INFLUENCE OF INDOLYL - BUTYRIC ACID (AIB) ON *IN VITRO* SOYBEAN GENESIS AND GROWTH

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Abstract

In vitro regeneration and organogenesis at some species of plants is an essential condition to accomplish vegetative multiplication.. In our experiments auxines were used for making the culture medium more effective. The auxines used in order to induce the cellular division process and the root formation process were the indolyl-butiric acid (AIB)

Key words: soybean, indolyl-butyric, auxines, organogenesis

INTRODUCTION

In plants, phytohormons and phytoregulators are organic compounds in low concentrations or very small, stimulate, inhibit or modify - qualitatively and quantitatively - the growth and development of plants . Phytoregulators or organic chemical regulators, which influence plant growth and development are synthetic compounds that "mimic" effects of phytohormones, and have a big practical importance in plant biotechnology (DORINA CACHIŢA-COSMA şi colab., 2004).

The neogenesis of an organism is a phenomenon that calls the non-operation of numerous physiological processes leading to the mitotic activity by which a meristematic cell acquires the ability to divide again (BIGOT, 1980).

For *in vitro* cultivation of cells and tissues are used auxins, which intervene in many physiological processes and interact with different endogenous substances, particularly with other phytohormones and especially with cytokines, gibberellins and ethylene (BOXUS şi colab., 1995).

In vitro meristematic cells continue their work or resume their mitotic activity. Differentiated cells, stimulated by growth hormones, added in the culture environment dedifferenciation and acquire the ability to divide. This dedifferentiation is specific for *in vitro* cultures (ELENA BADEA şi colab., 2001; SAVATTI şi colab., 2003).

MATERIAL AND METHOD

For inducing cell division and risogenesis, it was used auxinic indolylbutyric acid (AIB), with a concentration of 0.5 to 2.0 mg / l.

The interaction of hormones used in the culture environment and their concentration on *in vitro* multiplication of soybean cultivars determines significant differences in plant neogenesis rates. At low concentrations, physiological stimulative, the auxins provide a favorable growth action; in higher concentrations, they can produce an inhibitory effect or may even be toxic.

In order to highlight this aspect, growth hormones were used on the Murashige-Skoog(1962) culture environment and the hormones contribution on neogenesis of *in vitro* plantlets was studied.

The reaction of soybean cultivars to indolylbutyric acid (AIB) influence in the organogenesis process has similar results with those of AIA (indolylacetic acid) another auxinic used in previous experiments. The only difference is that on Murashige-Skoog culture environment, adding AIB, regardless of the concentration has a minor effect on the caulogenesis process.

The molecular mechanisms by which AIB exerts its auxogen effect are not fully elucidated. SÖDING (1937) mentioned the fact that the increase of plant cells in length, AIB labilizes the connections of cellulose microfibers in the pecto-celluloses cellular wall. MOORE (1989) experimentally demonstrated, on *in vitro* cultures, that during auxo-genesis, an increase in biosynthesis of nucleic acids and proteins occurs.

This experiment studies the indolylbutyric acid (AIB) influence on calusogenesis and risogenesis within the three soybean cultivars, Diamond, Pearl and Agate, introduced in the Murashige-Skoog (1962) environment .

RESULTS AND DISCUSSION

Table 1 presents some interesting issues highlighting the behaviour differences of genotypes under the influence AIB introduced into the culture environment.

Tabel 1

Influence of indolyl butyric acid (IBA) on organogenesis of soybean neoplantules from apical meristeme

Cultivar	IBA (mg/l)	*Evolution of organogenesis (%)*			
		No development	*Calusogenesis*	*Risogenesis*	*Caulogenesis*
Diamant	0,0	100,0	0	0	0
	0,5	50	10	27	0
	1,0	55	12	23	2
	1,5	55	9	36	6
	2,0	45	10	32	4
	3,0	65	3	14	0
	%	54	6,80	26,8	2,40
Perla	0,0	100,0	0	0	0
	0,5	73	3	25	3
	1,0	75	3	26	5
	1,5	60	6	36	5
	2,0	70	5	32	5
	3,0	82	2	7	0
	%	72,0	3,80	25,2	3,60
Agat	0,0	100,0	0	0	0
	0,5	65	0	26	3
	1,0	66	0	30	4
	1,5	60	3	31	8
	2,0	69	3	36	7
	3,0	80	0	12	2
	%	68,0	1,20	27,0	4,80
$\overline{X}$ **/genotip**		**64,7**	**3,93**	**26,4**	**3,60**

Introducing the indolylbutyric acid (AIB) in the culture environment highlights the fact that the organogenesis evolution, expressed as a percentage presents the higher parameters if a concentration of 1.5 to 2.0 mg/l is used.

The effect of indolylbutyiric acid (AIB) on soybean organogenesis, regardless of the cultivar, reflects especially on the risogenesis process, at concentrations from 0.5 to 2.0 mg/l for Diamond and Pearl, and in only two cases at concentrations from 1.5 to 2.0 mg / l at Agate. In calusogenesis, the phenomenon is not as pronounced as for the indolylacetic acid (AIA) influence, and a genotypic differentiation is found in the sense that Pearl and

Agate varieties have a higher tendency of proliferation compared with Diamond variety, a reverse situation in calusogenesis terms.

The results be seen in reserve of very high percentage of without development explants between 54.0 to 72.0%.

The same ontogenesis processes mitigation phenomenon in case of using higher doses AIB (3.0 mg/l) may be indicated, but without equalizing the process reaction found in case of using the culture environment with AIA, in the same concentration. (CHIRILEI şi colab., 1970; BANDICI, 2001).

Increasing the dose probably has an toxic effect on *in vitro* cultures, obviously reducing organogenesis processes.

CONCLUSIONS

It can be concluded that the existence of increased auxinic concentrations in culture environments, in conjunction with cytokinin, stimulates the risogenesis processes, while increasing the cytokinin content stimulates buds formation, their growth and the generation of strains. It is also observed that the existence of equal cytokinin and auxinic acting compounds concentrations in culture environment can boost- in conjunction with morphogenesis processes - both generating the callus and its growth.

Organogenesis can be adjusted within certain limits by changing the concentration, as well as the ratio of phytohormones types in the layer of culture.

The results obtained lead us to recommending moderate auxins usage and adenine sulfate addition in basic medium, enrolling in the recommendations made by GAMBORG et al. (1968).

Reviewing the auxins and cytokinins influence in the soybean organogenesis process, it shows the indisputable need for their presence in Murashige-Skoog nutrient medium. In all cases it was found that explant switching to the base culture medium, without the growth hormones participation, organogenesis does not take part.

Obviously, auxins have an inducing effect of calusogenesis and risogenesis and amplifying this phenomenon with concentration increasing. In previous experiments it is found that in low concentrations, auxin induces roots formation and with increasing concentration it stimulates the calusogenesis. Basically, *in vitro* development processes are oriented by phytohormons.

In terms of organogenesis, a differential response of the used germplasm is seen, in both the genotypes, but especially between them. (CACHI□A –COSMA □i SAND, 2000).

It was found that plant explants can be kept alive by inoculating and growing them in aseptic environments *in vitro*, complex in terms of their chemical composition.

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