



EFFECT OF LIGHT INTENSITIES AND GROWTH REGULATORS ON PRODUCTION OF POTATO MICROTUBERS OF TWO CULTIVARS "SPUNTA" AND "DIAMANT"

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ABSTRACT

Experiments were conducted in the Tissue Culture Laboratory, Faculty of Environmental Agricultural Sciences (FEAS), EL-Arish, Suez Canal University during the period from 2011-2014. The present study aimed to determine the optimum hormone concentrations and light intensities for potato microtubers by tissue culture technique of two potato cultivars, "Spunta" and "Diamant". Production of microtubers in vitro where two experiments were conducted to study the effect of: (A) 6-benzyl adenine concentrations with light intensities on multiplication and microtubers production, (B) kinetin concentrations with light intensities on multiplication and microtubers production, addition of BA at rate 1.0 mg/l was recorded with both cultivars and gave the best results for all microtuberization parameters for all studied traits in the first experiment. Concerning the second experiment, "Diamant" cv. with 1000 lux had the highest record values; the results showed that light intensity 1000 lux with 4.0 mg/l of kinetin have significant effects during 60 and 90 days on multiplication and microtuber production for all studied traits.

Key words: Light, growth, production microtubers, cultivars "spunta" and "diamant", microtuberization parameters.

INTRODUCTION

Potato (*Solanum tuberosum* L.) is one of the most important vegetable crops for local consumption and exportation. **Levy, (1985)**. The use of tissue culture techniques for propagation can get about 80 fold increase in potato plants within 40 days. **Wattimena (1985)**. In addition the use of tissue culture materials (micro plants or microtubers) was estimated to be 28% less costly than that of seed tubers.

Badawi et al., (1996). many workers have used different concentrations of sugars in the medium. Showed that on (*Solanum tuberosum* L.) under light and dark condition, the highest number of

plantlets which produced microtubers were recorded

by BA with 2 mg/l. Combined treatments of BA (2, 3 and 4 mg/l), increase in potato stolon and tuber formation in both the cultivars "Diamant" and "Desiree". Although all the treatments increased chlorophyll contents, BA alone excelled other treatments in this respect **Majeed and Bano, (2006)**. **Singh et al., (2012)**. found that growth hormones, (BA 1 mg/l and naphthalene acetic acid NAA) were added to the basal medium.

Iqbal et al., (2014). observed that effect different concentration of growth regulators; viz. BA, NAA and GA₃ combinations to check their effect on

callus formation. Plant growth regulators had significant results on callus formation. The results showed that the combination of BA and NAA at the concentration of 5 and 4 mgL⁻¹, respectively, produced maximum callus from nodal explants. Maximum brownish callus was observed in variety "Desiree" while maximum whitish callus was produced in "Cardinal" variety. **Shibli *et al.*, (2002).**

in vitro shoots of *Solanum tuberosum* cv. "Spunta", were subcultured on liquid MS media containing (0.0, 0.5, 1.0, 1.5 and 2.0 mg/l) Benzyl Adenine (BA) or kinetin. **Aslam and Iqbal, (2010).** significant reduction in stem and internode length was observed by increasing BA and kinetin concentrations. BA (up to 1.0 and 1.5 mg/l) resulted in increased number of proliferated shoots and number of nodes per flask. Also they studied different concentrations of Kinetin ranging from 2.0 and 2.5 mg/l with high concentrations of sucrose (5-8 %) on microtuberization, the best results of this combination were achieved when 2.5 mg/l kinetin was used with 8% sucrose in MS medium (MK8) for cv. "Diamant".

Forooghian and Esfarayeni, (2013). studied the effect of plant growth regulators and light on callus induction, as three types of potatoes (*Solanum tuberosum* L.) including "Sante", "Agrida" and "Savalan".

Where, placed at MS culture environment under different hormonal treatments include 2,4-D at three levels (0, 2 and 5 mg per liter) and Kinetin in three levels (0, 5/0 and 2 mg/L) and different photoperiods (light and dark) to produce callus. Results showed that, there is a very significant different between numbers and different hormonal treatments in terms of all traits studied.

Also there is a very significant difference between different photoperiods

in terms of all traits, except for callus fresh weight.

Calluses produced under dark conditions and hormonal treatments of 5 mg/L 2, 4-D and 2 mg/L Kinetin showed superiority among under study cultivars over other treatments.

MATERIALS AND METHODS

This work was carried out at The Tissue Culture Laboratory, Faculty of Environmental Agricultural Sciences (FEAS), EL-Arish, Suez Canal University during the period from 2011-2014. Locally produced seed tubers of two potato cultivars; viz., "Spunta" and "Diamant" were kindly supplied from the Horticultural Research Institute (HRI), Agriculture Research Center (ARC), Giza, Egypt.

Tubers of two cultivars were washed thoroughly in running water, then cleaned gently with a soft brush, sprayed with distilled water, and stored in the dark at 4 °C for breaking their dormancy to accelerate sprouting of the eyes which formed the initial explant.

Apical meristems and apical shoots were excised and surface sterilized, and washed with a few drops of liquid soap. They were also washed with distilled water 3-4 times.

The sprouts were dipped in ethanol 70 % for 1/2 minute and then washed with sterile distilled water followed for 15 min in 10 % v/v Clorox (5.25 % of Sodium Hypochlorite) on the shaker. Finally explants were rinsed 4-5 times in sterile distilled water. Under aseptic conditions of laminar flow hood and using Binocular for excising, the apical meristems (about 0.2-0.5mm long). Apical shoot of (2-3 mm) in length was excised from potato tuber. The excised explant were cultured on MS medium (**Murashige and Skoog, 1962**).

This study was divided into two experiments:

A- Materials:

Spunta and Diamant were used in this study these cultivars Egyptian.

B- Methods:

1. Effect of cultivars, light intensities, 6-benzyl adenine BA concentrations and their interactions on multiplication and tuberization of potato plantlets after 60 and 90 days:

1. Two cultivars "Spunta" and "Diamant".
2. Three light intensities (1000, 2000 and 3000 lux).
3. Three concentrations of 6-benzyl adenine (0.0, 1.0 and 2.0 mg/l).

In vitro 6 stem cuttings (with 6 nodes)/jar of each cultivar were cultured on solid MS medium, the experiment included 18 treatments.

2. Effect of cultivars, light intensities, kinetin concentrations and their interactions on multiplication and tuberization of potato plantlets after 60 and 90 days:

4. Two cultivars "Spunta" and "Diamant".
5. Three light intensities (1000, 2000 and 3000 lux).
6. Three concentrations of Kinetin (0.0, 2.0, and 4.0 mg/l). *In vitro* 6 plantlets /jar of each cultivar were cultured on solid MS medium, the experiment included 18 treatments.

3. Experimental design and statistical analysis:

Experimental design and statistical analysis a randomized completely block design in split-split plot was used (Cochran and Cox, 1957), with three replicates, each replicate consisted of ten vessels (jars) with six stem cuttings (each 6 explants) per jar, data were statistically

analyzed using MSTAT-C computer program V^{4.0}. Duncan's Multiple Range Test was used for the comparison among means (Duncan, 1955).

RESULTS AND DISCUSSION

The present study data in the: **Effect of cultivars, light intensities, 6-benzyl adenine (BA) concentrations and their interactions on multiplication and tuberization of potato plantlets after 60 and 90 days.**

a- Effect of interaction between cultivars and light intensities on potatoes microtuberizations:

Data obtained from Table (1) show the effect of interaction between cultivars and light intensities on potatoes during microtuberization stage.

Results show significant interaction between cultivars and light intensity of the first period (60 days) for average weight of microtubers/ jar with highest records for the two cultivars under 2000 and 3000 lux. At the second period (90 days) data had significant effects for the interaction of three traits (number of microtubers/ jars, average weight of microtubers/ jars and microtubers percentage).

The highest records were recorded with the two cultivars under 2000 and 3000 lux.

b- Effect of interaction between cultivars and BA concentrations on potatoes microtuberization:

The results in Table (2) show the interaction between 6-benzyl adenine and cultivars on potatoes during microtuberization stage. Significant interactions were recorded with all studied traits at the first period (60 days) except average weight of microtubers/ plantlet, while significant effects were recorded at the second period (90 days) for all studied

Table (1): Effect of interaction between cultivars and light intensities on potatoes microtuberization.

Treatments		Culture period (days)									
		60 days					90 days				
CVS	L.I. (lux)	No.M./jar	No.M./Pla	Av.Wt.M./jar	Av.Wt.M./Pla	%	No.M./jar	No.M./Pla	Av.Wt.M./jar	Av.Wt.M./Pla	%
Spunta	1000	2.78 a	0.46 a	9.17 a	1.52 b	40.72 a	3.44 b	0.57 b	11.35 b	1.89 a	50.00 b
	2000	4.11 a	0.68 a	13.56 a	2.26 ab	53.33 a	5.33 a	0.88 a	17.58 a	2.93 a	68.22 ab
	3000	4.44 a	0.74 a	14.65 a	2.44 ab	56.67 a	5.11 a	0.85 ab	16.86 a	2.81 a	77.44 a
Diamant	1000	3.78 a	0.63 a	12.47 a	2.07 b	38.92 a	4.56 ab	0.76 ab	15.04 a	2.50 a	60.89 ab
	2000	4.22 a	0.70 a	13.92 a	2.32 a	56.67 a	5.44 a	0.90 a	17.95 a	2.99 a	71.89 a
	3000	4.44 a	0.74 a	14.65 a	2.44 a	58.89 a	5.22 a	0.87 a	17.22 a	2.87 a	71.89 a

Means followed by the same alphabetical letter (s) within each column are not significantly different at 5% level according to Duncan's Multiple Range Test.

No.M./jar.= Number of microtuber / jar, No.M/Pla= Number of microtuber /plantlet, Av.Wt.M./jar =Average weight of microtuber / jar (gm) , Av.Wt.M./Plantlet= Average weight of microtuber / Plantlet (gm) , % = Microtuberization percentage.

Table (2): Effect of interaction between cultivars and BA concentrations on potatoes microtuberizations.

Treatments		Culture period (days)									
		60 days					90 days				
CVS	BA (mg/l)	No.M./jar	No.M./Pla	Av.Wt.M./jar	Av.Wt.M./Pla	%	No.M./jar	No.M./Pla	Av.Wt.M./jar	Av.Wt.M./Pla	%
Spunta	0.0	3.22 b	0.53 b	10.62 b	1.77 a	46.29 b	4.11 b	0.68 b	13.56 a	2.26 a	59.11 b
	1.0	4.22 b	0.70 ab	13.92 ab	2.32 a	51.48 ab	5.11 ab	0.85 ab	16.86 a	2.81 a	68.22 ab
	2.0	3.89 b	0.64 b	12.83 ab	2.13 a	52.96 ab	4.67 b	0.77b	15.41 a	2.56 a	68.33 ab
Diamant	0.0	3.89 b	0.64 b	12.83 ab	2.13 a	47.40 b	4.88 b	0.81 b	16.10 a	2.68 a	62.67 ab
	1.0	5.56 a	0.92 a	18.34 a	3.05 a	66.33 a	6.33 a	1.05 a	20.88 a	3.48 a	84.89 a
	2.0	3.00 b	0.5 b	9.9 b	1.65 a	40.75 b	4.00 b	0.66 b	13.20 a	2.20 a	57.11 b

Means followed by the same alphabetical letter (s) within each column are not significantly different at 5% level according to Duncan's Multiple Range Test.

No.M./jar.= Number of microtuber / jar, No.M/Pla= Number of microtuber /plantlet, Av.Wt.M./jar =Average weight of microtuber / jar (gm) , Av.Wt.M./Plantlet= Average weight of microtuber / Plantlet (gm) , % = Microtuberization percentage

traits except average weight of microtuber/ jar and average weight of microtuber/ plantlet. The highest values were recorded with both cultivars treated by 1.0 mg/l of BA.

These results confirm the findings of **Shibli *et al.*, (2002)** who observed that increasing BA and kinetin concentrations. (BA up to 1.0 and 1.5 mg/l) resulted in increasing number of proliferated shoots and number of nodes per flask.

c- Effect of interaction between cultivars, light intensities and BA concentrations on potatoes microtuberization:

Data in Table (3) show significant effects for the interaction among studied factors (cultivars, light intensities and used BA concentrations) on potatoes during microtuberization stage.

The highest values were recorded with "Diamant" *cv.* in 1.0 mg/l BA with all light intensities and "Diamant" *cv.* at 3000 lux and 2.0 mg/l of BA. For all studied traits (number of microtuber per jar, number of microtuber per plantlets, weight of microtuber per jar, average weight of microtuber per plantlets and percentage of tuberization).

Effect of cultivars, light intensities, kinetin concentrations and their interactions on multiplication and tuberization of potato plantlets after 60 and 90 days.

a- Effect of interaction between cultivars and light intensities on potatoes multiplication and microtuberization:

Data in Table (4) show significant effects for the interaction between cultivars and light intensities on potatoes during multiplication and microtuber production after 60 and 90 days. Data presented that, "Diamant" *cv.* with 1000 lux had the highest record values.

As regard to plantlet height the highest value was recorded with "Diamant" *cv.* with 1000 lux, and the highest records of number of microtubers per jar, number of microtubers per plantlets and percentage of tuberization were recorded with both cultivars and 3000lux after 60 or 90 days.

b- Effect of interaction between cultivars and Kinetin concentrations on potatoes multiplication and microtuberization:

Data in Table (5) show significant effects for the interaction of cultivars and kinetin concentration on potatoes during multiplication and microtubers production. The highest values of number of axial shoots/ plantlet, number of leaves/ plantlet and plantlet height were recorded with "Spunta" cultivar and 0.0 mg/l of BA.

While, the concentration of 2.0 mg/l kinetin with "Diamant" *cv.* had the highest values for number of microtuber per jar, number of microtuber per plantlet and percentage of tuberization after 60 and 90 days.

c- Effect of interaction between cultivars, light intensities and Kinetin concentrations on potatoes multiplication and microtuberization.

Data in Table (6) show significant effects for the interaction among studied factors (cultivars, light intensities and kinetin concentrations). Both cultivars had the highest values with 4.0 mg/l kinetin and 1000 lux for number of shoots after 60 and 90 days.

As regard to number of leaves/ plantlet the highest values were recorded with "Spunta" cultivar and 1000 lux and 2.0 mg/l of kinetin or 3000 lux and 0.0 mg/l of kinetin, while the highest record of plantlet height was with both cultivars at 1000 lux and 0.0 mg/l of kinetin.

Table (3): Effect of interaction between cultivars, light intensities and 6-benzyl adenine concentrations on potatoes microtuberization.

Treatments			Culture period (days)									
			60 days					90 days				
CVS.	L.I (lux)	BA (mg/l)	No.M	No.M	Av.Wt	Av.Wt	%	No.M	No.M	Av.Wt.	Av.Wt	%
			/jar	/Pla	M. /jar	.M/Pla		/jar	/Pla	M. /jar	.M/Pla	
Spunta		0.0	2.33 ef	0.38 bc	7.67 c	1.28 c	38.87 e	3.00 c	0.50 c	9.9 b	1.65 b	50.00 c
	1000	1.0	3.67 cd	0.61 cd	12.11 bc	2.01 bc	44.43 de	4.33 bc	0.72 bc	14.28 b	2.38 ab	50.00 c
		2.0	2.33 ef	0.38 de	7.68 c	1.28 c	38.87 e	3.00 c	0.50 c	9.9 b	1.65 ab	50.00 c
		0.0	3.67 cd	0.61 cd	12.11 bc	2.01 bc	0.00 cde	5.00 ab	0.83 ab	16.5 ab	2.75 a	61.00 bc
	2000	1.0	4.33 a-c	0.72 abc	14.28 bc	2.38 bc	33.33 b-e	5.67 ab	0.94 ab	18.71 ab	3.11 b	77.33 ab
		2.0	4.33 a-c	0.72 abc	14.28 bc	2.38 bc	6.67 bcd	5.33 ab	0.88 ab	17.58 ab	2.93 b	66.33 abc
		0.0	3.67 cd	0.61 cd	12.11 bc	2.01 bc	0.00 cde	4.33 bc	0.72 bc	14.28 ab	2.38 b	66.33 abc
	3000	1.0	4.67 a-c	0.77 abc	15.41 bc	2.56 bc	6.67 bcd	5.33 ab	0.88 ab	17.58 ab	2.93 ab	77.33 ab
		2.0	5.00 ab	0.83 abc	16.50 ab	2.75 ab	33.33 abc	5.67 ab	0.94 ab	18.71 ab	3.11 ab	88.67 a
Diamant		0.0	3.67 cd	0.61 cd	12.11 c	2.01 c	38.87 e	4.33 bc	0.72 bc	14.28 b	2.38 b	55.33 bc
	1000	1.0	5.67 a	0.94 a	18.71 bc	3.11 c	55.67 b-d	6.33 a	1.05 a	20.88 ab	3.48 ab	77.33 ab
		2.0	2.00 f	0.33 e	6.60 c	1.10 c	22.24 f	3.00 c	0.50 c	9.9 b	1.65 b	50.00 c
		0.0	4.00 bc	0.66 bc	13.2 bc	2. bc	50.00 cd	5.33 ab	0.88 ab	17.58 ab	2.93 b	66.33 ab
	2000	1.0	5.33 ab	0.88 ab	17.58 a	2.93 a	70.00 ab	6.33 a	1.05 a	20.88 a	3.48 ab	88.67 a
		2.0	3.33 de	0.55 cde	10.98 bc	1.83 bc	50.00 cd	4.67 b	0.77 b	15.41 b	2.56 b	60.67 bc
		0.0	4.00 bc	0.66 bc	13.2 bc	2.2 bc	53.33 b-d	5.00 ab	0.83 ab	16.5 ab	2.75 b	66.33 ab
	3000	1.0	5.67 a	0.94 a	18.71 a	3.11 a	73.33 a	6.33 a	1.05 a	20.88 ab	3.48 ab	88.67 a
		2.0	3.67 cd	0.61 cd	12.11 bc	2.01 bc	50.00 cd	4.33 bc	0.72 bc	14.28 b	2.38 b	60.67 bc

Means followed by the same alphabetical letter (s) within each column are not significantly different at 5% level according to Duncan's Multiple Range Test.

No.M./jar.= Number of microtuber / jar, No.M/Pla= Number of microtuber /plantlet, Av.Wt.M./jar =Average weight of microtuber / jar (gm) , Av.Wt.M./Plantlet= Average weight of microtuber / Plantlet (gm) , % = Microtuberization percentage

Table (4): Effect of interaction between cultivars and light intensities on Potatoes multiplication and microtuberization.

Treatments		Culture period (days)									
		60 days					90 days				
CVS.	L.I. (lux)	No.M./jar	No.M/Pla	Av.Wt.M./jar	Av.Wt.M/Pla	%	No.M./jar	No.M/Pla	Av.Wt.M./jar	Av.Wt.M/Pla	%
Spunta	1000	2.66 a	8.70 a	9.63 b	2.72 b	0.45 b	40.73 b	3.54 a	10.77 a	11.61 b	3.77 b
	2000	2.36 ab	7.41 cd	7.74 c	3.81 a	0.63 a	52.22 ab	3.29 a	9.44 c	9.79 c	4.82 a
	3000	2.25 ab	7.92 bc	7.77 c	4.11 a	0.68 a	55.56 ab	3.28 a	10.08 b	9.94 c	4.92 a
Diamant	1000	2.56 a	8.58 ab	10.97 a	3.47 a	0.57 a	46.33 ab	3.53 a	10.62 a	12.86 a	4.59 a
	2000	2.04 b	6.48 e	6.22 d	3.99 a	0.66 a	55.56 ab	3.03 a	8.48 e	8.23 d	4.97 a
	3000	1.89 b	7.11 de	7.52 c	4.03 a	0.67 a	57.78 a	2.69 a	9.00 d	9.60 c	5.12 a

Means followed by the same alphabetical letter (s) within each column are not significantly different at 5% level according to Duncan's Multiple Range Test.

No.M./jar.= Number of microtuber / jar, No.M/Pla= Number of microtuber /plantlet, Av.Wt.M./jar =Average weight of microtuber / jar (gm) , Av.Wt.M./Plantlet= Average weight of microtuber / Plantlet (gm) , % = Microtuberization percentage

Table (5): Effect of interaction between cultivars and light intensities on potatoes multiplication and microtuberization.

Treatments		Culture period (days)									
		60 days					90 days				
CVS.	Kin. (mg/l)	No.M./jar	No.M/Pla	Av.Wt.l./jar	Av.Wt.M/Pla	%	No.M./jar	No.M/Pla	Av.Wt.M./jar	Av.Wt.M/Pla	%
Spunta	0.0	.22 ab	3.44 a	9.44 a	2.96 d	0.49 d	4.43 b	3.18 a	10.55 a	11.58 a	3.82 c
	2.0	.44 ab	1.85 b	7.75 b	3.76 b	0.62 b	1.48 ab	3.31 a	9.92 b	9.82 b	4.73 abc
	4.0	1.62 a	1.74 b	7.96 b	3.93 b	0.65 b	2.59 ab	3.63 a	9.82 b	9.95 b	4.97 ab
Diamant	0.0	.07 b	3.33 a	9.45 a	3.55 bc	0.59 bc	9.26 ab	3.06 a	0.25 ab	11.44 a	4.73 abc
	2.0	.22 ab	1.26 c	7.85 b	4.74 a	0.79 a	3.00 a	3.18 a	0.27 c	9.92 b	5.73 a
	4.0	.19 ab	6.58 d	7.40 b	3.20 cd	0.53 cd	7.40 b	3.01 a	3.59 d	9.33 b	4.22 bc

Means followed by the same alphabetical letter (s) within each column are not significantly different at 5% level according to Duncan's Multiple Range Test.

No.M./jar.= Number of microtuber / jar, No.M/Pla= Number of microtuber /plantlet, Av.Wt.M./jar =Average weight of microtuber / jar (gm) , Av.Wt.M./Plantlet= Average weight of microtuber / Plantlet (gm) , % = Microtuberization percentage

Table (6): Effect of interaction between cultivars, light intensities and kinetin concentrations on potatoes multiplication and microtuberization.

Treatments	Culture period (days)												
	60 days						90 days						
	CVS.	L.I (lux)	Kin. (mg/l)	No.M./jar	No.M /Pla	Av.Wt. M/jar	Av.Wt. M/Pla	%	No.M. /jar	No. M /Pla	Av.Wt. M/jar	Av.Wt. M/Pla	%
	0.0	2.21 d	8.11 e	10.11 a	2.11 h	0.35 h	33.30 e	3.22 bc	10.21 de	12.20 b	3.14 e		
1000	2.0	2.66 bc	9.22 a	9.02 c	3.05 g	0.50 g	44.43 bc	3.27 bc	11.33 a	10.98c	4.07 de		
	4.0	3.11 a	8.77abc	9.77 c	3.01 g	0.50 g	44.44 bc	4.14 a	10.78bc	11.66bc	4.11de		
	0.0	2.33 cd	8.11 e	9.11 d	3.33 fg	0.55 fg	50.00 bc	3.11 bc	10.11 de	11.22 c	4.33 d		
2000	2.0	2.33 cd	7.12f	7.00 f	4.00 cd	0.66 d	53.33 bc	3.43 abc	9.22fg	9.03 ef	5.00 bcd		
	4.0	2.44 cd	7.00 f	7.11 f	4.11 cd	0.68 d	53.33 bc	3.33 abc	9.00 g	9.14e	5.14 bcc		
	0.0	2.11 d	9.11 ab	9.11 d	3.44 efg	0.57 efg	50.00 bc	3.21 bc	11.33 a	11.33 c	4.00de		
3000	2.0	2.33 cd	7.22f	7.22 f	4.22 bc	0.70 cd	56.67 ab	3.22 bc	9.22fg	9.44 de	5.11 bcd		
	4.0	2.31 cd	7.44f	7.00 f	4.66 ab	0.77 bc	60.00 ab	3.41 abc	9.68 ef	9.04 ef	5.66 abc		
	0.0	2.21 d	8.e	12.13 a	3.12 g	0.52 g	44.44 cd	3.22 bc	10.21 de	14.03 a	4.67 cd		
1000	2.0	2.45 c	9.11 ab	10.11bc	4.11 cd	0.68 d	55.67 ab	3.44 abc	11.23 ab	12.22 b	4.98 bcd		
	4.0	3.02 ab	8.53cde	10.66 b	3.17 fg	0.52 g	38.87 de	3.94 ab	10.43 cd	12.33 b	4.13de		
	0.0	2.00 d	8.22 de	8.11e	3.66 def	0.61 de	50.00 cd	3.00c	10.21 de	10.15 d	4.68 cd		
2000	2.0	2.10 d	6.11g	6.3 g	4.99 a	0.83 ab	63.33ab	2.98 c	8.11 h	8.33 f	6.01ab		
	4.0	2.00 d	5.11 h	4.2 h	3.33 fg	0.55 fg	53.33bcc	3.11 bc	7.13 i	6.22 g	4.23 de		
	0.0	2.00 d	8.66bcd	8.11 e	3.88 cde	0.64 de	53.33bcc	2.96 C	10.3 cd	10.15 d	4.85cd		
3000	2.0	2.11 d	6.5 g	7.1f	5.11 a	0.85 a	70.00 a	3.13 bc	8.46h	9.22 e	6.2a		
	4.0	1.55 e	6.1 g	7.3f	3.1 g	0.51 g	50.00bcc	1.98d	8.2 h	9.4de	4.31d		

Means followed by the same alphabetical letter (s) within each column are not significantly different at 5% level according to Duncan's Multiple Range Test.

L.I. = light intensity, CVs = cultivars, No.M./jar.= Number of microtuber / jar, No. M/Pla= Number of microtuber / plantlet, % = Microtuberization percentage.

Concerning the highest values of number of microtubers per jar, number of microtubers per plantlet and microtuberization percentage the highest values were recorded with "Diamant" cultivar under 3000 and 2000 lux and 2.0 mg/l of kinetin.

These data are in a harmony with **Forooghian and Esfarayeni, (2013)** who found that calluses produced under dark conditions and hormonal treatments of 5 mg/L 2,4-D and 2 mg/L Kinetin showed

superiority among under study cultivars over other treatments.

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الملخص العربي

تأثير الكثافات الضوئية و منظمات النمو على إنتاج درنات البطاطس لـصنفين سبونتا ودايمونت

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أجريت هذه الدراسة في معمل زراعة الأنسجة بكلية العلوم الزراعية البيئية بالعريش- جامعة قناة السويس خلال الفترة من عام ٢٠١١ إلى ٢٠١٤. تهدف هذه الدراسة إلى إنتاج درنات بطاطس يمكن استخدامها كتقاوي لإنتاج محصول البطاطس بدلا من استيراد تلك التقاوي من الخارج سنويا بالعملات الحرة. تم في هذا البحث استخدام درنات تقاوي بطاطس منتجة محليا من صنفان هما سبونتا ودايمونت. واستخدم تجربتين هم:

(أ) تأثير تركيزات البنزويل أدنين مع كثافات ضوئية مختلفة على تضاعف وإنتاج الدرينات.

(ب) تأثير تركيزات الكينيتين مع كثافات ضوئية مختلفة على تضاعف وإنتاج الدرينات وكانت أفضل النتائج عند استخدام البنزويل أدنين مع الكثافات الضوئية المختلفة وتركيزاتها أدى الى زيادة فى الصفات الخضرية مع الصنف سبونتا عن الصنف دايمونت وسجل تركيز ١ ملجم/ لتر من البنزويل أدنين أفضل النتائج فى إنتاج الدرينات مع كل المعاملات فى التجربة الأولى. بالنسبة للتجربة الثانية لوحظ أن الكثافة الضوئية ١٠٠٠ لوكس مع تركيز ٤ ملجم/ لتر من الكينيتين أعطت تأثيراً معنوياً خلال ٦٠ و ٩٠ يوم على تضاعف وإنتاج الدرينات فى كل المعاملات المدروسة.

الكلمات الاسترشادية: الكثافة الضوئية، صنفى البطاطس سبونتا ودايمونت، الكينيتين، من البنزويل أدنين.

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