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Plant Growing

Effect of Different Growth Media on *in vitro* Propagation of Grapevine Cultivar "Chkhaveri"

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ABSTRACT. Artificial Gamborg (B5) and Murashige-Skoog (MS) nutrient media have been exploited for *in vitro* propagation of endemic grapevine cultivar "Chkhaveri". Cultivation media were added by phytohormones benzylaminopurine (BAP, group of cytokinins), and indole acetic acid (IAA, group of auxins). The Murashige-Skoog (MS) cultivation medium added by 8 μM BAP solution turned out to be the optimum for propagation of grapevine explants. Buds grew rapidly on the medium, the developed plants were of light green color and at the end of subcultivation shoot height reached 20-25 mm, average number of developed shoots was equal to 5-6 units. Adding auxin to the cultivation medium was ineffective. Auxin negatively influenced the cultivation, process probably due to the content of endogenous auxin in the explant. © *2007 Bull. Georg. Natl. Acad. Sci.*

Key words: *explant, micro shoots, phytohormones, benzylaminopurine (BAP), naphthyl acetic acid (NAA), indole acetic acid (IAA).*

Viticulture has a long and interesting history in Ajara region. Best of all wine-growing is developed in Keda District of mountainous Ajara [1].

The aim of our experiments was to establish optimum conditions for rapid mass propagation of the oldest endemic grapevine cultivar "Chkhaveri" and to choose concentrations of phytohormones which promote fast growth and propagation of buds.

Micro shoots developed in the first stage of the experiment have been used as explants. Explants were cultivated on the modified Gamborg (B5) and Murashige-Skoog (MS) artificial nutrient media (pH 5.8-5.9) [2, 3]. The following growth regulators: benzylaminopurine (BAP), naphthyl acetic acid (NAA) or indole acetic acid (IAA) were added to the media at different concentrations. Subcultivation of explants was carried out every 25 days. Explants were incubated in phytotron at 26°C temperature, at 16/8 h photoperiod, at 2-3 Klux illumination. Evaluations were carried out at the end of each subcultivation [3-5].

Mineral composition of cultivation media, concentration and proportion of phytohormones differently affected propagation coefficient. The following ratios of BAP/IAA have been used in the experiment:

8μM/ 1μM; 8μM/0.5μM; 8μM/-
14μM/1μM; 14μM/0.5μM; 14μM/-
20μM/1μM; 20μM/0.5μM; 20μM/-

None of cytokinin (BAP) concentrations added to Gamborg medium gave desirable effect. Only emergence of negligible amount of adventitious buds has been attested. In particular, development of buds *de novo* and growth in height of micro shoots proceeded slowly on the Gamborg medium (B5) added by BAP at 8mM concentration. During the further cultivation plant leaves became yellow and their abscission took place.

Table

Effect of phytohormones on *in vitro* propagation of grapevine cultivar "Chkhaveri"

Phytohormone concentration, μM		Number of adventitious buds	Average height of shoots, mm
BAP	IAA		
8	-	5.2	20-25
14	-	5.0	20-25
8	0.5	2.3	12
14	0.5	2.0	10
8	1	1.7	10
14	1	1.5	10

Adding BAP solution of 10μM concentration to Gamborg medium (B5) caused significant delay of propagation and growth processes. Condition of the cultures worsened, shoots became brittle and perished. Further elevation of BAP concentration yielded a similar result. It can be concluded that the components of Gamborg medium ineffectively influenced the morphogenetic potential of grapevine plant. This was manifested as repressive effect of phytohormones as well. Contrary to this, addition of phytohormones to the modified nutrient medium of Murashige-Skoog (MS) positively affected microclonal propagation of grapevine explants.

The results of experiments have shown that substitution of one nitrogen source KNO_3 with another one NH_4NO_3 in grapevine *in vitro* culture acted as inductor of initiation and realization of morphogenetic potential of the plant.

Murashige-Skoog (MS) medium added by 8M BAP solution turned out to be the optimum for grapevine cultivation. On the 3rd-4th days after subcultivation development of new buds at the basal part of the explant started. The buds grew rapidly, the developed plants were of light green color and at the end of subcultivation shoots reached 20-25 mm in height, average number of shoots was 5-6 units.

To reach the higher propagation coefficient BAP concentration was increased up to 14μM, but we failed to obtain a significantly different result. Elevation of BAP concentration up to 20μM caused shortening of apical shoot, its thickening and increase of leaf size, probably due to surplus concentration of cytokinin (Table).

Thus, summarizing points of growth and development of grapevine explants 8μM concentration of BAP can be regarded as an optimum one. As regards auxins, addition of IAA to the cultivation media negatively affected culture growth probably due to the content of endogenous auxins in the explant tissues [2, 6, 7]. So, synthesis of auxins took place in tissues of the explant. Halving of auxin concentration (0.5μM), caused strong retardation of processes of culture growth and development. Thus the use of auxin, namely IAA, for microclonal propagation of explants of grapevine cultivar "Chkhaveri" has been found to be ineffective.

მემცენარეობა

საკვები არის გავლენა ვაზის ჯიშის "ჩხავერის" გამრავლებაზე *in vitro* სისტემაში

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ვაზის ენდემური ჯიშის "ჩხავერის" კულტურაში გამრავლებისათვის გამოყენებულ იქნა გამბორგის (B_5) და მურასიგე-სკუგის (MS) ხელოვნური საკვები არეები. საკვებ არეებს ემატებოდა ფიტოჰორმონები ბენზილამინოპურინი (ბაპ) და ინდოლძმარმჟავა (იძმ). *in vitro* ვაზის ექსპლანტთა გამრავლებისთვის

ოპტიმალური აღმოჩნდა MS საკვები არე ბაპ-ის 8 მკმ კონცენტრაციით. ამ არეზე კვირტები სწრაფად იზრდებოდა, ვარჯი იყო მთლიანად ღია მწვანე შეფერილობის და სუბკულტივირების ბოლოს ყლორტების სიმაღლე 20-25 მმ-ს აღწევდა, ხოლო საშუალო რაოდენობა 5-6 ერთეული იყო. საკვებ არეში აუქსინების დამატება არაეფექტური აღმოჩნდა. ამ ფიტოჰორმონის დამატება უარყოფითად მოქმედებდა კულტურაზე, რაც საგარაუდოდ გამოწვეული იყო ექსპლანტში ენდოგენური აუქსინის შემცველობით.

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