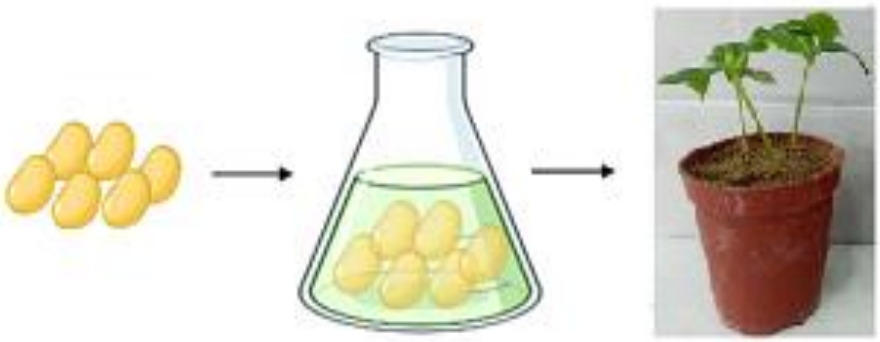


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OZIQ-OVQAT XAVFSIZLIGI:

MILLIY VA GLOBAL MUAMMOLAR





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MUNDARIJA:

Abdikarimov B.Q., Qodirova Z.N., Maxmudov T.X., Usmonov O.A. NO‘XAT O‘SIMLIGINI KASALLANTIRUVCHI BEET WESTERN YELLOWS VIRUSI MOLEKULYAR GENETIK IDENTIFIKATSIYASI..... 4-8

Ergashova D.U., Sanakulov A.L. EFFECT OF MICROELEMENTS ON THE BIOCHEMICAL COMPOSITION OF MELON..... 9-12

Maxmudov T.X. O ASPV-PAV T-UZB1 IZOLYATI OQSIL QOBIG‘I AMINOKISLOTA KETMA-KETLIGINING QIYOSIY TAHLILI..... 13-18

Negmatova S.T. TURLI KO‘CHAT QALINLIGI VA CHILPISH USULLARIDA O‘RTA VA INGICHKA TOLALI G‘O‘ZA NAVLARINI PARVARISHLASH..... 19-25

Matniyazova H.X., Nabiyev S.M., Yuldashov O?X. SUV BILAN TURLICHA TA’MINLANGANLIK SHAROITLARIDA O‘RTA TOLALI G‘O‘ZADA FIZIOLOGIK BELGILAR TAHLILI..... 26-29

Ismoilov K. T. TURLI EKOLOGIK HUDUDLARDAGI SUR QORAKO’L QO’ZILARINING FIZIOLOGIK (KLINIK) KO’RSATKICHLARINING MAVSUMIY O‘ZGARUVCHANLIGI..... 30-34

Abduraximov U. K. XORAZM VILOYATI TUPROQ-IQLIM SHAROITIDA ODDIY DAStARBOSHNING (*TANACETUM VULGARE* L.) O‘SISHI, RIVOJLANISHI VA HOSILDORLIGI..... 35-38

Fayzullayeva D.B., Haydarov X.Q. TERMIZ SHAHAR AEROPLANKTONLARINING PALINOLOGIK TARKIBI VA MONITORINGI..... 39-44

Alikulov B.S., Yuldasheva M.Q., Ismailov Z.F. GALOFITLARDAN AJRATIB OLINGAN ENDOFITLARNING BAKTERIAL SUSPENZIYALARI BILAN URUG`LARGA ISHLOV BERISHNING QISHLOQ XO‘JALIK EKINLARI O‘SISH-RIVOJLANISH KO‘RSATKICHLARIGA TA’SIRI (VEGETASION TAJRIBALAR NATIJALARI ASOSIDA)..... 45-52

Norqulova L.U., Haydarov X.Q. *ELAEAGNUS MACROPHYLLA* THUNB. BARGINING MORFOLOGIYASI VA KIMYOVIY TARKIBI..... 53-59

Matkarimov F.I., Xakimov A.E., Rasulova O.O., Tuxtayev D.D., Qulmamatova D.E., Baboyev S.K. MIKROBIOLOGIK O`G`ITLARNING MOSH (*VIGNA RADIATE* L.) O SIMLIGIDAGI FOTOSINTETIK PIGMENTLAR MIQDORIGA TA’SIRI..... 60-64

Muxtorova S.A. H. PEGANUM ENDOFIT BAKTERIYA SHTAMMLARI SUSPENZIYASI BILAN ISHLOV BERISHNING NO‘XAT O‘SIMLIGI ILDIZ HAMDA POYA RIVOJLANISHIGA TA’SIRI..... 65-69

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EFFECT OF MICROELEMENTS ON THE BIOCHEMICAL COMPOSITION OF MELON

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Annotatsiya. *Maqolada poliz ekinlarini yetishtirishda rux, mis, marganets va kobalt mikroelementlaridan foydalanishning azot-uglevod almashinuvi va poliz hosildorligiga ta'siri bayon etilgan. Tadqiqot uchun qovunlarning 3 navi olindi: ertapishar Amiri va ikkita kechpishar - sariq Gulobi va qizil Gulobi. Bu navlarning urug'lari mikroelementlarning 0,02% li eritmalarida 2 soat davomida namlangan, quritilganidan keyin dalaga ekilgan. Tadqiqotlar shuni ko'rsatdiki, barglardagi mikroelementlar tarkibining dinamikasi olingan navlar uchun har xil edi. Gullash bosqichida mis miqdorining kamayishi xarakterlidir, bu o'simlik hayotining eng muhim davrida mikroelementlarning vegetativ organlardan jinsiy a'zolarga harakatlanishi bilan izohlanadi. Marganets uchun, asosan, barglar miqdorining uzluksiz o'sishi mavjud. Barglar ildiz tizimi kuchli ishlayotgan paytda tuproqqa kiritilganda gullash bosqichida mikroelementlar bilan ayniqsa intensiv boyitilgan. Shuning uchun, eng samarali usul ehtimol uni tuproqqa kiritish usuli.*

Kalit so'zlar. *Qovun, bo'yi, rivojlanishi, mikroelement, azot almashinuvi, uglevod almashinuvi, ferment.*

Abstract. *The article describes the influence of the use of microelement zinc, copper, manganese and cobalt when growing melons on nitrogen-carbohydrate metabolism and melon yield. For the study, 3 varieties of melons were taken: the early-ripening variety Amiri and two late-ripening ones - sari Gulyabi and kzil Gulyabi. The seeds of these varieties were soaked for 2 hours in 0.02% solutions of micronutrients, after drying they were sown in the field. Studies have shown that the dynamics of the content of microelements in the leaves were different for the varieties taken. A decrease in the copper content in the flowering phase is characteristic, which can be explained by the movement of microelements from the vegetative organs to the reproductive organs during the most critical period of the plant's life. For manganese, there is mainly an uninterrupted increase in the amount of leaves. The leaves were especially intensively enriched with microelements in the flowering phase when they were introduced into the soil when the root system was vigorously working. Therefore, the most effective, presumably, is the method of introducing it into the soil.*

Keywords: *Melon, height, development, microelement, nitrogen metabolism, carbohydrate metabolism, enzyme.*

Аннотация. *В статье описано влияние применения микроэлементов цинка, меди, марганца и кобальта при выращивании дыни на азотно-углеводный обмен и урожайность дыни. Для исследования были взяты 3 сорта дыни: раннеспелый сорт Амири и два позднеспелых – Сари Гуляби и Кзил Гуляби. Семена этих сортов замачивали на 2 часа в 0,02% растворах микроэлементов, после подсушивания высевали в поле. Исследования показали, что динамика содержания микроэлементов в листьях у взятых сортов была различной. Характерно снижение содержания меди в фазу цветения, что можно объяснить перемещением микроэлементов из вегетативных органов в репродуктивные в наиболее критический период жизни растения. По марганцу преимущественно наблюдается непрерывное увеличение количества листьев. Особенно интенсивно обогащались микроэлементами листья в фазе цветения при внесении их в почву при активной работе корневой системы. Поэтому наиболее эффективным, по-видимому, является способ внесения его в почву.*

Ключевые слова: *Дыня, рост, развитие, микроэлемент, азотистый обмен, углеводный обмен, фермент.*

Introduction. Growing melon in Central Asia has a centuries-old history and melon (*Cucumis melo* L.) is revered as a product loved and consumed by people. Currently, there are more

than 160 cultural varieties of melons in Uzbekistan, they differ in terms of their ripening period, productivity, taste, and smell of fruits, and most of them have gained fame around the world. Melon (*Cucumis melo* L.) – an important horticultural crop and widespread plants in Uzbekistan [1; 2].

Nowadays, one of the most important tasks is to improve the supply of the country's population with high-vitamin, environmentally friendly food throughout the year. Now all over the world, melons are grown in subtropical and temperate climates, and their volume is 6,2 million tons per / ha and 142,4 million tons of gross crop. The largest producers of melons are China, Turkey, India, USA, Iran, Egypt, and Spain. From long ago, varieties of melon have grown in areas where the soil and climatic conditions of the globe are favorable for growing melons. For many years, melon (*Cucumis melo* L.) has been a favourite product of the people of Central Asia, especially because of its high nutritional value [3].

Melon fruit contains a large amount of potassium, calcium, magnesium, iron, sulfur and a number of vitamins. The energy value of its fruits is on average 34 kcal, most of which consists of water. The main part of the fruit consists of carbohydrates and another part consists of proteins, oil, ash, pectin, and organic acids. The seed is also rich in biologically active substances (more than 25% fat, sugars, protein and other compounds) [4; 5]. Melon fruit contains useful bioactive compounds, actually in the peel which contain in large quantities antioxidants which are used in food, cosmetic and pharmaceutical industries [6].

From the data of some studies, it follows that by influencing various methods of pre-sowing seed treatment, a high yield can be achieved. To study the effect of pre-sowing seed treatment on improving the formation of the melon yield and improving the quality, the seeds were enriched with microelements by soaking them in various solutions, in addition, the effect of their introduction into the soil before sowing was tested [7].

In this regard, the use of micro fertilizers in plant cultivation, especially in melon cultivation, is one of the most urgent issues. Because microelements participate in many physiological and biochemical processes in the body - from the processes of anabolism and catabolism inside the cell to the reproduction of the organism [8].

Object of study and methods

In the experiments, it was found that by providing the plants with the need for mineral elements, their resistance to drought increases dramatically. The effect of fertilizers directly depends on the supply of moisture to the plant. Therefore, in plants with sufficient water, their efficiency increases by 2-4 times as a rule [9; 10].

In order to improve the quality of the seeds, increase the crop yield and accelerate the ripening of the crop, the seeds are influenced with microelements. The use of influence with microelements in melon growth is of great importance. Under the influence of microelements, the productivity of melons increases, and the quality of melon seeds improves [11]. In this case, the use of seeds of a large fraction is particularly noteworthy [12]. As a result of applying microfertilizers[13] and microfertilizer-preserving complex bioactive substances[14] to agricultural crops, acceleration of many physiological processes in the plant has been achieved. As a result, the quantity of the product has increased and the quality has improved.

For the study, 3 varieties of melons were taken: the early-ripening Amiri variety and two late-ripening ones - sari Gulyabi and kzil Gulyabi. The seeds of these varieties were soaked for 2 hours in 0,02% solutions of microelements, after drying they were sown in the field. Before sowing, one watering was carried out, and in total during the growing season 3 waterings. The experiments were carried out on grey soils in the Samarkand region.

0,02% solutions of the corresponding salts were prepared: copper ($CuSO_4*5H_2O$), zinc ($ZnSO_4*8H_2O$), manganese ($MnSO_4*5H_2O$), cobalt ($CoSO_4*7H_2O$), soaking the seeds in distilled water was the control. In total, there were 5 variants with seed lock and 5 variants with the introduction of the same elements into the soil in the following quantities: zinc - 20 kg/ha, copper - 10 kg/ha, cobalt - 5 kg/ha, manganese - 15 kg/ha.

The experiment was carried out in 4-fold repetition, with the plot area (2,5 m x 80 m) 200 m^2. Learned from these changes in the content of microelements, nitrogen in different periods of melon development; enzymes, sugars in the leaves, and take into account the yield.

The results and discussion

Dynamics of microelement accumulation in melon plants. Studies have shown that the dynamics of the content of micronutrients in the leaves were different for the varieties taken. A

decrease in the copper content in the flowering phase was characteristic, which could be explained by the movement of microelements from the vegetative organs to the reproductive organs during the most critical period of the plant's life. (table 1) For manganese, there was mainly an uninterrupted increase in its amount in the leaves. The leaves were especially intensively enriched with microelements in the flowering phase when they were introduced into the soil when the root system was vigorously working. Therefore, the most effective, presumably, is the method of introducing it into the soil.

The observation showed that such microelements as zinc, and especially manganese, from the very beginning of plant development, significantly stimulated the growth of leaves in melons. Both the number of leaves and their total area increased. In the early ripe variety Amiri, the number of leaves, and, accordingly, their area, increased in comparison with the control, to cobalt, copper, zinc and manganese and reached the highest value in the latter. So, for example, according to the control we had 118 leaves, according to the variant with manganese - 144 leaves, according to the variant with zinc - 199 leaves. A powerful development of the leaf surface

Table 1.

Dynamics of microelements accumulation in leaves of melon cultivars in different development phases (mg/kg of dry leaves).

Name of Variety	Microelement	Development phase		
		7 leaves period	blooming	ripening
Amiri	Copper	13,5	7,3	8,0
sari Gulyabi		8,3	7,6	8,3
kzil Gulyabi		8,2	6,7	6,8
Amiri	Zinc	10,7	12,8	8,5
sari Gulyabi		11,8	12,3	11,4
kzil Gulyabi		14,8	12,8	11,8
Amiri	Manganese	55,0	75,5	56,1
sari Gulyabi		76,7	85,0	90,0
kzil Gulyabi		67,4	79,0	92,6
Amiri	Cobalt	8,6	10,7	6,4
sari Gulyabi		6,2	5,5	6,2
kzil Gulyabi		6,1	4,6	4,7

These experiments for 3 years (2020-2022) confirmed this point of view. The experiments of both years on seed soaking gave approximately the same results in the early phase. Despite this, the introduction of microelements into the soil turned out to be more effective, the soaking seed had a positive effect on the subsequent growth and development of plants and observed this effect right up to fruit formation, which ultimately affected the yield. This effect can be explained by the action of microelements on nutrient metabolism, which precedes nitrogen and carbohydrate metabolism, or their effect on the activation of growth processes.

of the melon was observed especially in the flowering period.

Table 1 showed the data on the dynamics of microelements accumulated in the leaves of different melon varieties, especially manganese. In all varieties taken, there is a significant increase in manganese in the leaves, ending in the maturation period. The amount of microelements in the soil is not the only factor that determines their content in melon leaves. This affects both the characteristics of the variety and its physiological state. Some relationship between the content of copper and zinc in melon leaves is striking, depending on its precocity. An earlier form of melon contains an

increased amount of copper and a slightly reduced amount of zinc.

Thus, the dynamics of the content of microelements in the leaves were different for the varieties taken. A decrease in copper in the flowering phase is characteristic, which can be explained by the movement of microelements from the vegetative organs to the reproductive organs during the most critical period of the plant's life. The amount of manganese element has shown regular increases in melon leaves.

Conclusions:

Based on the results obtained for 2020 and 2022, the following were concluded:

1. Melons were found to be very sensitive to the use of microelements. Both soaking the seeds in microelement solutions and carrying them into the soil stimulated the growth and development of melon plants.

2. Of the microelements used, the best results in many respects were given by manganese and zinc, which provided high yield increases, forming fruits from the melon varieties taken with high sugar content.

3. The introduction of microelements into the soil turned out to be more effective than soaking the seeds in solutions.

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