

STUDY ON THE INFLUENCE OF SOME BIOLOGICALLY ACTIVE SUBSTANCES OVER ETHEREAL OIL CULTURES – CORIANDER

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Abstract

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The examination has been carried out on the land of Gorni Lozen, region of Sofia, during the period of 2003 – 2005. Experiments have been held to determine the influence of some biologically active substances upon the yield of seeds, ethereal and regular oil of ethereal bearing cultures – coriander. It was found that the tested chemicals XII-55 (20 ml/da) and ПБ – 31 (30 ml/da) have positive influence over the tested indexes. The chemical ПБ -31 (30 ml/da) increases the contents of ethereal oil with 8.66%, of regular oil – with 6.30% and the yield – with 11.6%, average for the period, compared to the control samples.

Key words: coriander, biologically active substances, ethereal oil, yield

Introduction

Biologically active substances are compounds, natural and synthetic, which help to control purposefully the physiological and biochemical processes and of some of the biological activities of the plants. The numerous groups of substances with marked activities, described by national and international authors in the scientific literature are from the groups of auxines, retardants and cytokines (Kalinin, 1984; Karanov, 1997; Musiaka and Grigoruk, 2001). Their exogenous application allows the regulation of processes, related to cultivation of plants – growth and development /6/, efflorescence (Kolev et al., 1999; Kolev et al.,

1999; Nenkova et al., 1997), germ formation, maturity, rooting and preservation of their production (Genchev and Petkova, 2002; Grawford, 1999; Rademacher, 2001).

In relation with the implementation of the programs for enlargement of growth of ethereal bearing plants, including coriander, a question has been put in discussion for increasing the yield of seeds and increasing the contents of ethereal oil.

There are no examinations with biologically active substances for this culture in our country.

With this study, we aim to determine the influence of some biologically active substances over the yield of seeds and the contents of regular and ethereal oil in coriander.

Methods and Materials

The experiment was carried out in the land of Gorni Lozen, region of Sofia during the period of 2003 – 2005. There were tested the biological stimulators XII -55 (a combined chemical, derivative of acid, retardant and moisturizer) in dose of 20 ml/da, ПБ – 31 (derivatives of two acids, microelements and moisturizers) in dose of 30 ml/da. The treatment was made in the period of a large efflorescence with back spraying machine.

The experiment has been conducted by block method with four reiterations and the size of the experimental plot was 10 m². There is a water control sample for comparison.

The soil type is meadow and maroon soil on the land of Gorni Lozen, region of Sofia and it has the following physicochemical characteristics: Aorn (0.28 cm); Density – 1.27 g/cm³; Specific gravity – 2.58; Total perviousness – 50.78%; Humus – 2.20%; Total N – 0.328%; PH in water – 6.5 and in potassium chloride – 6.3; Carbonates – missing.

The results are mathematically processed by the methods of dispersion analysis.

Results and Discussion

From the biometric tests of the size of the plants (Table 1), it is visible that both chemicals have the tendency to increase with 1.8 cm for XII -55 and with 133.9 cm for ПБ-31, compared to the water control samples.

The results for the main index – the contents of both types of oil, are present in Table 1. The treatment of coriander with biologically active substances in the period of large efflorescence influences positively the contents of ethereal and regular oil. The results from the chemical XII -55, applied at a dose of 20 ml/da show an increase of the contents of ethereal oil with 4.13% and for the regular oil – with 5.42%, compared to the control samples, average for the period, but these results have not been approved. The chemical ПБ-31, applied at a dose of 30 ml/da increases the contents of ethereal oil with 8.66% and of regular one – with 6.30%, compared with the control sample average for the period, approved at GD – 5%.

The results of the yield by years and average for the period are present in Table 2.

Table 1
Contents of ethereal and regular oil, %

№	Variants	Contents of ethereal oil			Average for the period % towards St	Contents of regular oil			Average for the period % towards St
		2003 y.	2004 y.	2005 y.		2003 y.	2004 y.	2005 y.	
		% towards St	% towards St	% towards St		% towards St	% towards St	% towards St	
1.	Control sample	1.05 100.0	1.01 100.0	1.07 100.0	1.043 100.0	15.8 100.0	17.2 100.0	16.8 100.0	16.6 100.0
2.	XII - 55 /20 ml/da/	1.09 103.8	1.04 102.97	1.12 104.7	1.083 104.13	16.9 106.9	17.8 103.5	17.8 105.8	17.5 105.42
3.	ПБ - 31 /30 ml/da/	1.14 108.6	1.09 107.92	1.17 109.3	1.13 108.66	17.3 105.2	18.3 106.2	18.0 107.1	17.86 106.30
	GD - 5 %	0.067	0.078	0.097		0.81	0.97	1.12	

Table 2
Total yield, kg/da

№	Variants	Yield by years, kg/da			Average for the period kg/da % towards St
		2003 y.	2004 y.	2005 y.	
		kg/da % towards St	kg/da % towards St	kg/da % towards St	
1.	Control sample	31.7 100.0	25.8 100.0	36.1 100.0	31.2 100.0
2.	XII - 55 /20 ml/da/	32.9 103.8	27.5 106.6	38.4 106.4	32.9 105.7
3.	ПБ - 31 /30 ml/da/	34.6 109.1	29.1 112.8	40.8 111.4	34.8 111.6
GD - 5 %		1.42	3.1	3.9	

The most characteristic for the whole period of the experiment with the chemicals is that there are lower yields for this culture, related to type of soil and the microclimate of the region of Sofia.

During these three years, there is a positive tendency of increasing the yield of seeds – with XII -55 the increase is with 5.7% and for ПБ-31 – with 11.6%, compared with control sample average for the period. The differences have been approved mathematically by years at GD – 5%.

The received positive values of the yield are the result of the influence of the tested chemicals over the detainment of more blossoms of plants and, consequently, the decrease of the losses from the drop of ripe seeds.

Conclusions

The tested biologically active substances in the period of efflorescence influence positively the contents of ethereal and regular oil and the received yield too.

The chemical XII -55 at a dose of 30 ml/da is proved to increase the contents of ethereal oil – with 8.66%, of the regular oil – with 6.30% and of yield – with 11.6%, compared to the water control sample, average for the tested period.

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