Influence of Indolyl acetic acid (AIA) 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 and cytokinins 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-acetic acid (AIA)

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

INTRODUCTION

In organogenesis terms one may consider plant as made of two concentric shells, one superficial and having the ability to form shoots and the other one, deeper, characterized by its risogenesis capacity.

The cells division, elongation and differentiation processes are controlled by hormones of endogen nature, synthesised, or synthesis hormones, produced artificially produced in laboratory, having the same or different chemical formulas but which are developing the same biological activity as the previous ones.

Auxins are employed for the purposes of *in vitro* cultivation of cells and tissues . Auxins intervene in numerous physiological processes and interact with various endogenous substances, particularly with other phytohormones, especially with cytokines, gibberellins and ethylene (BOXUS et al., 1995).

MATERIAL AND METHODS

The auxin employed to induce *in vitro* cells division and risogenesis process was the indolyl acetic acid (AIA) at a concentration of 0.5 to 2.0 mg/ l.

The interaction of the hormones used in the growth environment and their concentration for *in vitro* multiplication of soybean cultivars prompts significant differences in terms of plant neogenesis rate. Following inter-phytohormons relations or the hormones relations with other compounds, more or less specific to auxins physiological effects occur, inducing or not,

certain processes of growth and morphogenesis or causing the production of specific phenomena. At low, physiologically stimulating, concentrations the auxins have a favourable impact on growth; in higher concentrations, they can generate an inhibitory effect or may even be toxic.

In order to highlight this aspect, one acted with growth hormones on the Murashige-Skoog growth environment (1962) and the hormones contribution on neogenesis of *in vitro* plantlets.

Molecular mechanisms by which AIA perform their auxogen effect are not fully elucidated yet. SÖDING (1937) mentioned the fact that the increases in length of plant cells, AIA loosen the connections of cellulose microfibers in the pecto-celluloses cellular wall. MOORE (1989) demonstrated experimentally, on *in vitro* cultures, which during auxo-genesis, an increase in biosynthesis of nucleic acids and proteins occur.

By this experiment one aims the impact of indolyl acetic acid (AIA) on calusogenesis and risogenesis within the three soybean cultivars, Diamond, Pearl and Agate, introduced in the Murashige-Skoog environment (1962).

RESULTS AND DISCUSSION

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

Table 1

Influence of indolyl -acetic acid (AIA) on organogenesis of soybean neoplantules from apical meristeme

Cultivar	AIA/ (mg/l)	*Evolution of organogenesis %*			
		No development	*Calusogenesis*	*Risogenesis*	*Caulogenesis*
Diamant	0,0	100,0	0	0	0
	0,5	85	7	15	0
	1,0	68	12	23	0
	1,5	60	16	36	0
	2,0	73	6	30	0
	3,0	80	6	12	0
	%	73,2	9,4	23,2	0
Perla	0,0	100,0	0	0	0
	0,5	73	10	20	0
	1,0	61	16	27	0
	1,5	65	9	36	0

	2,0	51	12	30	0
	3,0	84	3	15	0
	%	66,8	10,0	25,6	
Agat	0,0	100,0	0	0	0
	0,5	59	16	32	0
	1,0	36	17	41	0
	1,5	39	12	46	0
	2,0	50	8	38	0
	3,0	68	2	10	0
	%	50,4	11,0	33,4	
$\overline{X}$ **/genotip**		**63,5**	**10,2**	**27,4**	**0**

It is noticed, at the level of both phenomena that the AIA favourable dose is ranging from 1.0 to 1.5 mg/l. in the culture environment, an aspect and phenomenon already noted in the dedicated literature, namely that AIA has a noticeable effect in generating the risogenesis process (CHIRILEI et al., 1970, BANDICI, 2001). Under this issue, one may notice that, in the case of the three cultivars used in the experiment, the risogenesis occurs at a level of 27.4%, one may notice a difference amongst genotypes behaviours, in the sense that, while in the case of Diamond and Pearl varieties the response at risogenesis is only 2.4%, for the Agate variety, the differences are striking, with 8-10% above the previous two varieties mentioned. However, the same remark does not go for calusogenesis process, which, per genotypes, is of 10.2%, while the differences between genotypes are less striking.

One may also notice a fact mentioned in the dedicated literature, that small doses of AIA in the culture environment are incentives for organogenesis process. In our case, if the doses of 1.0 to 1.5 mg/l provide the best results, one may notice that while increasing the AIA dose, the organogenesis processes are slowed down or even inhibited. This fact is recorded at 2.0 ml/g and especially at 3.0 mg/l. Increased values will have a probably a toxic effect on *in vitro* cultures, and obviously reducing the organogenesis processes.

CONCLUSIONS

While analyzing the results thus obtained it seems that, at the level of *in vitro* culture, and at least in soybean, there is a correlation between risogenesis and calusogenesis on the one hand and the calusogenesis process on the other hand.

Organogenesis can be adjusted within certain limits by changing the concentration, ie the ratio of the types of phytohormones present in the layer of culture. Thus, the existence of a culture medium auxinic high concentrations, stimulate processes of rootedness,. Note that in the presence of high concentrations, can trigger processes of morphogenesis with the generation of callus and its. The results lead us to recommend the moderate use of auxins and the addition of adenine sulphate to the basic environment, varying within the recommended limits made by GAMBORG et al. (1968).

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