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CHANGES IN THE FATTY ACID COMPOSITION OF CORN SEEDLINGS UNDER THE INFLUENCE OF THE MICROBIOLOGICAL COMPLEX

*Orientation of agricultural production to ecological expediency leads to interest in the use of microbial preparations that are able to increase the resistance of plants to negative environmental factors and activate germination processes. This study was conducted with the **aim** to investigate the influence of a microbiological complex on the sowing properties of seeds and the fatty acid composition of seedlings of different breeding samples of corn. **Methods**. Corn seeds of two lines 1-Ak026 and 2-Ak033 and their simple interline hybrid, which is the parent component of the three-line hybrid NUBiSe included in the State Register of plant varieties suitable for distribution in Ukraine, were used for the research. Seed inoculation was carried out with a microbial complex, which contained biological preparations Sporazyn, Avercom, and Phytovit. Seedlings from the seeds of the corresponding corn samples not treated with the microbial complex served as controls. The fatty acid composition of lipids was determined in the biological material of corn seedlings of different variants of the experiment. The Folch method was used to extract fats from plant material. Hydrolysis and methylation of fatty acids of lipids obtained from corn seedlings was carried out according to DSTU ISO 5509-2002. Fatty acids were detected and identified by gas chromatography . The quantity of fatty acids was calculated by the method of internal normalization in percentages. **Results.** The influence of the microbiological complex on the quantitative and qualitative composition of fatty acids of the lipid complex of corn seedlings was established, which depended on the breeding sample. In the process of research, 22 fatty acids were detected and quantitatively identified in corn seedlings. In the seedlings of lines 1-Ak033 and 2-Ak033, 20 and 19 of them were found, respectively, and in the hybrid — 18. The highest percentage content (more than 90%) was revealed for palmitic (C16:0), oleic (C18:1n9c), and linoleic (C18:2ω6c) fatty acids. The*

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use of the microbial complex made it possible to detect the fatty acids in line 1 and the hybrid that were not detected in the samples without inoculation. ***Conclusions.*** *The study of the fatty acid composition of the microbial preparation Sporazyn revealed the highest content of unsaturated fatty acids (67.47%) and the ratio of saturated to unsaturated (0.48). The use of microbiological preparations on corn seeds increased the activity of the germination processes, which led to the improvement of sowing properties and changes in the fatty acid composition of the lipid complex of seedlings of various breeding forms of Zea mays.*

Keywords: *corn, Zea mays, lines and hybrid, seeds and seedlings, microbiological complex, sowing properties, fatty acids.*

One of the most important cereal crops in the world is corn which occupies a wide area due to its plasticity as a breeding and genetic object. Three-line and simple corn hybrids are the most common in Ukraine. Global climate changes and the excessive use of pesticides with a large-scale plowing of agricultural land intensify soil degradation processes. The orientation of agricultural production to ecological expediency leads to interest in the use of microbial preparations that can increase the resistance of plants to negative environmental factors (Chiaranunt & White, 2023), influence the reduction of phytotoxicity of the soil, and preserve its fertility (Melnichuk et al., 2020). Microorganisms in combination with metabolic biological preparations form protective, growth-stimulating, adaptogenic, and anti-stress properties in plants (Czarnes et al., 2020; Iutynska et al., 2017).

The productivity of microorganisms' interaction with the plant depends on many factors including the production of substances of different compositions (Canarini et al., 2019). Lipids, which are a source of energy and structural components of cell membranes, play an important role in the exchange processes between cells and the environment. Fatty acids are a necessary structural and functional component of a molecule of any class of lipids. They have various biological activities and participate in the adaptation of the organism to the environment.

Lipid degradation is catalyzed by hydrolases and other enzymes, and their activity is controlled by various intracellular activators and inhibitors. The role of enzymes in the formation of signaling substances involved in the formation of an adaptive response to abiotic and biotic stress factors is known (Babenko et al., 2017; Adhikari et al., 2016). The intensity of degradation processes changes during ontogenesis and depends on the conditions of plant existence.

Thus, exiting the dormant state of seeds leads to the activation of the breakdown of complex reserve substances. The enzymatic reactions of the hydrolysis of ester bonds and their activity probably influenced by substances produced by microorganisms are a kind of starting point for the degradation of lipids.

The **aim** of this research was to study the influence of the microbial complex on the sowing properties of seeds and the fatty acid composition of seedlings of different breeding samples of corn.

Materials and Methods. The research used corn seeds of two lines 1-Ak026 and 2-Ak033 and their simple interline hybrid, which is the mother component of the three-line hybrid NUBiSel, entered in the State Register of Plant Varieties suitable for distribution in Ukraine. Seed inoculation was carried out with a microbiological complex which included biological preparations Sporazyn, Avercom, and Phytovit developed by the D.K. Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine. At the core of the complex, there are living cultures of pseudomonads and bacilli, as well as metabolites of soil streptomycetes. Metabolic biopreparations Phytovit (based on *Streptomyces netropsis* IMV As-5025) and modified Avercom (based on *S. avermitilis* IMV As-5015) by introducing chitosan into its composition. Chitosan is a biological substance with elicitor properties. These metabolites exhibit nematocidal, insecticidal, fungicidal, antibacterial, and partially antiviral effects, which promote plant growth and development, disease resistance, and priming effects (Iutynska et al., 2017).

A laboratory experiment has been previously established in which the influence of the microbial complex on the sowing properties of the seeds of both lines 1-Ak026 and 2-Ak033 and their simple interlineal hybrid of corn was studied under the conditions outlined in (DSTU, 2023). For further research, seedlings were selected from the variants that showed a significant increase in seed germination under the influence of inoculation. Seedlings from the seeds of the corresponding corn samples not treated with the microbial complex were used as control.

The fatty acid composition of lipids was determined in the biological material of corn seedlings of different variants of the experiment. Fats were isolated from the studied samples according to the Folch method (Folch et al., 1957). The next stage of sample preparation was hydrolysis and methylation of fatty acids of lipids obtained from corn seedlings. 4 cm^3 of methyl sodium hydroxide solution was added to 100 mg of the obtained fat, and a reflux condenser was attached to the flask and boiled until fat drops disappeared, stirring the flask contents at intervals of 30—60 sec. 5 cm^3 of methyl boron trifluoride solution was added to the flask, continuing boiling for 1 h. 3 cm^3 of hexane was added to the boiling mixture through the upper part of the reflux condenser and removed from the heating element. 20 cm^3 of saturated sodium chloride solution was added to the hot solution and stirred for 15 sec. The upper (hexane) layer was selected for research and analyzed according to DSTU ISO 5509-2002.

Analysis of methyl esters of fatty acids was carried out on a gas chromatograph Trace GC Ultra (USA) with a flame ionization detector. The column temperature was 140—240 °C, and the detector temperature was 260 °C. The volume of the injected sample was 1 μL.

The fatty acids were identified using a standard sample of Supelco 37 Component FAME Mix. The quantitative assessment of the spectrum of fatty acids of lipids was carried out by the method of internal normalization, determining their content in percent. The research was conducted in 3 parallels.

Statistical analysis of experimental data was made using generally accepted methods of variational statistics. The probability of a difference in indicators was assessed using the Student's t-test. Differences between the compared indicators were considered probable at the significance level of $P \leq 0.05$.

Results. In the research, 22 fatty acids were detected and quantitatively identified in corn seedlings. In the seedlings of lines 1-Ak033 and 2-Ak033, 20 and 19 of them were detected, respectively, and in the hybrid — 18. The highest percentage content (more than 90%) was determined for palmitic (C16:0), oleic (C18:1n9c), and linoleic (C18:2ω6c) fatty acids (Table 1). Stearic acid (C18:0) is also one of the main components of the corn seed germ (Jovanovic et al., 2005). Its content in the investigated corn seedlings was in the range of 1.72—3.53%. An increase in the content of stearic acid under the influence of the microbiological complex by 1.2 times was noted in line 1, it was not significant in the hybrid, while in line 2 there were downward trends.

The determination of the content of fatty acids in corn seedlings under the influence of the microbiological complex revealed differences in both their quantitative and qualitative compositions. The presence of such fatty acids as tridecanoic (C13:0) and myristoleic (C14:1) with a content of 0.04 and 0.37%, respectively, which were not detected in the control, was detected when corn seedlings of line 1 were treated with microorganisms and metabolites. Similar changes were not observed in line 2, whereas in the hybrid under the influence of the microbiological complex, acids absent in the control was also determined. These were caprylic (C8:0), capric (C10:0), and lauric (C12:0) acids, the content of which was 0.09, 0.19 and 0.19%, respectively.

Under the action of the microbiological complex, the quantitative composition of fatty acids changed depending on the breeding samples of corn. Thus, the content of unsaturated linoleic acid (C18:2ω6c) decreased by 13% (1.4 times) in the version with inoculation of line 1, while in the hybrid — only downward trends. The content of oleic acid (C18:1ω9c) also decreased in these variants, but in the hybrid, the decrease was greater and amounted to 9.76% (1.4 times), in line 1 — 3.34%. In line 2, on the contrary, there were tendencies to increase the content of both acids. The tendencies to decrease the content of arachidic acid (C20:0) under the influence of microbiological complex were observed in all samples, including line 2. The content of behenic (C22:0) and lignosiric (C24:0) fatty acids decreased under the influence of inoculation in both lines, while in the hybrid it was observed to increase by 2.1 and 3.2 times, respectively, compared to the control.

Among the saturated fatty acids, an increase in the palmitic acid content was noted in the variants with inoculation: in the 1-Ak026 line by 9.45% (1.7 times), in the hybrid by 4.98% (1.5 times), a slight increase in stearic acid, while in line 2 there were slight tendencies to decrease for both acids. In the samples of line 1 and the hybrid under the influence of the microbial complex, an increase in the content of a number of other acids, namely caprylic, capric, tridecanoic, miristic, palmitoleic, margaric, and heptadecenoic

Table 1. **Fatty acid content (%) in corn seedlings treated with the microbial complex, M ± m; n = 5**

Fatty acid code and name	Line 1-Ак026		Line 2-Ак033		Hybrid L1xL2	
	control	MC*	control	MC*	control	MC*
C6:0 (caproic)	0.60	0.32	0.08	0.13	0.09	0.70
C8:0 (caprylic)	0.03	0.49	0.01	0.01	0.00	0.09
C10:0 (capric)	0.06	1.18	0.01	0.01	0.00	0.19
C12:0 (lauric)	0.07	1.46	0.01	0.00	0.00	0.19
C13:0 (triple decan)	0.00	0.04	0.00	0.00	0.01	0.25
C14:0 (miristic)	0.42	4.24	0.05	0.05	0.06	1.06
C14:1 (myristoleic)	0.00	0.37	0.00	0.00	0.00	0.00
C15:0 (pentadecanoic)	0.11	0.49	0.00	0.00	0.01	0.00
C16:0 (palmitic)	12.99	22.44	10.90	10.49	9.83	14.81
C16:1 (palmitoleic)	0.14	0.57	0.05	0.04	0.08	0.18
C17:0 (margaric)	0.11	0.20	0.07	0.07	0.06	0.15
C17:1 (heptadecanoic)	0.03	0.08	0.03	0.03	0.03	0.04
C18:0 (stearic)	2.96	3.53	1.99	1.82	1.72	1.94
C18:1ω9c (oleic)	30.27	26.93	27.57	27.87	35.25	25.49
C18:2ω6c (linoleic)	48.54	35.53	57.08	57.61	50.99	50.04
C18:3ω3 (linolenic)	0.16	0.16	0.25	0.20	0.16	0.49
C20:0 (arachidic)	0.29	0.21	0.53	0.44	0.33	0.28
C20:1ω9 (eicosamomonoeic)	1.74	1.01	0.91	0.84	0.84	1.55
C20:2ω6 (cis-11,14-eicosadiene)	0.04	0.03	0.02	0.02	0.02	0.03
C22:0 (behenic)	0.23	0.16	0.15	0.11	0.15	0.32
C22:2ω6 (cis-13,16-docosadieic)	0.89	0.37	0.10	0.13	0.20	1.66
C24:0 (lignosiric)	0.32	0.19	0.19	0.13	0.17	0.54

* microbial complex: Sporazyn, Avercom, and Phytovit

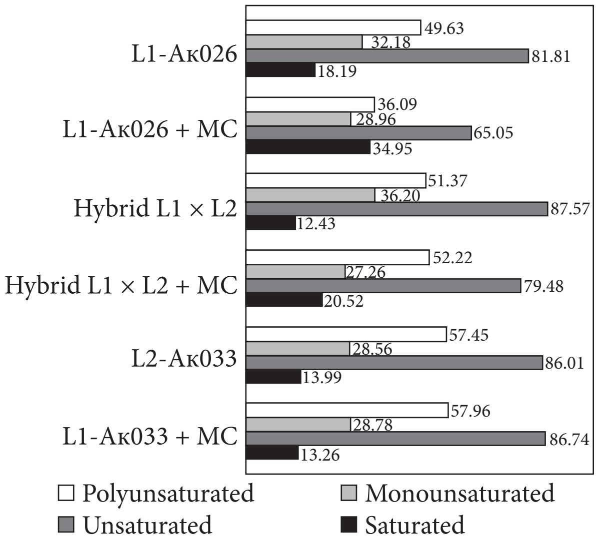

Fig. 1. Mass fraction of saturated, unsaturated, and monounsaturated fatty acids (%) in lipids obtained from corn seedlings under the influence of the microbiological complex (MC)

ones, was found. In line 2, the indicators of the content of these acids remained at the same level as in the control. The greatest 8.3-fold increase in the content of polyunsaturated cis-13,16-docosadienoic acid (C22:2ω6) was found in the hybrid under the influence of inoculation.

The conducted studies of the content of fatty acids in corn seedlings confirmed the effect of the microbiological complex on the activation of seed germination processes, which affected the increase in its sowing quality indicators (Table 2).

It should be noted that no positive effect of inoculation on the indicators of germination energy was found in the lines, and a 6.0% increase was established in hybrid seeds. Germination rates of corn seeds increased in both lines and hybrids from 6.0 to 11.3%. A positive effect of inoculation on both indicators was obtained in the hybrid: a 6.0% increase in germination energy and seed germination compared to the control.

Determining the mass fraction of fatty acid groups in lipids obtained from corn sprouts made it possible to place them in order of decreasing indicators: unsaturated (65.05—87.57), polyunsaturated (36.09—57.96), monounsaturated (27.26—36.20), and saturated (12.43—34.95%).

The dependence of the influence of the microbial complex on the mass fraction of the studied groups of fatty acids on the original breeding sample of corn was established. Thus, inoculation did not cause changes in the mass fraction of fatty acids in line 2-Ak033 (Fig. 1).

In corn seedlings of the 1-Ak026 line under the influence of the microbial complex, an increase in the mass fraction of saturated fatty acids by 1.9 times and a decrease in polyunsaturated and unsaturated by 1.4 and 1.3 times, respectively, were noted. In the hybrid, there were established tendencies to increase the mass fraction of polyunsaturated and decrease monounsaturated fatty acids by 1.3 times and increase saturated acids by 1.6 times compared to the control without inoculation.

The highest ratio of saturated to unsaturated fatty acids was found in the seedlings of line 1. The ratio increased with the application of the micro-

Table 2. **The influence of the microbiological complex on the indicators of seed germination and germination energy of corn seeds, %**

Variant	Line 1-Aк026		Line 2-Aк033		Hybrid L1xL2	
	energy	germination	energy	germination	energy	germination
Control	33.0	79.7	11.3	80.0	29.0	87.3
MC*	29.3	91.0	13.0	86.7	35.0	93.3
SD_{05}	*3.97*	*5.13*	*2.17*	*4.78*	*3.51*	*4.17*

* microbiological complex: Sporazyn, Avercom, and Phytovit

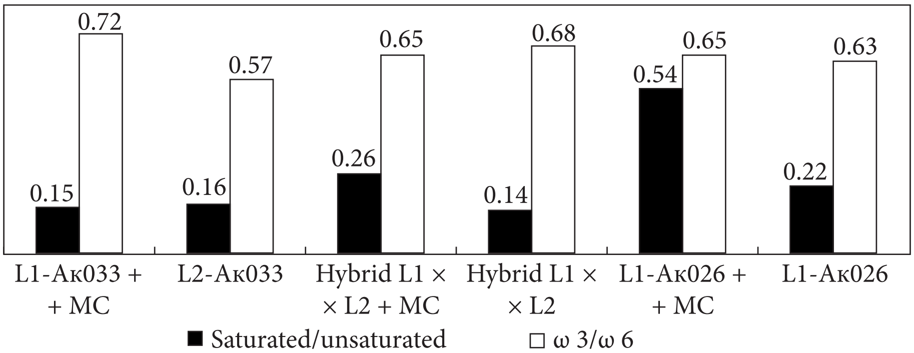

Fig. 2. The ratio of fatty acids in corn seedlings under the influence of the microbiological complex (MC)

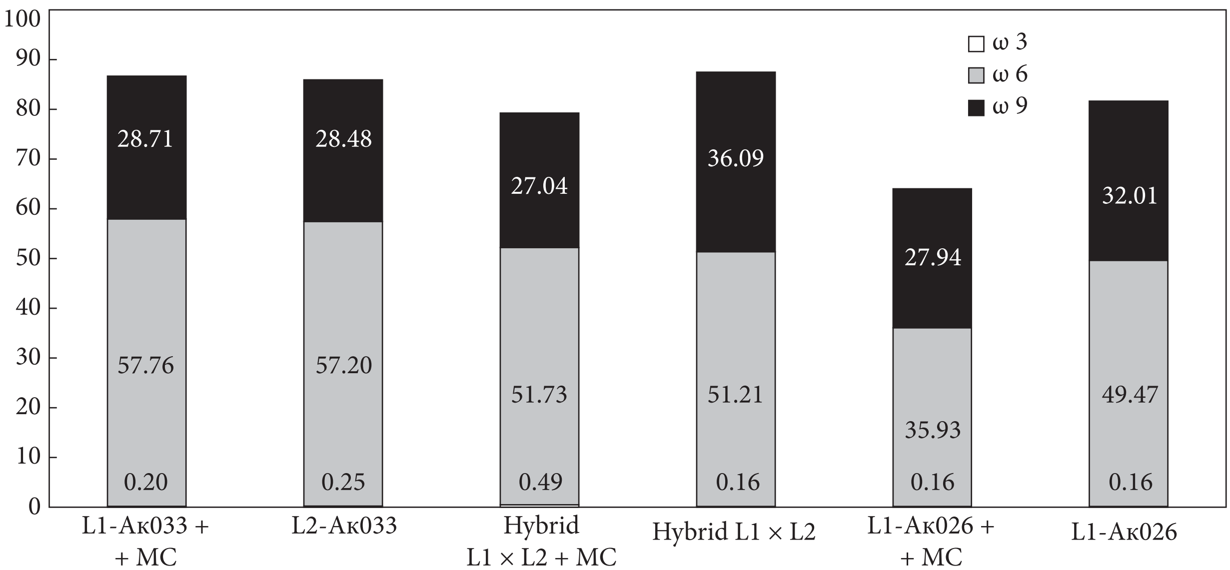

Fig. 3. The ratio of polyunsaturated fatty acids of omega families in corn seedlings under the influence of the microbiological complex (MC)

biological complex in the seedlings of line 1 and the corn hybrid by 2.4 and 1.9 times, respectively (Fig. 2). Under the influence of inoculation, an increase in the ratio of omega 3 to omega 6 in the lipid composition of line 2 seedlings was noted.

Polyunsaturated fatty acids of the omega families ensure the functional activity of cell membranes and are precursors of a number of biologically active substances. The conducted studies revealed changes in the ratio of polyunsaturated fatty acids of omega families in corn seedlings under the influence of the microbiological complex, which were most pronounced in the hybrid and line 1 (Fig. 3).

The lipid composition of bacterial membranes is an important component that plays a significant role in the adaptation of microorganisms to adverse living conditions (Dimova & Iutynska, 2022). The study of the fatty acid composition of the microbial preparation Sporazyn revealed the highest content of unsaturated fatty acids (67.47%), while the ratio of saturated to unsaturated was 0.48 (Fig. 4). Polyunsaturated and monounsaturated fatty acids were at the same

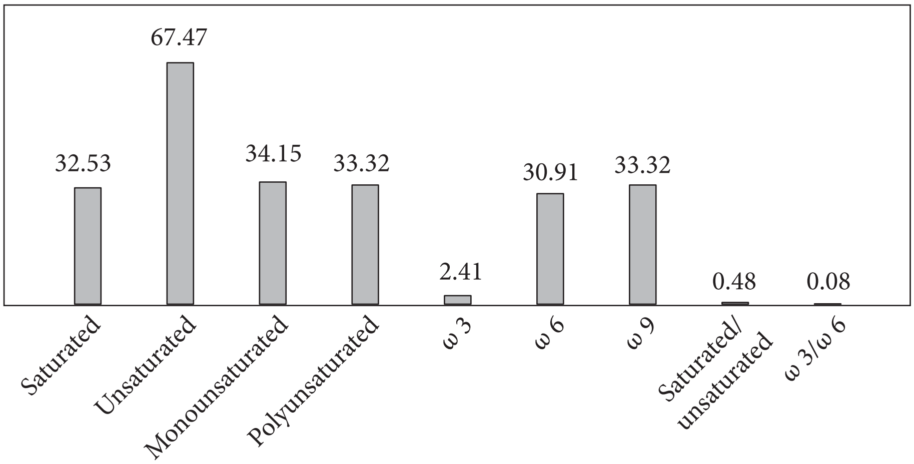

Fig. 4. The ratio of polyunsaturated fatty acids of the omega families in the preparation Sporazyn

level of 33.32 and 34.15%. The content of omega 9 was the largest and amounted to 33.32, while that of omega 6 — less by 2.41%. The lowest content of omega 3 (2.41%) was noted in the lipid complex of Sporazyn.

We previously have determined that the fatty acid composition of lipids isolated from the mycelium of *S. avermitilis* IMV As-5015 contained acids with the number of carbon atoms from C4 to C24, saturated (unbranched, iso- and anti-iso-) and unsaturated, with even and odd by the number of carbon atoms. In addition to low-molecular fatty acids C4 — C10, which are precursors in the synthesis of avermectin, linoleic (up to 26%), oleic (up to 21%) and palmitic (up to 17%) amino acids were represented in significant quantities. Arachidonic acid (0.05%) was discovered for the first time, which is not synthesized by higher plants, is a foreign object for them, and is perceived as an «invasion of infection». Arachidonic acid is a biogenic elicitor that triggers a false «alarm signal» and activates plant defense reactions. The fatty acid composition of the drug Avercom differed from the composition of the mycelium. A total of 14 acids were detected, of which the oleic acid had the highest content (up to 22%) and 12-methyltetradecanoic acid — up to 16%. The amount of arachidonic acid in the Avercom was higher than in the mycelium and amounted to 2.4%, while the content of linoleic acid decreased to 4.6%, from which, as known, arachidonic acid is formed (Iutynska et al., 2017).

Also, among the fatty acids of *S. netropsis* IMV As-5025, acids (from 22) with the number of carbon atoms from C10 to C22, saturated and unsaturated, with even and odd numbers of carbon atoms were found. A significant amount of mono-, di-, and polyunsaturated fatty acids was found, including linoleic (up to 22.37%), oleic (up to 13.62%), palmitic (up to 10.93%), stearic, myristoleic (up to 17.99%), and palmitoleic. They can act as growth factors and adaptogens of bacteria, and some, in particular 3-hydroxypalmitin, as communicative agents. The coefficient of unsaturation of fatty acids in the strain *S. netropsis* IMV As-5025 was less than 1 and was 0.53. We previously observed the same pattern in terms of the unsaturation ratio of fatty acids for the avermectin producer *S. avermitilis* IMV As-5015. But unlike *S. avermitilis* IMV As-5015, *S. netropsis* IMV As-5025 did not synthesize low molecular fatty acids — butyric (C4:0), valeric (C5:0), caproic (C6:0), and caprylic (C8:0), which can probably influence the formation of antibiotics of different chemical structures, in particular macrolide avermectins (Biliavska, 2018).

Thus, the positive influence of the microbiological complex, which consists of both living strains of pseudomonads and bacilli and metabolites of soil streptomycetes (Sporazyn+Avercom+Phytovit preparations), on the activation of seed germination processes of selection samples of corn was established.

The content of fatty acids in the microbial preparation Sporazyn and in the seedlings of corn lines 1-Ak026 and 2-Ak033 and their simple interlineal hybrid was determined. The dependence of the influence of the microbial complex on the quantitative and qualitative fatty acid composition of corn seedlings on the selection sample was revealed.

Discussion. The content of fatty acids differs in different organs of corn. 23 fatty acids were found in sweet and high-amylose corn. As a representative of saturated fatty acids, palmitic acid prevailed in all samples. Among the unsaturated fatty acids, linoleic acid is the most abundant in stems, columns with stigmas, and roots, and linolenic acid predominated in leaves and panicles (Karpyuk, 2014).

The main process during seed germination is lipid catabolism, which provides energy for the production of biogenic elements necessary for plant development (Theodoulou & Eastmond, 2012). It is known that products of lipoxygenase oxidation of polyunsaturated fatty acids play a significant role in plant metabolism, affect their growth and development and tolerance to biotic and abiotic stresses (Babenko et al., 2017). The content of polyunsaturated fatty acids increases in seedlings compared to seeds (Al-Taher & Nemzer, 2023). One of the ways of metabolizing hydroperoxides of unsaturated fatty acids is the formation of hydroxy and epoxy derivatives, which play an important role in protecting plants from fungal infection. Some derivatives of linoleic and linolenic acids have the ability to stimulate the growth of plants and callus tissues. Acceleration of the exit of seeds from a state of rest, increased growth of the main root, and new formation of lateral roots were noted due to their influence. There are data on growth-stimulating, fungicidal, repellent, antitumor, and other properties of oxygenated derivatives of fatty acids (Babenko et al., 2017).

The role of microorganisms in the processes of seed germination is known (Balbinot et al., 2020). Microorganisms are able to form mutualistic relationships with plants (Guerrieri et al., 2020; Alemneh et al., 2022), influence the processes in the plant in different periods of its development and under stress conditions (Khan et al., 2020; Lin et al., 2020; Barnawal et al., 2019), and contribute to increasing their productivity and protection against harmful organisms (Song et al., 2020). Previously, we showed at the molecular and cellular levels the ways of bioregulation of the phenylpropanoid, sterol-synthesizing, and silencing activities of plants by metabolic biological preparations, including Avercom and Phytovit, which contributes to increasing their resistance to biotic and abiotic stresses — the priming effect (Biliavska, 2018). Research in recent years for the development of microbiological preparations based on live cultures of microorganisms and their metabolites has opened opportunities and promising prospects for adaptive crop production, which allows farmers to adapt to changing environmental conditions and reduce dependence on anthropogenic factors (Hanaka et al., 2021; Vinnikova et al., 2023).

Taking into account the ecological orientation of agricultural production, it is necessary for the selection process to be guided by knowledge about plant-microbial relationships, as well as to carry out plant selection to increase the symbiotic potential of such interaction concerning the maximum genetic diversity. Thanks to this selection, commercial varieties of agricultural plants will be obtained that interact as efficiently as possible with microorganisms of agrophytocenoses (Davranov et al., 2021).

Conclusions. The influence of the microbiological complex on the quantitative and qualitative composition of fatty acids of the lipid complex of corn seedlings was established, which depended on the breeding sample. In the study, 22 fatty acids were detected and quantitatively identified in corn seedlings. In the seedlings of lines 1-Ak033 and 2-Ak033, 20 and 19 of them were found, respectively, and in the hybrid — 18. The highest percentage content (more than 90%) was determined for palmitic (C16:0), oleic (C18:1n9c), and linoleic (C18: 2ω6c) fatty acids. The use of the microbiological complex made it possible to detect fatty acids in line 1 and the hybrid that were not detected in the samples without inoculation.

The study of the fatty acid composition of the microbial preparation Sporazine revealed the highest content of unsaturated fatty acids (67.47%) and the ratio of saturated to unsaturated acids (0.48).

The use of microbiological preparations on corn seeds increased the activity of the germination processes, which affected the improvement of sowing properties and changes in the fatty acid composition of the lipid complex of seedlings of various breeding forms of *Zea mays*.

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ЗМІНИ ЖИРНОКИСЛОТНОГО СКЛАДУ ПРОРОСТКІВ КУКУРУДЗИ ЗА ВПЛИВУ МІКРОБІОЛОГІЧНОГО КОМПЛЕКСУ

Орієнтація сільськогосподарського виробництва на екологічну доцільність зумовлює інтерес до використання мікробних препаратів, які здатні підвищувати стійкість рослин до негативних чинників навколишнього середовища та активізувати процеси проростання. Цей експеримент був проведений з **метою** вивчення впливу мікробного комплексу на посівні властивості насіння та жирнокислотний склад проростків різних селекційних зразків кукурудзи. **Методи.** Для дослідження використано насіння кукурудзи двох ліній 1-Ак026 і 2-Ак033 та їх простого міжлінійного гібриду, який є материнським компонентом трилінійного гібриду НУБіСел, занесеного до Державного реєстру сортів рослин, придатних для поширення в Україні. Інокуляцію насіння здійснювали мікробним комплексом, до складу якого увійшли біопрепарати споразин, аверком та фітовіт. Контролем слугували проростки з необробленого мікробним комплексом насіння відповідних зразків кукурудзи. У біологічному матеріалі проростків кукурудзи різних варіантів досліду визначали жирнокислотний склад ліпідів. Для виділення жиру з рослинного матеріалу застосували метод Фолча. Гідроліз та метилювання жирних кислот ліпідів, отриманих із проростків кукурудзи, проводили згідно з ДСТУ ISO 5509-2002. Виявлення та ідентифікування жирних кислот проводили методом газової хроматографії (GC). Обрахунок кількості жирних кислот здійснювали методом внутрішньої нормалізації у відсотках. **Результати.** Встановлено вплив мікробіологічного комплексу на кількісний і якісний склад жирних кислот ліпідного комплексу проростків кукурудзи, який залежав від селекційного зразка. У процесі досліджень у проростках кукурудзи виявлено та кількісно ідентифіковано 22 жирні кислоти. У проростках ліній 1-Ак033 і 2-Ак033 їх виявлено відповідно 20 і 19, у гібриду — 18. Найвищий відсотковий вміст (більше 90%) припадає на пальмітинову (C16:0), олеїнову (C18:1n9c) та лінолеву (C18: 2ω6c) жирні кислоти. Застосування мікробного комплексу дозволило виявити у лінії 1 та гібриду жирні кислоти, які не встановлені у зразках без інокуляції. **Висновки.** Дослідження жирнокислотного складу мікробного препарату споразину виявило найбільший вміст ненасичених жирних кислот (67,47 %) і співвідношення насичених до ненасичених склало 0,48. Застосування мікробіологічних препаратів на насінні кукурудзи підвищувало активність процесів його проростання, що позначилось на покращенні посівних властивостей та змінах у жирнокислотному складі ліпідного комплексу проростків різних селекційних форм *Zea mays*.

Ключові слова: *кукурудза, Zea mays, лінії і гібрид, насіння і проростки, мікробіологічний комплекс, посівні властивості, жирні кислоти.*