41 .

References

- Barton, O.D. and E.W. Henry. 1976. Electrical stimulation and its effect on indoe aceticacid and pyroxidase level in tomato plants (*Lycopersicon esculentum*). J. Exp. Bot. 28 (103): 338–344.
- Botany .1999. <http://www.madsci.org/libs/areas/botany.html>

- Bull, H. .1971. Electrophysiological research in plant pathology. Ann. Rev. Plant Pathology. 14 : 309-325.
- Fensom D.S.1965. The bio-electrical potential of plant and their function significance 1-An electrokinetic theory of transport. Can. J. bot. 40 : 405- 413.
- Khan-ngern W. 2005. The Effect of Electric Field on Bean Sprout Growing .International Conference on Electromagnetic Compatibility.6: 249-254.
- Modern Electrostatics.1997. <http://www.esd-china.com/ESD/index.html> more information Madscl Network, webadmin@www.madsci.org
- Nelson A. .2000. Electro-Culture (Chapter 5) .Internet Edition.
- Terry, A.T. and Robert .1976. Electrophysiological research in plant pathology. Ann. Rev. of phytopath. 14 : 309 - 325.