THE INFLUENCE OF CERTAIN PHITOHORMONS ON ORGANOGENESIS PROCESS FOR "IN VITRO" CULTURE OF APRICOT (ARMENIACA VULGARIS)

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Abstract

This work is presenting the results obtained in several experiments on the influence of different doses of phitohormons on organogenesis. The root genesis process is mostly stimulated when AIB added in basic MS culture medium, the dose would be 1,5-2,5 mg/l. Benzyladenine strongly stimulates the caulogenesis at a dose of 5 mg/l. The callus genesis process is the most stimulated when 2,5 mg/l AIB is added to MS culture medium.

Key Words: apricot, phitohormons, organogenesis

INTRODUCTION

In vitro multiplication technique for fruit trees represents an alternative to classic methods of multiplication for fruit trees. The fruit tree species are considered recalcitrant to "in vitro" multiplication. The research done in our country and abroad conducted to elaboration of certain technologies for "in vitro" multiplication of fruit tree species, as follows: Mladin and Isac 1982 for cherry, Ochatt and Power 1988 for plum, Marino 1989 for apricot, Orlikowska 1991 for apple, etc.

For the induction of organogenesis process a major role is taken by the phitohormons balance. In the present work we embraced the goal to observe the evolution of organogenesis on apricot explants (leaf pieces) under the influence of different hormonal balances.

MATERIAL AND METHOD

We used 2 auxines (β-indolil acetic acid, β-indolil butyric acid) and 2 cito- kinins (kinetin, benziladenine). Each phitohormon was used in several concentrations (0,1; 0,5; 1,0; 2,5) and was added to basic culture medium.

The phitohormons form the two experience groups have been added according to the protocol to the basic culture medium (Murashige-Skoog). According to the obtained results we established an optimal hormonal balance consisting of the concentrations of phitohormons with the best results.

RESULTS AND DISCUSSION

Tabels 1 and 2 contain the results of testing the 2 types of auxines added to MS medium, after 4 weeks of "in vitro" culture.

In Table 1 we have the results regarding testing the β-indolil acetic acid (AIA) in 4 concentrations on the explants of the 4 studied species. The best results regarding root genesis were obtained at 0,5 mg/l auxine. At this concentration 33-48% of the explants were developing rootlets. The rest of the explants, in between 6-10% were developing a callus mass which after 5 weeks did not show organogenesis signs.

Table 1

Results regarding the influence of β-indolil acetic acid added in different concentrations to MS medium "in vitro" cultivation of apricot explants

Cultivar	AIA mg/l	Organogenesis %			
		Without initiation	Callus genesis	Root development	Bud development
CMBU	0,0	100	0	0	0
	0,1	72	9	41	0
	0,5	68	10	43	0
	1,0	59	12	44	0
	2,5	61	8	36	0
CR24/12	0,0	100	0	0	0
	0,1	70	7	38	0
	0,5	68	6	40	0
	1,0	61	7	44	0
	2,5	56	8	43	0
DACIA	0,0	100	0	0	0
	0,1	67	5	42	6
	0,5	60	10	48	0
	1,0	52	9	56	0
	2,5	48	9	49	0
FAVORIT	0,0	100	0	0	0
	0,1	5,7	8	39	0
	0,5	51	10	42	6
	1,0	43	7	49	0
	2,5	40	10	52	6

In a compared analysis of the reaction of the species to AIA administration, we can see that the differences between species are small. Better results are obtained for the species *Cea Mai Buna de Ungaria (CMBU)* and *Dacia*.

At an AIA concentration of 1mg/l the explants develop rootlets in a percent of 44-56% and callus is developed in 7-12% of the explants.

In Table 2 we present the results of the tests regarding the effects of β-indolil butyric acid (AIB) on organogenesis of the "*in vitro*" apricot explants.

As a general feature of the influence of AIB on organogenesis we can observe a stimulation of root genesis and a also a smaller stimulation of caulogenesis. At 0,5 mg/l AIB concentration we see rootlet genesis in proportion of 36-57% of the explants. At high concentrations of AIB: 1,5-2,5mg/l we can see a stronger stimulation of root genesis, reaching 65%.

Table 2

Results regarding the influence of β-indolil butiryc acid added in different concentrations to MS medium "*in vitro*" cultivation of apricot explants

Cultivar	AIB mg/l	Organogenesis %			
		Without initiation	Callus genesis	Root development	Bud development
CMBU	0,0	100	0	0	0
	0,1	76	2	36	4
	0,5	68	3	38	4
	1,0	62	4	38	5
	2,5	60	4	40	5
CR24/12	0,0	100	0	0	0
	0,1	60	35	58	0
	0,5	55	30	57	0
	1,0	50	27	60	8
	2,5	47	23	69	6
DACIA	0,0	100	0	0	0
	0,1	45	25	50	0
	0,5	45	27	53	0
	1,0	50	39	60	4
	2,5	52	40	65	1
FAVORIT	0,0	100	0	0	0
	0,1	50	36	45	0
	0,5	50	40	49	0
	1,0	55	45	52	2
	2,5	50	50	58	4

Compared analysis of the influence of AIB on different species, we realize that the differences between the 4 studied species are not so big. The best results regarding root genesis are presented by *Dacia.*

In Table 3 we give the results on kinetin testing added in 4 concentrations to MS culture medium.

The kinetin phitohormon has different actions on organogenesis, it stimulates or inhibits organs genesis.

The effect of kinetin on apricot explants is significant regarding caulogenesis, reaching up to 57-80%. The best results were obtained on variants where used high concentrations of kinetin. The best results were on CR24/12 and CMBU species. In the case of the other species the caulogenesis process is high.

Table 3

Results regarding the influence of kinetin added in different concentrations to MS medium "in vitro" cultivation of apricot explants

Cultivar	K mg/l	Organogenesis %			
		Without initiation	Callus genesis	Root development	Bud development
CMBU	0,0	100	0	0	0
	0,1	49	32	0	65
	0,5	45	38	0	68
	1,0	30	43	1	72
	2,5	26	49	2	80
CR24/12	0,0	100	0	0	0
	0,1	32	43	0	64
	0,5	30	46	1	66
	1,0	30	51	1	72
	2,5	32	57	3	77
DACIA	0,0	100	0	0	0
	0,1	48	36	0	51
	0,5	45	40	0	57
	1,0	30	42	1	61
	2,5	26	58	2	69
FAVORIT	0,0	100	0	0	0
	0,1	50	40	0	57
	0,5	41	45	1	65
	1,0	36	49	1	74
	2,5	25	60	2	79

From the Table we can also see that kinetin phitohormon is stimulating callus genesis process that can reach 60% (at *Favorit* cultivar).

It is interesting to observe that kinetin has a negative effect of inhibition on root genesis. We can see rootlets forming only in a percent of 1-3% of the explants, at the highest concentration of kinetin from the medium. The percent of the explants without initiations reaches 50%, mainly at small kinetin concentrations. In the case of higher concentrations the inactive explants percent is 22-26%.

In Table 4 we present the results in percentage of the influence of benziladenine added in different concentrations to basic MS culture medium, influence on organogenesis process on explants at the 4 studied cultivars. The benziladenine effect on the explants is to stimulate more the caullo genesis process and less the callus genesis. As for the rootlets, their growth is inhibited. The stimulation of aerial parts is obvious for 57-78% of the explants cultivated on media with benziladenine. Low concentrations of benziladenine have a lower stimulating effect : 9-12% of the explants develop caullogenesis.

As for callus genesis process, we can see that all the concentrations of benziladenine determined callus development, in different proportions.

For smaller concentrations the callus genesis is smaller: 16-23%, and in higher concentration the callus genesis is higher, reaching 36%.

From the table we can also see that for the caullogenesis the differences between the cultivars are small.

Table 4

Results regarding the influence of benziladeninie added in different concentrations to MS medium "*in vitro*" cultivation of apricot explants

Cultivar	BA mg/l	Organogenesis %			
		Without initiation	Callus genesis	Root development	Bud development
CMBU	0,0	100	0	0	0
	0,5	88	10	0	12
	1,0	72	20	0	46
	2,5	49	24	2	68
	5,0	33	36	2	78
CR24/12	0,0	100	0	0	0
	0,5	95	14	0	10
	1,0	81	22	0	45
	2,5	46	24	1	66
	5,0	31	31	3	76
DACIA	0,0	100	0	0	0
	0,5	84	15	0	0
	1,0	42	18	0	55
	2,5	36	22	2	67
	5,0	29	30	1	74
FAVORIT	0,0	100	0	0	0
	0,5	90	19	0	13
	1,0	54	23	1	60
	2,5	40	29	0	69
	5,0	31	33	2	71

CONCLUSION

1. At a 1mg/l concentration of AIA there are rootlets formed at 45-56% of the explants, we have callus at 7-12% of the explants and at 0,5 mg/l AIA we have 33-48% explants with rootlets formed.
2. Concentrations of 0,5mg/l of AIB determine rootlet development in proportion of 36-57%. An amount of 1,5-2,5mg/l AIB added to the MS medium strongly stimulates root development (65% of the explants).
3. Kinetin added to culture medium in amount of 2,5mg/l stimulates very strongly caullogenesis process (57-80% of the explants).

4. Benziladenine has a stimulating effect on caullogenesis (57-78% of the explants).

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