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The Effect of Various Concentrations of 6- Benzylaminopurine (BAP) and Sucrose on in Vitro Potato (*Solanum tuberosum* L.) Microtuber Induction

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Abstract: In order to study the effect of various concentrations of 6- benzylaminopurine and sucrose on in vitro potato (*Solanum tuberosum* L.) microtuber induction. Explants from in vitro grown plants were cultured on Murashige and Skoog medium salts with agar (8 g/l). This experiment performed according to the factorial on the base of completely randomized design in five replications which the factor A included three levels of concentrations of sugar (0, 60 and 80 g/l) and factor B, benzylaminopurine with four levels (0, 12, 15 and 18 g/l). Analysis of variance from measured traits showed that significant difference between concentrations of sugar, BAP them interaction in terms of microtuber number and size average in levels 5 and 1% probably. Results indicated that Sucrose and BAP had also significant (p less than 0.05) effect on microtubers. Sucrose 60 g/l and BAP 15 g/l showed maximum number of microtubers. Also the sucrose 60 g/l with BAP 12 g/l had maximum size of microtubers.

Key word: Sucrose · Potato · Benzylaminopurine · Microtubers

INTRODUCTION

Potato is the fourth most food crop after wheat, rice and maize, therefore, the most important dicotyledonous and tuber crop [1]. Microtuber production is one of the strategies under this perspective. Because of their small size and weight microtubers have tremendous advantages in terms of disease free, storage, transportation and mechanization [2, 3]. A number of research groups all over the world are trying to bring about this revolution [4, 5 and6]. Now a day, exogenous supply of cytokinin and cytokinin like compounds in microtuber growth media has been getting much attention for future perspective [7]. However, cytokinin stimulated transition of axillary buds into stolons, which could be useful in tuberization In Vitro but not maintenance of shoot cultures [8]. Microtubers can be used in the green house to produce minitubers or they can be used directly in the field. Themicrotubers used for direct field planting have high commercial potential, particularly in regions with warm and well-drained soils during planting seasons. However, the size of the tubers selected for field planting has a strong effect on the performance of the crop [9]. This research was planned to study the effect of various concentrations of 6- benzylaminopurine (BAP) and sucrose on in vitro potato (*Solanum tuberosum* L.) microtuber induction.

MATERIALS AND METHODS

In vitro microtubers were obtained in potato (*Solanum tuberosum* L.) cultivar Agria a variety of potato introduced in Ardabil east north of Iran. Explants from in vitro grown plants were cultured on Murashige and Skoog (MS, 1962) with agar (8 g/l). This experiment performed according to the factorial on the base of completely randomized design in five replications which the factor A included three levels of concentrations of sugar (0, 60 and 80 g/l) and factor B, benzylaminopurine with four levels (0, 12, 15 and 18 g/l). The following traits were measured in each plot: 1. Number of Microtuber 2. Microtuber Size. All statistical analyses were conducted by SAS V.9.0 [10].

RESULTS AND DISCUSSION

Analysis of variance from measured traits showed that significant difference between concentrations of sugar, benzylaminopurineand them interaction in terms of microtuber number and size average in levels 5 and 1% probably. Sucrose by BAP interaction effects was significant for number of microtuber and microtuber Size traits (Table 1). The Results showed that Sucrose 60 g/l and benzylaminopurine with 15 g/I had higher production

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Table 1: Analysis of Variance Summary (mean of square) for measured size and number of microtubers.

		MS	
Source of variation	Degree of freedom	Number of Microtuber	Microtuber Size
replication	4	2.98^{ns}	0.023^{ns}
Sucrose	2	26.22**	0.131*
BAP	3	12.42**	0.089*
BAP * Sucrose	6	9.08**	0.126*
error	44	1.55	0.030
Coefficient of variation (%)		29.3	26.86

ns=Non significant and *, ** = significant at 5%, 1%, respectively.

Table 2: The influence of Sucrose and BAP on Number of Microtuber and Microtuber Size of potato in vitro condition

		Trait			
Source of variation	Levels (g/l)	Number of Microtuber		Microtuber Size (cm)	
	0	2.00	c	0.28	b
Sucrose	60	4.20	a	0.44	a
	80	3.65	b	0.38	ab
	0	2.60	c	0.42	b
BAP	12	4.00	ab	0.31	b
	15	4.13	a	0.45	a
	18	2.40	bc	0.29	c

Table 3: Interaction effect of BAP and Sucrose on induction and development of potato microtuber.

		Trait			
Sucrose (g/l)	BAP (g/l)	Number of Microtuber		Microtuber Size (cm)	
0	0	2.60	bc	0.35	bc
	12	3.40	bc	0.33	bc
	15	2.00	c	0.45	b
	18	0.00	d	0.00	d
60	0	2.60	bc	0.45	b
	12	5.60	b	0.49	a
	15	5.80	a	0.43	b
	18	2.80	bc	0.40	b
80	0	2.60	bc	0.46	b
	12	3.00	bc	0.13	c
	15	4.60	b	0.46	b
	18	4.40	b	0.47	b

(Table 2). The minimum number of microtubers per was 0.0 in absence of Sucrose, while it was highest with 15g/I BAP in combination with 60 g/l sucrose (5.80) [11, 12]. This might be due to the positive effect of both BAP and sucrose in the medium (Wang and Also the sucrose 60 g/l with BAP 12 g/l had maximum size of microtubers (Table 3). It was concluded that 6- benzylaminopurine and sucrose are still a powerful Materials for in vitro potato (*Solanum tuberosum* L.) microtuber induction.

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