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Hormon Combinations for Root Induction of Pear

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Abstract

Propagation and root-induction of in vitro plants are regulated by different types and concentrations of phytohormones. The main objective of our study was to observe the effects of different hormone combinations on rooting habit of micropropagated in vitro pear plants. Different amounts of cytokinin (BAP) (0.0; 0,01; 0.02; 0.03 mg l^{-1}) and auxin (2,4 D) (1;2;3 mgl^{-1}) were applied in 8 different combinations of two treatments. Differences among hormone combinations were recorded by rooting habit, number of roots and root length.

Keywords: Pear; Micropropagation; Hormone combinations; Rooting

Introduction

Pyrus communis L. (pear) is grown in the temperate climate zones in the World. The first report of pear micropropagation was in 1979. Significant progress has been made since the first report, but rooting scion pear cultivars in vitro has proven still difficult [1-3]. In vitro multiplication is used for rapid plant propagation, plant breeding and several aspects of plant development in pear. Percentage of in vitro rooting of 30 *Pyrus communis* L. cultivars were very variable (from 0 to 100%) using six rooting treatments [2]. NAA was significantly better then IBA in that study, previous study also strengthens where 80% of microcuttings of three pear (*Pyrus communis* L.) cultivars formed roots with alpha-naphtalenebutyric acid 10mM [4]. Our aim is to find the best rooting media for in vitro maintained genetic resources of pear cultivar collection.

Conclusion

Pear plants (two pear genotype, ' Szobi legkorábbi' one hungarian region pear variety and the ' Dix' pear variety) were transferred into a root induction medium, which contains, half amounts of MS medium with vitamins , 2 % sucrose, at pH, 5.5.

Eight treatments were used at the induction medium.

a. 1mg l-1 2.4 D and 0.01mg l-1 BAP

b. 2mg l-1 2.4 D and 0.02mg l-1 BAP

c. 3mg l-1 2.4 D and 0.03mg l^{-1} BAP

d. 2mg l-1 2.4 D and 0.0mg l^{-1} BAP

e. 2mg l-1 IAA and 0.01mg l^{-1} BAP

f. 2mg l-1 IBA and 0.01mg l^{-1} BAP

g. 2mg l-1 NAA and 0.01mg l^{-1} BAP

h. 2mg l-1 2.4 D and 0.01mg l^{-1} BAP (Table 1).

Plants were incubated for one week in totally dark conditions, the temperature was 26-27 °C. The temperature and dark conditions are very important in the period of root induction. After one week pear plants were transferred into a root elongation medium, which contains, half amounts of MS medium with vitamins, 3 % sucrose, at pH, 5.7. This medium was hormone-free. Conditions were as same as used in the period of shoot propagation, the temperature was 20-22 °C. After 2 or 3 weeks we have evaluated the results. The following rooting parameters were monitored: number of roots, root length. Total root length and average of root length were calculated. Several hormone combination were used in our experiments. No significant differences were detected among treatments 1 to 4. Highest number of root were developed at the 2mg l-1 IBA and 0.01mg l-1 BAP medium in case of 'Szobi legkorábbi' pear cultivar and the 'Dix' pear cultivar too. Significant differences were among the treatments 5 to 8. Two hormone

combinations (6 and 8) resulted relatively high number of roots with both cultivars 'Szobi legkorábbi' and 'Dix' (8.4-8.1 and 4.8-7.6 respectively) and total root length (192 -136mm and 155-235mm respectively). According to our results we will work with 6 and 8 treatment combinations int he future, instead of NAA what most of the literature suggest [3].

Table 1: The effect of eight different treatments on the micropropagated plants in two Pyrus communis L. Genotypes.

	Hungarian Region Pear Cultivar ,Szobi legkorábbi'			Pear Cultivar "Dix'		
Treatments 1 to 8 in order	**Average number of roots**	**Total root length (mm)**	**Average of root length (mm)**	**Average number of roots**	**Total root length (mm)**	**Average of root length (mm)**
1mg l^{-1} 2.4 D and 0.01mg l^{-1} BAP	1,9	94,0	41,0	1,8	86,0	43,0
2mg l^{-1} 2.4 D and 0.02mg l^{-1} BAP	3,0	119,0	46,0	1,3	60,0	38,0
3mg l^{-1} 2.4 D and 0.03mg l^{-1} BAP	4,4	115,0	29,0	2,4	79,0	20,0
2mg l^{-1} 2.4 D and 0.0mg l^{-1} BAP	4,6	158,0	30,0	3,3	104,0	30,0
2mg l^{-1} IAA and 0.01mg l^{-1} BAP	4,6 ab*	195,0 a	37,0 a	0,6 b	39,0 b	30,0 a
2mg l^{-1} IBA and 0.01mg l^{-1} BAP	8,4 a	192,0 a	25,0 ab	8,1a	136,0 ab	16,0 a
2mg l^{-1} NAA and 0.01mg l^{-1} BAP	1,3 b	21,0 b	10,0 b	5,6 a	140,0 ab	24,0 a
2mg l^{-1} 2.4 D and 0.01mg l^{-1} BAP	4,8 ab	155,0 a	35,0 a	7,6 a	235,0 a	32,0 a

*Significant differences at p= 0,05 level by Tukey's Multiple Comparison Test

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Conflict of Interest

Authors declare there are not any conflict of economic interest or any conflict of interest exists.

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