ECOLOGY

INFLUENCE OF THE BIOPREPARATION ON INDICATORS OF THE QUALITY OF SUZIRYA SOYBEAN SEED

ВПЛИВ БІОПРЕПАРАТУ НА ПОКАЗНИКИ ЯКОСТІ НАСІННЯ СОЇ СУЗІР'Я

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Soybeans have a valuable chemical composition and high nutritional and forage qualities. Proteins are the main biochemical component of soybean seeds. [1, c. 35–43; 2, c. 445–452; 3, c. 725–729]. When soybean seeds are contaminated by the mold fungus, some significant amount of yield is lost each year. Soybean plants are often parasitized by several pathogens at the same time *(fuzarios, alternarios, peronosporos, asperhilos mildew, aspergillosis*, etc.,), which reduces the yield of its seeds by 15–20% or more, lowers protein content by 4–18% and fat content by 1,6–5,6% [4, c. 1237–1257; 5, c. 21–40; 6, 7, c. 610] and reduce the ecologic safety of the plant products. Since the question of high quality soybeans in terms of biological cultivation conditions has been studied insufficiently it was necessary to research the influence of different technological measures as to the soil types and climatic conditions of its cultivation on the formation the of colony forming units in seed varieties as well as to analyze the biochemical composition of soybean seeds.

The experimental research was conducted in the Central Forest-Steppe region of Ukraine (Skvyrska research station of organic production Institute of Agroecology and Nature Management of NAAS (SRS OP IAN NAAS)) and in the department of agrobioresources and ecologically safe techno-logies of the Institute of Agroecology and Nature Management of NAAS.

The samples of soybean seeds were taken on the ripening phase. The object of the study were soybean plants of the Suzirya variety selected by the National Research Center of the Institute of Agriculture of NAAS of Ukraine. Soybeans was grown using the biological preparation Filazonit, which was developed by the company Filazonit-Ukraine. Filazonit is a biopreparation of the complex action based on helpful soil bacteria.

The indicators of seed quality were determined by the method suggested by DSTU 4964: 2008. TU. SOYA [8, c. 7].

Statistical processing of the obtained results was performed using the analysis of variance and correlation (p=0,05) [9, c. 156]. To process the obtained results, the standard mathematical methods of analyzing and diagram construction using a package programs Microsoft Office, Statgraphics Plus for windows, Excel 2000, were used.

As a result of the research, It was detected that with the help of the technologies named Philazonite of Ukraine some significant inhibition of the colony-forming units (CFU) formation the micromycetes in the Suzirya seed variety in comparison with the control sample. In particular, in second year, during the research, the highest efficiency of the biopreparation for the soybean cultivar Suzirya was detected. In that case, the number of CFU micromycetes was 0,4 thousand CFU/g of seeds (Tab. 1).

Table 1

The number of CFU/g of micromycete seeds on soybean plants of the Suzirya variety grown according to the «Filazonit-Ukraine» technology

Thousand CFU/g of seeds of the Suzirya					
first year		second year		third year	
Control	Filazonit	Control	Filazonit	Control	Filazonit
2,3	1,3	0,8	0,4	1,9	0,8

Due to the fact that the indicators of the CFU numbers in the micromycetes of the studied variety turned out to be twice lower than the indicator of the control specimen, then the influence of the biopreparation product Filazonit on the formation of colony-forming units should be considered inhibitory. This proved that antifungal properties of the soybean plant of the tested cultivars significantly depend on the genotype of the variety.

It was statistically proven that the effectiveness of the biopreparation Filazonit for soybean variety was significant compared to the one for the control specimen ($H_{05} = 0,24$). The greatest effectiveness of the biopreparation on the soybean cultivars Suzirya was detected in the second year research, when the number of the CFU was 0,4 thousand CFU/g. It can be connected with certain weather conditions. In the second year of the research, the hydrothermal coefficient was 0,9 (weak dryness), which could play a role in inhibiting of the growth of the phytopathogenic micromycetes.

A number of phytopathogenic species of the micromycetes was isolated and identified in soybean seed cultivars Suzirya (Fig. 1).
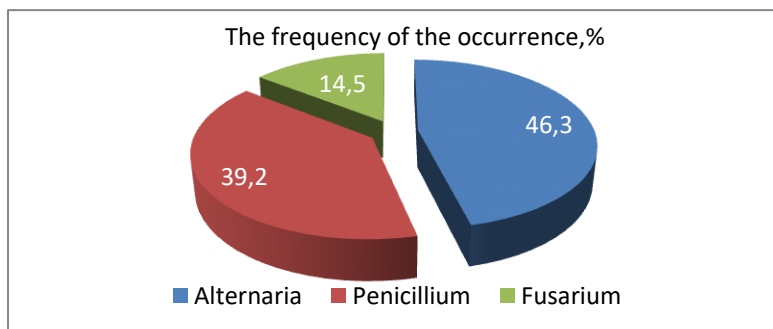

Fig. 1. The frequency of the occurrence of the isolates taken from soybean seed cultivars *Suzirya* in the laboratory

The most common were micromycetes of the genus *Alternaria* are most common (46,3%). The percentage of the micromycetes of the genus *Penicillium* is 39,2%. The genus *Fusarium* can be characterized by the lowest frequency of the occurrence of the micromycetes (14,5%).

According to the results of the research conducted over three years, it was found out that the indicators of protein and oil content in the soybean seed cultivars Suzirya in all variants exceeded the standard indicators (protein norm – 35%; oils – 12%) suggested in DSTU 4964: 2008. TU. SOY. At the same time, the indicators of the mass fraction of seed moisture did not exceed the permissible norms. Thus, the protein content in the soybean seed cultivar Suzirya grown by using the technology Filazonit ranged from 37,5 to 39,21%. The lowest protein indicators in the soybean seed cultivar Suzirya (37,5%) were observed during the first year (Table 2).

Table 2

The quality indicators of the soybean seed cultivars Suzirya within the research period

Variant	The quality indicators of soybean seed,%								
	Proteins			Oil			Moisture		
	first year	second year	third year	first year	second year	third year	first year	second year	third year
Control	37,11	39,07	38,8	19,3	20,5	19,9	10,5	8,8	9,8
Filazonite Ukraine	37,5	39,21	38,8	19,4	21,23	19,02	10,2	8,8	9,9
Norm	35			12			12		

That can be caused by the special connections between the soil types and weather conditions. Similarly, in the research of the same period of time, the hydrothermal coefficient was 1,35 (quite high moist). As is known from the academic sources, the excessive moisture causes reduce in the protein content in soybean seeds. Indicators of the oil content of soybean seeds of the Suzirya variety ranged from 19,02 to 21,23% and the moisture mass fraction ranged from 8,8 to 10,5%.

Our research has shown that the biochemical composition the soybean seeds is influenced by both their genotype variety and the cultivation technology in specific soil types and weather conditions. It has been experimentally proven that there is a physical possibility to regulate the number of the phytopathogenic

micromycetes in soybean seeds by using biological product Filozanit, which can increase biosafety in soybean agrocenoses.

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