THE CONTENT'S VARIATION OF NUCLEIC ACIDS UNDER THE INFLUENCE OF THE TREATMENT WITH SIMAZIN AT SOME *LEGUMINOSAE* SPECIES

ODETTA GRAMA, ION I. BĂRA, CSILLA IULIANA BĂRA

Key words: nucleic acids, simazin, *Vicia sativa, Vicia villosa, Pisum sativum.*

Abstract: The treatment with simazin has implications in the synthesis of nucleic acids.The maximum effect of stimulation of the biosynthesis has recorded at the concentration of 0.1% simazin, at *V. sativa* and *V. villosa* species, at 6 and 12 hours treatment and concentration of 0.5% at *P. sativum* species.

The lasting treatment with herbicide, for 24 hours, has disturbed drastically the biosynthesis activity in small roots, at all three sdudied species.

INTRODUCTION

The SIMAYIN is a heterocyclic substance with 3 atoms of N in its cycle and it belongs to the triazynes group. It is like a white powder, soluble in water and chlorophorm, having a content of active substance of 50-80% (Şarpe, 1987). It is not volatile, it doesn't burn and is not corrosive. Its way to act against weeds is based on a slowdown of photosynthesis but it can also have side effects. Some plants tolerate it by changing it within a process of metabolism into hydroxi-simazin and conjugate amino-acids. Hydroxi-simazin can be altered again by the cycle's disalkylation and by hydrolysis, having as result groups of amino-acids in a cycle and CO_2.

THE AIM OF INVESTIGATIONS

We aimed to determine the action of simazin and the degree of involvement in the synthesis of nucleic acids at the *Vicia sativa, Vicia villosa* and *Pisum*s sativum pecies.

MATERIAL AND METHODS

The studies had been realized on individuals of *Vicia sativa, Vicia villosa* and *Pisum sativum* species, taken from the ICCC–Balti of Mokdova Republic. The biochemical analyses had been done according to the Spirin's method (1958) by dosing the nucleic acids, a method adjusted to the plant tissues, having as principle the separation of nucleic acids in a solution of perchloric acid. The resulted values were expressed into mg/g and the samples readings had been realized at the UV/VIS-JASKO, X-530 spectrophotometer.

RESULTS AND DISCUSSIONS

One noticed of the quantitative analysis of the content of RNA, DNA and NA that the simazin in low and moderate concentrations at the 6 and 12 hours treatments had a stimulant effect of the biosynthesis at the *Vicia sativa* species and it was also related to a stimulation of the mitotic division.

After 24 hours of treatment with simazin, the activity in the small roots of *V. sativa,* was in accordance with the expectations – the decrease of the quantity of total nucleic acids, at the same time with the increase of herbicide concentration.

The treatment with simazin, at the *Vicia villosa* species, for 6 and 12 hours has also been recording an increase of the quantity of total nucleic acids (RNA and DNA), comparatively to the control.

The increase of the quantity of nucleic acids was due both to the increase of the quantity of RNA and also to the increase of the content of DNA. After 24 hours

treatment, the simazin had an inhibitive action on the synthesis of nucleic acids, except for 0.01% concentration which had a stimulative effect.

The decrease of the quantity of nucleic acids was due to the decrease of the quantity of DNA which recorded much lower values than the control. Thus, the lasting treatment with simazin, for 24 hours has had an inhibitive action on the activity of DNA.

One can notice of the data of table 3 that the simazin which has been given for 6 hours, induced a considerable stimulation of the biosynthesis at the pea's small roots, the values for DNA and RNA being much higher than the control.

After 12 hours treatment there had been no important stimulations, the amount of nucleic acids being much closer to that of the control. The lasting treatment for 24 hours has been inducing a decrease of the quantity of total nucleic acids, due only to the quantitative decrease of DNA and not of RNA, the last of them having higher or similar values to those of control, which demonstrated that the herbicide had a greater action on the DNA.

The comparative study of the action of simazin on the amount of nucleic acids proved an obvious influence on their accumulation at the *V. sativa* and *V. villosa* species (at 6 and 12 hours treatments) and a less one at *P. sativum* species.

Table 1. The evolution of the DNA and RNA synthesis at the *Vicia sativa* species under the treatment with simazin

The time of treatment	The variant	Fresh material (mg)	Nucleic acids (mg/g)	RNA (mg/g)	DNA (mg/g)
6h	M	6.739	64.581	12.808	51.773
	0.01	12.832	68.42	14.857	53.185
	0.1	11.543	78.927	16.452	62.475
	0.25	11.710	75.088	16.548	58.540
	0.5	11.019	74.369	16.457	57.912
	0.75	9.357	65.703	12.178	53.525
	1	11.0s0	56.413	11.163	45.250
12h	M	11.860	54.381	11.418	42.963
	0.01	11.551	60.484	16.946	43.538
	0.1	20.412	69.446	18.188	51.258
	0.25	17.598	64.084	19.471	44.613
	0.5	10.835	57.821	16.339	41.482
	0.75	12.115	57.886	15.258	42.628
	1	10.626	53.717	15.176	38.541
24h	M	9.957	57.921	17.124	40.797
	0.01	11.250	57.961	168.415	39.546
	0.1	11.385	51.222	18.575	32.647
	0.25	11.437	41.702	20.024	21.678
	0.5	29.928	40.178	18.805	21.373
	0.75	18.305	32.433	15.502	20.192
	1	15.891	30.277	12.241	18.036

Table 2. The evolution of the DNA and RNA synthesis at the *Vicia villosa* species under the treatment with simazin

The time of treatment	The variant	Fresh material (mg)	Nucleic acids (mg/g)	RNA (mg/g)	DNA (mg/g)
	M	9,500	71,305	14,194	57,111
	0,01	10,400	73,272	16,747	56,525

6h	0,1	11,223	80,201	17,176	63,025
	0,25	11,250	78,870	18,415	60,455
	0,5	11,342	73,103	17,193	55,910
	0,75	11,700	70,266	14,509	55,757
	1	11,553	76,475	13,277	63,198
12h	M	9,770	59,342	13,013	46,329
	0,01	11,341	68,882	17,827	51,055
	0,1	11,903	67,434	21,527	50,373
	0,25	8,032	65,253	24,411	40,842
	0,5	8,262	66,399	27,379	39,020
	0,75	11,658	62,235	20,329	41,906
	1	11,346	59,105	15,669	43,436
24h	M	11,275	55,563	9,2812	46,282
	0,01	10,842	58,011	13,702	44,309
	0,1	11,964	52,328	13,087	39,241
	0,25	10,330	35,737	10,383	25,351
	0,5	11,210	36,570	9,648	26,922
	0,75	10,865	30,230	9,192	21,039
	1	10,340	29,956	9,879	20,077

Table 3. The evolution of the DNA and RNA synthesis at the *Pisum sativum* species under the treatment with simazin

The time of treatment	The variant	Fresh material (mg)	Nucleic acids (mg/g)	RNA (mg/g)	DNA (mg/g)
6h	M	12,838	45,420	10,658	33,493
	0,01	12,877	61,548	12,711	48,837
	0,1	14,287	59,534	17,257	42,277
	0,25	14,614	75,377	21,003	54,374
	0,5	12,649	82,636	19,891	62,745
	0,75	18,148	69,909	11,036	58,873
	1	15,821	65,820	9,910	55,910
12h	M	14,534	77,587	15,158	62,429
	0,01	12,031	73,554	21,156	52,398
	0,1	21,527	78,213	19,934	58,279
	0,25	17,303	81,047	20,227	60,820
	0,5	18,399	83,754	19,860	63,894
	0,75	19,324	81,193	15,097	66,096
	1	14,631	68,800	9,721	59,079
24h	M	14,521	86,944	17,163	69,781
	0,01	13,603	80,013	19,039	60,974
	0,1	19,988	77,068	21,212	55,856
	0,25	15,697	76,589	19,754	56,835
	0,5	26,917	67,591	19,088	48,503
	0,75	9,957	59,087	17,124	41,963
	1	14,784	59,080	16,458	42,622

CONCLUSIONS

The treatment with simazin has implications in the synthesis of nucleic acids, with a stimulant effect on their synthesis at all three studied species.

The quantity of total nucleic acids increases both the grow of amount of RNA and also of DNA.

The maximum effect of stimulation of the biosynthesis has recorded at the concentration of 0.1% simazin, at *V. sativa* and *V. villosa* species, at 6 and 12 hours treatment and concentration of 0.5% at *P. sativum* species.

The lasting treatment with herbicide, for 24 hours, has disturbed drastically the biosynthesis activity in small roots, at all three sdudied species.

The stimulation of biosynthesis and also of the mitotic division suggest s the possibility of using the simazin as a growth and germination's promoter.

The simazin, in low concentrations does not represent a danger for studied species.

BIBLIOGRAPHY

Spirin A., S., 1958, *Spektrofotometricheskoe oredilenie summarnovo kalichestva nukleinovzkh kislot*, Biohimiya, 23: 656-662.

Şarpe N., Ciorlăuş A., Ghinea L., Vlăduţu I., 1976, *Erbicidele principale şi practica combaterii buruienilor*, Ed. Ceres, Bucureşti, 65-161.

Şarpe N., 1987, *Combaterea integrată a buruienilor din culturile agricole*, Ed. Ceres, Bucureşti, 46-47, 163-164.

Comaniţă E., Şoldea C., Dumitrescu C., 1986, *Chimia şi tehnologia pesticidelor, Ed. Tehnică*, Bucureşti, 13-17, 398-402.

Dubinin N., 1978, *Potensal'nye izmeneniza v DNK i mutatsii*, Nauka, Moskva, 84.

Shevchenko V., V., 1968, *Izuchenie lokalizatsii razryvov khromosom, indutsirovannykh khimicheskimi mutagenami, dejstvuyushimi na razlicnye pary osnovanii v DNK*, Genetika, Nauka, Moskva, 8: 24.