THE INFLUENCE OF N-NAPHTHYLACETIC ACID (NAA) AND OF KINETIN ON THE FORMATION AND DEVELOPMENT OF BIRD'S FOOT TREFOIL PLANTS

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Abstract

This paper deals with the influence of naphthylacetic acid (NAA), as well as of kinetin (K), on the organogenesis of bird's foot trefoil neo-plantlets, Alina species, obtained from apical meristems.

The experiment has shown that NAA has a positive influence mainly on callusogenesis. Under the influence of this auxin, a differenciated process of caulogenesis could also be noticed at the level of the cultivar. In the case of Alina cultivar, with a 1.5mg/l NAA concentration, a 9% caulogenesis process is achieved. Analyzing the effects of artificial auxins on bird's foot trefoil organogenesis, it can be seen that the reaction, expressed in percentage, depends on the NAA concentration.

Unlike naphthylacetic acid (NAA), kinetin (K) does not have rhizogenic effects, it influences callusogenesis and especially caulogenesis. By increasing the concentration from 0.5 to 2.0 mg/l, the caulogenesis phenomenon is affected significantly, with variations between 55-65%.

When kinetin (K) is used in the basal medium, the absence of rhizogenesis can impair the formation of normal neo-plantlets.

Key words: bird's foot trefoil, callusogenesis, caulogenesis, kinetin, naphthylacetic acid, rhizogenesis.

INTRODUCTION

Auxins are growth stimulants, which, in very small doses, can have a positive influence on plant development and growth, as well as on the formation of vegetative and generative organs.

Auxins get involved in a high number of physiological processes, they interact with a great deal of endogenous substances, including other phytohormones, with cytokinins, gibberellins and ethylene in particular.

Kinetin is a growth substance that promotes cell division. It was originally isolated by Miller, who used it in an experiment on tobacco pith explants and obtained a strong cell multiplication.

In 1892, Weisner mentioned the possible existence of a specific substance which, in very low concetrations, triggers and stimulates cell division (cytokinesis) (Bandici G. E., 2001).

MATERIAL AND METHODS

Naphthylacetic acid (NAA) in concentrations between 0.5 and 2 mg/l was added to a Murashige-Skoog (Murashige-Skoog, 1962), modified

culture medium (Pamfil D., 1980), and the same concentrations were used in the case of kinetin (K) as well.

RESULTS AND DISCUSSION

The experiment showed that NAA has a positive influence mainly on callusogenesis. Under the influence of this auxin, a differentiated process of caulogenesis could also be noticed at the level of the cultivar. In the case of Alina cultivar, when a concetration of 1.5 mg/l NAA is used, the process of caulogenesis is 9% (Table 1).

Table1

The influence of naphthylacetic acid (NAA) upon organogenesis of Bird's-foot trefoil plantlets, Alina cultivar, obtained from apical meristems

Cultivars	*NAA* (mg/l)	*Organogenesis evolution %*			
		Without development	*Callusogenesis*	*Rhisogenesis*	*Caulogenesis*
Alina	0.0	100.0	0.0	0.0	0.0
	0.5	30.0	60.0	56.0	0.0
	1.0	27.0	62.0	53.0	9.0
	1.5	26.0	65.0	60.0	5.0
	2.0	25.0	70.0	65.0	5.0

Kinetin (K) has a particularly significant influence on caulogenesis.

Unlike naphthylacetic acid (NAA), kinetin (K) does not influence rhisogenesis, but it promotes callusogenesis and especially caulogenesis. It can be seen that an increase in concetration from 0.5 to 2.0 mg/l has a considerable effect on the caulogenesis phenomenon, which varies between 55-65% (Table 2).

Table2

The influence of kinetin (K) upon organogenesis of Bird's-foot trefoil plantlets, Alina cultivar, obtained from apical meristems

Cultivars	*Kinetin* (mg/l)	*Organogenesis evolution %*		
		Callusogenesis	*Rhisogenesis*	*Caulogenesis*
Alina	0.0	0.0	0.0	0.0
	0.5	30.0	0.0	55.0
	1.0	25.0	1.0	58.0
	1.5	25.0	1.0	62.0
	2.0	20.0	2.0	65.0

CONCLUSIONS

The experiment has shown that the reaction, expressed in percentage, depends on the concentration of NAA. This fact suggests that in the process of *in vitro* multiplication of bird's foot trefoil, the individualization process

should be done profoundly, which means that each cultivar may have a specific reaction to hormonal activity and, as a result, each genotype should be individualized for a specific structure of the culture media. Thus, in the case of Alina cultivar, callusogenesis varies between 62-70%, rhisogenesis between 60-65% and caulogenesis between 5-9%.

The positive influence of kinetin (K) is due to its stimulating effect on cell division, as it promotes essential changes in the mitotic cycle, decreases the duration of the pre-synthesis phase (G_1) of the mitotic cycle, intensifies the rhythm of DNA synthesis (S) and expands the pre-synthesis periods.

When using kinetin (K) in a basal medium, the absence of rhisogenesis can impair the formation of normal neo-plantlets.

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