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EFFECT OF BAP CONCENTRATION AND CONTENT OF FOOD ENVIRONMENT ON "IN VITRO" REGENERATION OF RIZAMAT (VITIS VINIFERA L) CULTIVAR

Djonibekova Nafosat Ergash kizi
PhD student
Jo'raev Sirojiddin Turdiqulovich
Doctor of biological subjects
Inoyatova Maftuna Hasan kizi
Master student

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Abstract:

This article identifies the composition of the nutrient medium and the amount of new concentrations for the development of local grape varieties of Uzbekistan in vitro. In the experiment, MS and DKW media were used, auxin NAA in the amount of 0.01 and 0.5 mg / l, and cytokinin BAP in the amount of 0.1; 0.5; 1; used at a concentration of 2 mg / l. According to the results, the best development parameters of the variety are MS 4,4 mg / l + NAA 0,01 mg / l + BAP 0,5 mg / l when applied at a concentration of 3 cm, 93.5%, root formation was 4 mm, 89,3%, buds while the length was 1.5 cm, 81.6%, the height of the implant was 2 cm, 48.5%, the most optimal values in the nutrient medium DKW 5.3 mg / l + NAA 0.01 mg / l BAP 0.1 mg / l when applied, the length of the root of the explant was 5 cm, 91.3%, colus formation was 2.5 mm, 60.1%, no budding was observed, the growth length of the implant was 7 cm, 88.7% was noted. It was found that the types of grape varieties, their morphological and physiological characteristics, as well as the parameters of development in artificial nutrient media vary. In conclusion, MS 4,4 mg / l + NAA 0,5 mg / l + BAP 0,5 mg / l nutrient medium for colus formation and bud, DKW 5,3 mg / l + NAA 0,01mg / l + BAP for growth and rooting of the explant, 1 mg / l nutrient medium is recommended.

Keywords: Grapes, In Vitro, Bud, Nutrient Medium, Explant, Variety, Auxin, Cytokinin

INTRODUCTION

Grapevine (Vitis spp.) is among the most widely grown fruit crops worldwide, which reflects its great economy significance [11; 2]. Viticulture is one of the most important branches of horticulture and, if done correctly, can become the most profitable, even when producing planting material in various ways, including in vitro. This is indicated by the entire world experience [14; 15; 16; 18].

In vitro regeneration, systems are generally shaped in thetriangle of genotype, explant source, and culture conditions.In this respect, for Vitis vinifera L., there is no general pro-tocol, whereas the required nutrition environment content,plant growth regulators, and environmental conditions showvariations as per the varieties [12].

For example in the in vitro studies of varieties of Muscat grape (V.rotundifolia), it was found out that TDZ was more influential than BAP [13]. However, Gray and Benton have reported that BAP gave a better result for the same type [4]. Furthermore, Mhatre et al have stated that for the proliferation of V. vinifera, BAP was the most suitable cytokinin. While 1.13 mg l–1 BAP was used for 'Carlos' grape, being among Muscat grape varieties, it was found out that for Fry grape variety usage of 4.5mg l–1 BAP, which was almost 4 times more than 1.13mg l–1 BAP, was more appropriate [8].

Numerous nutrient concentrations have been identified for growing grape varieties in vitro. However, due to the morphological and physiological characteristics of local grape varieties of Uzbekistan, no new nutrient composition has been developed and no scientific publications have been published. Therefore, it is important to determine the optimal nutrient concentrations for the development of local grape varieties of Uzbekistan in vitro culture.

According to data of Sirojiddin Turdikulovich Jurayev, the significant influence of the environment on the yield indicates the complex structure of this trait. Lines 681 and 765 were identified, which showed consistently high yield rates. The results of this experiment allow us to conclude that when selecting for cotton yield, it is necessary to consider that the environment significantly affects it, and in order to find the optimal variant of the genotype-geographical point, it is necessary to conduct a number of analysis in different cultivation regions [20].

According to data of Juraev Sirojiddin Turdiqulovich, Egamberdieva Saida Abdusamatovna Yakubjonova Nodirakhon Avazovna, Phenotypic correlations were determined between fiber yield and some economic traits in ten lines of medium-fiber cotton Gossypium hirsutum grown in three different regions of Uzbekistan. It is noted that there is a direct relationship of average strength between the fiber yield and the length of the growing season [21].

MATERIALS AND METHODS

The study was conducted in the in vitro laboratory of De Nova Agro in 2020-2021. The Rizamat variety of local grapes was selected as the object for the experiment.

Rizamat navi. It was created at the Samarkand scientific-experimental station of the Research Institute of Horticulture, Viticulture and Enology named after Academician M. Mirzaev. Authors: K.V. Smirnov, G.V. Ogienko, A.F. Gerasimova. It has been included in the State Register of the Republic since 2006. The cultivar is early-middle-ripening, resistant to disease. The bush is medium, the racemes are large, the average weight is 350-400 g. the raceme is cylindrical, pink in color, large and hard cortex, taste - 5 points. The yield is 200-250 c / ha per hectare [19].

A 1% solution of chlorine oxide (Cl2O) was used to sterilize the grape variety surface. Parts of grape apical buds cut into 10 cm size and put in a flask with a mixture of water and soap with the lid closed for 15 minutes. In the next step, the buds were washed several times in sterile water and soaked in 1% chloride oxide at pH 6 for 5 minutes. After the allotted time, the buds were soaked in 75% alcohol for 30 seconds. The plant tissue was then washed in distilled water, every 5, 10, 15 minutes, in a new container. Surface sterilized buds were cut to a size of 2 cm and planted in a medium of MS4.4mg / l + sucrose-30gr / l + agar-agar 6 g as the initial nutrient medium. New shoots formed from seedlings transplanted into the nutrient medium were cut to a length of 1 cm and transplanted into the nutrient medium selected for the study [17].

In the study, MS (Murashige and Skoog 1962) and DKW (Driver and Kuniyuki 1984) used a nutrient medium with NAA of 0.01 and 0.5 mg / l, and BAP (benzylaminopurine) of 0.1; 0.5; 1; Enriched with a concentration of 2 mg / l. In the study, 2,000 seedlings were planted and monitored for 40 days [3; 9].

RESULTS AND DISCUSSION

According to the results of the study, the best indicators are obtained when applied at a concentration of MS4.4mg / l + NAA0.01mg / l + BAP0.5 mg / l, rooting was 3 cm, or 93.5%, colossus formation was 4 mm, or 89.3%, bud length while was 1.5 cm, or 81.6%, growth along the explant was 2 cm, or 48.5% result was determined. At a concentration enriched with MS 4,4 mg / l + NAA 0,5 mg / l auxin, the highest result was obtained when BAP was applied in an amount of 0.5 mg / l, rooting was 1 cm, 35.8%, colossus formation was 5 mm, 98.5%, The length of the buds was 2 cm, 97.2%, the growth in the height of the seedlings was 2 cm, 75.2%.

The optimum parameters in DKW 5.3 mg/l + NAA 0.01 mg / l where the nutrient medium BAP 0.1 mg/l When applied, the length of the root of the implant is 5 cm, 91.3%, colossus formation 2.5 mm, 60.1% , no budding was observed, growth of the explant was 7 cm, 88.7% was recorded. A concentration of DKW 5,3 mg / l + NAA 0,5 mg / l + BAP 0,1 mg / l used, the root of the explant was 3 cm, 82.5%, growth of the explant was 5 cm, 81.7%, colossus formation and survival not observed. DKW 5.3 mg / l + NAA 0.01 mg / l and NAA 0.5 mg / l at BAP concentrations, results were taken colossus formation was from 1 mm to 2.5 mm, budding was from 0.65 cm to 0.80 cm. In the MS 4.4 mg / l + NAA 0.01 mg / l and NAA 0.5 mg / l nutrient medium, the colossus formation was 2.5 times higher and the budding rate was 1.5 times higher.

In our in vitro laboratory studies, MS 4,4 mg / l + IBA 0,01 mg / l + BAP 0,01 mg / l auxin and cytokinin enriched nutrient medium were used for budding and colossus formation of local grape varieties of Uzbekistan. A nutrient medium with a concentration of MS4.4 mg / l + IBA0.1 mg / l + BAP 0.01 mg / l was used for root growth and growth along the explant. The novelty of the study is that the optimal nutrient composition and concentration for rooting and germination have been redesigned.

Table 1

Indicators of development of Rizamat variety of grapes in different nutrient medium (2020-2021)

BAP concentration, mg/l	Rooting		Colossus formation		Bud formation		Growth of explant	
	cm	%	mm	%	cm	%	cm	%
MS+NAA 0.01								
0,1	2	91,7	3,5	81,2	-	-	-	-
0,5	3	93,5	4	89,3	1,5	81,6	2	48,5
1	-	-	2,5	85,0	1	72,4	-	-
2	-	-	2,5	76,4	1,3	76,8	-	-
MS+NAA 0.5								
0,1	3	95,7	2	84,1	-	-	2	60,4
0,5	1	35,8	5	98,1	2	97,2	2	75,2
1	-	-	3	86,2	1,7	53,8	-	-
2	-	-	2,5	78,6	1	88,5	-	-
DKW+NAA 0.01								

0,1	5	91,3	2,5	60,1	-	-	7	88,7
0,5	3,5	72,5	1	62,5	0,65	63,1	-	-
1	3	88,2	2,5	71,4	0,70	44,5	-	-
2	1	33,2	2	75,9	0,75	52,7	-	-
DKW+NAA 0.5								
0,1	3	82,5	-	-	-	-	5	81,7
0,5	3	74,6	2	67,7	0,70	69,3	4	56,8
1	2	55,4	1,5	71,8	0,80	72,4	3	78,2
2	-	-	1	78,7	-	-	-	-

According to the results, for Rizamat variety in the amount of MS 4,4mg / l + NAA 0,5 mg / l + BAP 0,5 mg / l the high result in bud and colossus formation was determined. Other scientific studies have shown that 2 mg l – 1 BA was the most suitable option for grape variety of 'Cabernet Savignon' [1]; 3 mg l – 1 BAP was the most suitable option for in vitro multiplication of 'Baco' grape [6]; 1 mg l–1 BAP was the most suitable option for regeneration of varieties of 'Öküzgözü' and 'Bogazkere' from the leaf [10]; It was stated that for the proliferation of V.Vinifera, BAP was the most suitable cytokinin [8]. In our study, a high result was achieved when DKW 5,3 mg / l + NAA 0,01 mg / l auxin was used instead of MS 4,4 mg / l nutrient medium for rooting and explant growth, and this figure was returned when BAP had a concentration of 0.1 mg / l. In the DKW nutrient medium in which 'Bull's Eye' and 'Bogazkere' cultivars were planted, from the 2nd week of development, darkening of the buds began and no development was observed [5]. V.P. Lewandowski tested the effect of NAA / IBA auxin compounds on the root of the buds from 0.01 to 0.05 mg / l. The best rooting results were obtained with 0.01 NAA in combination with 0.05 mg / l IBA [7]. According to the discussion of the results of the study, it was found that the parameters of development in artificial nutrient medium also differ due to the types of grape varieties, their morphological and physiological characteristics.

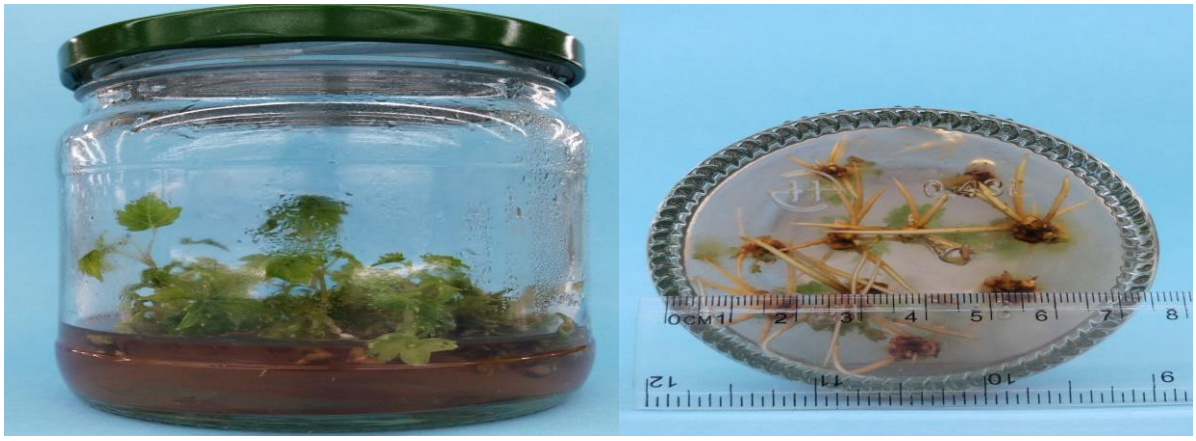

Figure 1: colossus and bud formation parameters of MS 4,4 mg/l+NAA 0,5 ml/l+ BAP 0,5 mg/l

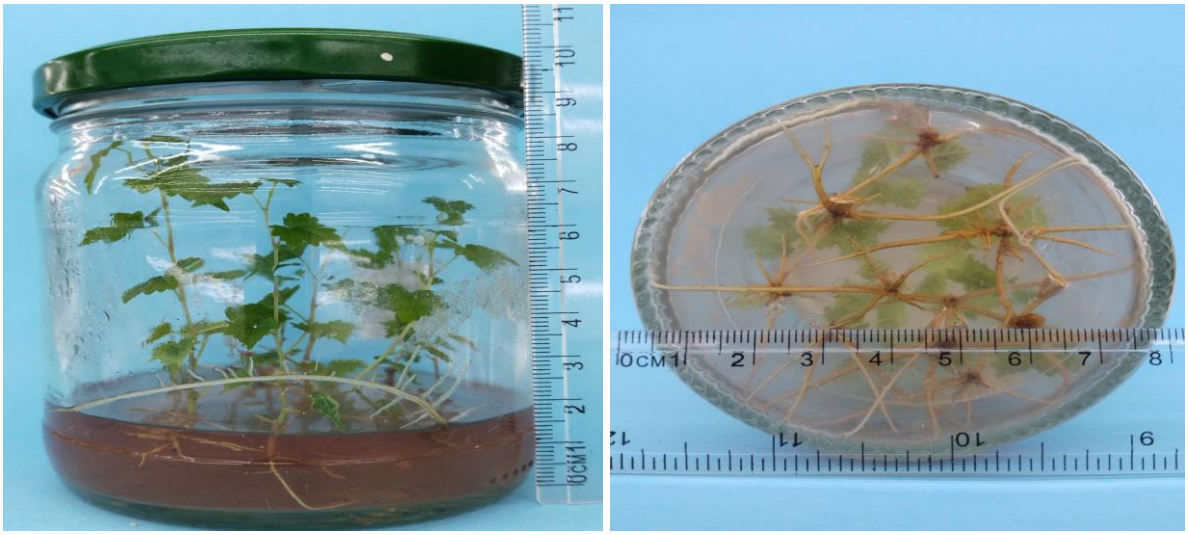

Figure 2: rooting and growth parameters of the explant in nutrient medium of DKW 5.3 mg / l + NAA 0.01 mg / l + BAP 0.1 mg / l

CONCLUSION

A new concentration of auxin and cytokinin compounds in the nutrient medium has been developed for in vitro regeneration of local grape varieties of Uzbekistan. According to the results, MS 4,4 mg / l + NAA 0,5 mg / l + BAP 0,5 mg / l nutrient medium was found to be the most optimal for colossus formation and making bud, while DKW 5,3 mg / l + NAA 0,01 mg / l + BAP 0,1 mg / l was the nutrient medium for the growth and rooting parameters of the explant and these nutrient medium are recommended for breeding local varieties of grapes in vitro condition.

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