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GOURD GROWING EFFICIENCY USING SILICON-CONTAINING FERTILIZERS IN THE SOUTH OF UKRAINE

[1]Shablia O. S., [1]Kosenko N. P., [2]Kuts O.V., [2]Rud V.P.
[1]Institute of Climate Smart Agriculture of the National Academy of Agrarian Sciences of Ukraine
24 St. Maiatska Doroha, Khlibodarske village, Odeska Oblast, Ukraine, 67667
[2]Institute of Vegetable and Melon Growing of the National Academy of Agrarian Sciences of Ukraine
1 Instytutska Str., Selektsiine village, Kharkivska Oblast, Ukraine, 62478
E-mail: *icsanaas@ukr.net*
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Purpose. To evaluate the effect of pre-sowing soaking of seeds on the plant performance and economic efficiency of watermelon and melon growing on drip irrigation in the South of Ukraine. **Methods.** Field, measuring, computational, comparative, and mathematical/statistical methods, analysis of economic efficiency. **Results.** Pre-sowing soaking of seeds in solutions of silicon-containing fertilizers was shown to help obtain early and full-bodied watermelon and melon seedlings, increase the length and number of lateral shoots, and improve fruit setting. Balanced plant nutrition contributed to high performance of watermelon and melon plants in the South of Ukraine. The highest yields of watermelon (23.4 t /ha) and melon (17.5 t/ha) fruits were harvested with 10% Quantum AquaSil solution, which increased the yield by 35.3 and 35.7%, respectively, compared to the untreated control. Silicon-containing fertilizers, 15% Bai-Si and Kelik Potassium-Silicon solutions, increased the fruit yield in watermelon fields by 22.5% and 19.7%, respectively, compared to the untreated control. The greatest economic effect of watermelon and melon growing was achieved by soaking seeds in 10% Quantum AquaSil solution prior to sowing; the profitability amounted to 122 and 101%, respectively. **Conclusions.** Pre-sowing soaking of seeds in silicon-containing fertilizer solutions contributed to high performance of plants and allowed increasing the economic efficiency of cultivation. The maximum percentage of fruit setting was recorded after seed treatment with 10% Quantum AquaSil solution. For example, this parameter was 67% in watermelon ‘Charivnyk’ and 87% in ‘Didona’ melon. In the south of Ukraine, the economic effect of outdoor watermelon and melon cultivation increased by 16,030–19,220 UAH/ha and 21,230–26,340 UAH/ha, respectively.

***Key words*:** watermelon, melon, seed treatment, silicon-containing fertilizers, performance, economic efficiency.

Introduction. Currently, under progressive global climatic changes on the planet, effects of adverse environmental factors are becoming more and more noticeable, determining the country's position at the world’s agricultural market. In Ukraine, like in many regions of intensive agriculture, high-quality agricultural production depends on sharp weather fluctuations during growing periods of plants. This issue is especially acute for the South of Ukraine, where long droughts have often been occurring in growing periods recently. Increased aridity of the climate, which is evident at the moment and is probable under climatic change scenarios, without adaptation measures in the southern regions is most likely to result in a 10 - 20% decrease in yields of almost all agricultural crops by 2050 and, in the case of a more severe scenario, such decrease may reach 25% or even 50% (*Romashchenko, M., Husiev, Y., Shatkovskyi, A., Saidak, R., Yatsiuk, M., Shevchenko, A., & Matiash, T.*, 2020). Application of silicon-containing fertilizers is a way to increase gourd yields.

Review of Recent Studies and Publications. According to data of the International Food and Agriculture Organization of the United Nations (UN FAO), in 2000, 76,382,000 tons of watermelons were harvested in the world, in 2010 – 93,530,000 tons, in 2021 – 101,635,000 tons. The mean fruit yield increased from 24.3 to 33.5 t/ha during this period (*Agricultural statistics FAOSTAT*, 2022). In Ukraine, over the past five years, gourd yields occupied 61,800–63,600 hectares, of which watermelons were grown on 42,700-43,200 hectares. The Khersonska Oblast has been the largest producer of gourds. In 2021, 168,500 tons of fruits were harvested, accounting for 67.2% of the gross production in the southern region and 33.5% of the total production in Ukraine (*Roslynnytstvo Ukrainy. Statistical collection*, 2021).

Current intensive technologies involve integrated mineral nutrition of vegetables and gourds due to increased efficiency of mineral fertilization on reclamation lands (*Lymar V. A.,* 2015). During long periods of intensive cultivation of agricultural crops, the content of available silicon in the soil drops and this can possibly become a limiting factor (among others), which reduces yields of agricultural crops (*Meena, V. D., Dotaniya, M. L., Coumar, V., Rajendiran, S., Ajay, S., Kundu, S., and Rao, A.S.,* 2014). Silicon is a biologically important element, necessary for plants. The silicon content in plant biomass ranges 0.02% to 0.15%. Silicon forms a cuticular-silicon wall in the epidermal cells of leaves, stems and roots, which protects plants from excessive water loss and regulates water absorption (*Szulc, W., Rutkowska, B., Hoch, M., Spychaj-Fabisiak, E., and Murawska, B.,* 2015). Gross collections depend on the granulometric composition and acidity of soil solutions. Liming of acidic soils increases the content of available forms of silicon (*Kadalli, G. G., Rudresha, B. A., Prakash, N. B.,* 2017). Diatomites and zeolites are the most famous examples of silicon fertilizers, which are mined as mineral raw materials. These compounds have relatively high solubility and are used in agriculture. When diatomite was applied at a dose of 150 kg/ha in combination with 50% of the fertilizer (NPK+manure) amount, potatoes yielded by 38.7% of tubers compared to the control (without fertilizers) and by 12.9% compared to the full dose of mineral fertilizers (*Marodin J. C., Resende J. T. V., Morales R. G. F., Silva M. L. S., Galvão A. G., Zanin D. S.,* 2014). In Brazil, studies of three silicate fertilizers, calcium silicate, potassium silicate and sodium silicate, were conducted; it was shown that the fertilizers significantly increased the yield to 60.8 t/ha. Application of these fertilizers at a dose of 400 kg/ha increased the yield of marketable products by reducing tomato dehiscence (*Kleiber, T., Krzesiński, W., Przygocka-Cyna, K., and Spiżewski, T.,* 2015). In Poland, studies were conducted on lettuce plants that were stressed by manganese excess. Application of a complex silicon-containing fertilizer for fertigation had a positive effect on plants: the relative water content increased (ratio of the current water content in the tissue to its content in the moistened tissue) (*Liang, Y., Nikolic, M., Bélanger, R., Gong, H., and Song, A.,* 2015). Chinese studies with soil application of silicon demonstrated that the tomato yield increased by 8.7-15.9% compared to the control (without application) (*Ma, J. F. and Yamaji N.,* 2008). Other scientists confirmed positive effects of silicon on resistance to abiotic and biotic stressors, including drought, lodging, frost, and soil salinity, plant growth and development in general, and on yield in sweet pepper (*French-Monar, R. D., Rodrigues, F. A., Korndorfer, G. H., and Datnoff, L. E.,* 2010), cauliflower (*Wenneck G. S., Saath R., Rezende R., e-Vila V. V., Terassi D. D. S. & Andrean A. F. B.,* 2023), and China squash (*Mitani, N., Yamaji, N., Ago, Y., Iwasaki, K., and Ma, J. F.,* 2011). Application of silicon boosts resistance of gourds to major diseases - bacterial spot of melons (*Ferreira, H. A., Nascimento, C. W. A., Datnoff, L. E., Nunes, G. H. S., Preston, W., Souza, E. B., & Mariano, R. L. R.,* 2015). Chemical analysis of disease- affected leaves revealed some patterns, namely a significant reduction in the contents of phosphorus, potassium, calcium, magnesium, and iron. Adding calcium silicate and lignin modified with silicic acid to the soil increased the contents of nitrogen, potassium, phosphorus, and calcium in plant leaves. An increase in the calcium level in plants due to silicon application indicates activation of transport of macronutrients and provision with nutritional compounds. Under such conditions, the supply of potassium (which is responsible for the water status of plants and ensures their resistance to drought) to plants is enhanced. It is known that plants with weak turgor are more susceptible to pathogenic fungi (*Makarenko N. V., Zaimenko N. V.,* 2020). However, silicon is currently recognized as a minor element for plants, and there are no economic studies to demonstrate benefits of silicon-containing fertilizers to growers (*Zellner, W., Tubaña, B., Rodrigues, F. A., and Datnoff L. E.,* 2021). Increasing the economic efficiency of production of any economic entity plays a significant role in its activities; therefore, there is a need for constant control and search for ways of its growth (*Yaroslavskyi A.O., 2018*).

The efficiency of different fertilization regimens in gourd cultivation depends on technological approaches of cultivation and soil/climatic conditions. No studies of the efficiency of silicon-containing fertilizers for watermelon and melon cultivation in the Steppe of Ukraine were conducted.

Purpose. To evaluate the effect of pre-sowing soaking of seeds on the plant performance and economic efficiency of complex fertilizers in watermelon and melon growing in the South of Ukraine.

Materials and Methods. The study was conducted in an experimental field of the Institute of Climate Smart Agriculture of NAAS in 2021–2022. The soil in the experimental field is solodized, sabulous chernozem, with a humus content in the arable (0–30 cm) layer of 1.52 %. The soil density in the 0–30 cm layer is 1.35 g/cm^3; the total porosity is 34 %. The soil solution was almost neutral (pH of the water extract was 6.8–7.2).

The studied formulations are modern silicon-containing fertilizers, which in small doses beneficially affect the germination energy and ability of seeds and further development of plants. Kelik Potassium-Silicon is a concentrated potassium-silicon chelate fertilizer (liquid), which contains 20.0 % of K_2O, 13.0 % of Si_2O and 2.0 % of EDTA. Manufacturer: Atlantica Agricola (Spain). Quantum AquaSil is a domestic highly concentrated complex chelate fertilizer (liquid). Composition: K_2O – 10 %, SiO_2 – 20 %, humic substances – 1 %. Bai-Si is a domestic silicon-based immunoprotector. Composition: SiO_2 – 5-7 %, K_2O – 2.2-3.3%, SiO_2 – 99.7 %, CuO – 0.54 %, FeO – 0.24 %, ZnO – 0.1 %.

The experiments was carried out with an 8-, 10- or 12-hour exposure depending on fertilizer concentration: 1) sowing of dry seeds (control I); 2) sowing of water-soaked seeds (control II); 3) pre-sowing treatment of seeds with 5% solution of Kelik Potassium-Silicon; 4) 10 % Kelik Potassium-Silicon; 5) 15 % Kelik Potassium-Silicon; 6) 5 % Quantum AquaSil; 7) 10 % Quantum AquaSil; 8) 15 % Quantum AquaSil; 9) 5 % Bai-Si; 10) 10 % Bai-Si; 11) 15 % Bai-Si. The sown plot was 125 m^2, with the record area of 100 m^2. Upon seed treatments, the manufacturers' recommendations were taken into account: according to them, the standard concentrations are as follows: Kelik Potassium-Silicon – 0.6 % solution; Quantum AquaSil – 1.0 % solution; Bai-Si – 150 mL/t, working solution 1:50. The experiments were carried out in four replications. Watermelon 'Charivnyk' and melon 'Didona' were used in the experiments. The study was conducted on drip irrigation.

Results. A lot of scientists reported that complex silicon-ontaining fertilizers had positive effectson the growth and development of gourds (root weight and number of shoots) (*Preston, H. A. F., Nascimento, C. W. A., Preston, W., Nunes, G. H. S., Loureiro, F. L. C., and Mariano, R. De L. R., 2020; Lozano, C. S., Rezende, R., Hachmann, T. L., Santos, F. A. S., Lorenzoni, M. Z., de Souza, Á. H. C.,* 2018).

In the South of Ukraine, it was shown that pre-sowing soaking of seeds in solutions of silicon-containing fertilizers contributed to emergence of early and full-bodied seedlings of watermelon and melon; the length and number of lateral shoots increased; fruit setting improved. Silicon-containing fertilizers increased the shoot number in watermelon plants by 1–2 shoots; the shoots became by 31.9–41.8 % longer; and the fruit setting was enhanced by 14–21 %. Pre-sowing soaking of seeds in solutions of silicon-containing fertilizers increased the shoot number by 1–2 shoots; the shoots were by 11.5–50.6 % longer; and the fruit setting was enhanced by 15–19 %.

Percentage of fruit setting is an important indicator when one evaluates experimental variants to boost resistance of gourds to unfavorable growing conditions. Fruit set in gourds was shown to be directly correlated with yield: the coefficient of correlation was 0.70 for watermelon and 0.72 for melon (Fig. 1).

The fruit set percentage, depending on experimental variants, ranged 46 % to 69 % for watermelon 'Charivnyk' and 60% to 82 % for melon 'Didona'. Seed treatments influenced to a greater extent and the influence of concentrations were slightly weaker. The maximum percentage of fruit set were noted after Quantum AquaSil treatment of seeds. In watermelon 'Charivnyk', this parameter was 67 %; in melon 'Didona', it was 87 %.

The lowest percentage of fruit set was observed in the control and, depending on the crop, it ranged from 46 % (watermelon) to 60 % (melon) (Fig. 2).

The weather in 2020 was favorable for shallot growth, development and yield. The best yields in 2020 were harvested from 'Sh-1' (KyivskaOblast), 'Sh-2' (Kyivska Oblast), 'Sh-6' (Dnipropetrovska Oblast), 'Sh-9' (Dnipropetrovska Oblast), and 'Sh-10' (Chernihivska Oblast): 32.6, 26.3, 19.3, 19.8, and 20.6 t/ha, respectively. It was more than the yield harvested from the control cultivar, 'Lira', by 16.8, 10.5, 3.5, 4.0, and 4.8 t/ha, respectively.

Lower yields were harvested in 2020 from 'Sh-4' (Kyivska Oblast), 'Sh-7' (Dnipropetrovska Oblast), and 'Sh-11' (Chernihivska Oblast): from 12.5 t/ha ('Sh-11' and 'Sh-7') to 12.8 t/ha ('Sh-4'). 'Sh-3' (15.5 t/ha), 'Sh-5' (15.2 t/ha), and 'Sh-8' (15.5 t/ha) yielded almost the same as 'Lira'.

On average for the two study years, the following accessions had significantly increased yields of bulbs: 'Sh-1' (30.5 t/ha), 'Sh-2' (25.4 t/ha), 'Sh-6' (18.9 t /ha), 'Sh-9' (18.1 t/ha), and 'Sh-10' (19.4 t/ha). 'Sh-4' (12.2 t/ha), 'Sh-7' (12.0 t/ha), 'Sh-11' (11.9 t/ha), 'Sh-12' (13.8 t/ha), 'Sh-13' (13.2 t/ha), and 'Sh-14' (13.0 t/ha) yielded significantly less. 'Sh-3' and 'Sh-8' from Kyivska and Dnipropetrovska Oblasts, respectively, yielded almost the same as the control cultivar, 'Lira' (15.5 t/ha).

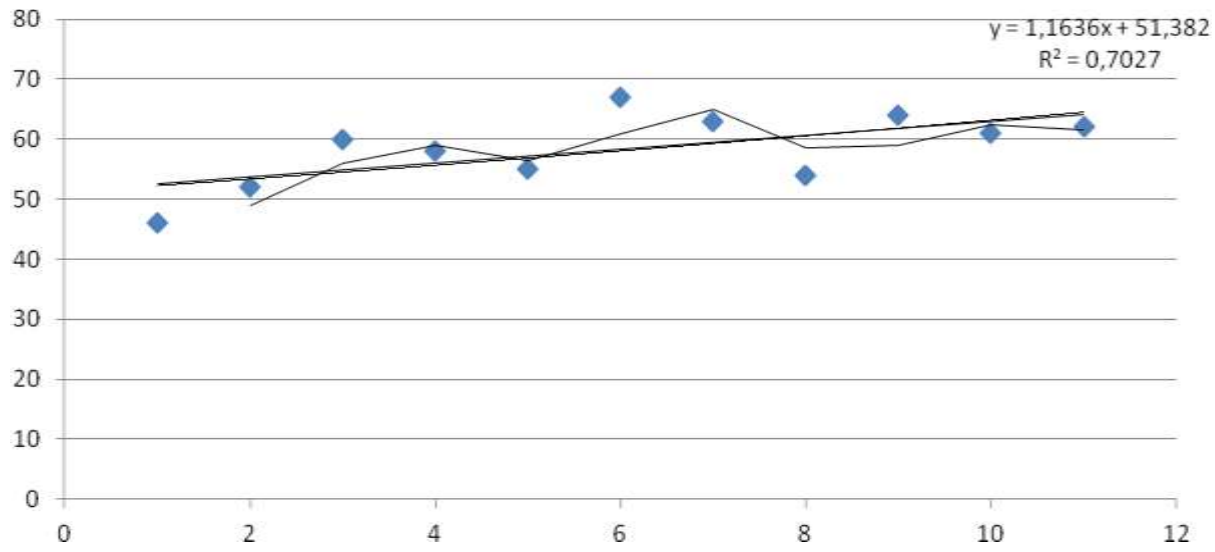

Figure 1. Correlation between fruit set on yield in watermelon

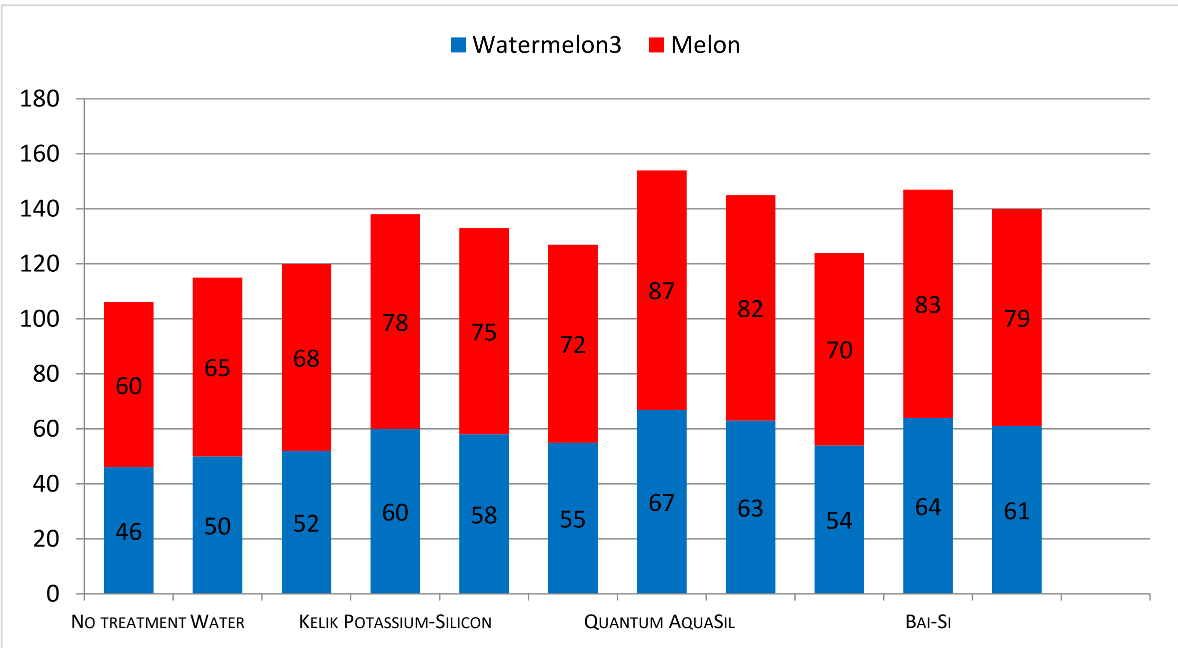

Figure 2. Fruit set percentage in gourds

The silicon-containing complex fertilizers significantly increased the gourd yields. Increased performance of watermelon plants and improved quality of its fruits after application of silicon-containing fertilizers into the soil is confirmed by studies of Spanish and Chinese scientists (*Kim, Y. S., Kang, H. J., Kim, T. I., Jeong, T. G., Han, J. W., Kim, I. J., and Kim, K. I.,* 2015*), (Toresano, F., Díaz, M., Pérez, L., Camacho, F.,* 2021).

Watermelon 'Charivnyk' yielded 17.3–23.4 t/ha of fruits in the experiments of the Institute of Climate Smart Agriculture of NAAS, depending on fertilization regimen; melon 'Didona' yielded 12.9–23.4 t/ha.

The highest yield of watermelon fruits (23.4 t/ha) was harvested after treatment with 10% Quantum AquaSil solution; the gain compared to the untreated control was 35.3 %, with the highest concentration of 30.6 %. With 5 % Kelik Potassium-Silicon solution, 20.7 t/ha of fruits were harvested, which is plus 19.7 % to the control (untreated seeds). 10 % solution of this formulation increased the yield by 18.5 % compared to the. The $LSD_{0.95}$ between the variants was 1.2. Pre-sowing soaking of seeds in 15 % Bai-Si solution resulted in a fruit yield of 21.2

t/ha, which was plus 22.5 % to the untreated control. 10 % solution of this formulation increased the yield by 13.9 % compared to the control, with the corresponding $LSD_{0.95}$ of 0.7.

In the melon fields, the highest yield of melon fruits (17.5 t/ha) was harvested with pre-sowing soaking of seeds in 10 % Quantum AquaSil solution; the gain compared to control I was 35.7 %. 15% solution of this formulation increased the yield by 31.0% compared to control I (Fig. 3). The $LSD_{0.95}$ between the variants was 1.3.

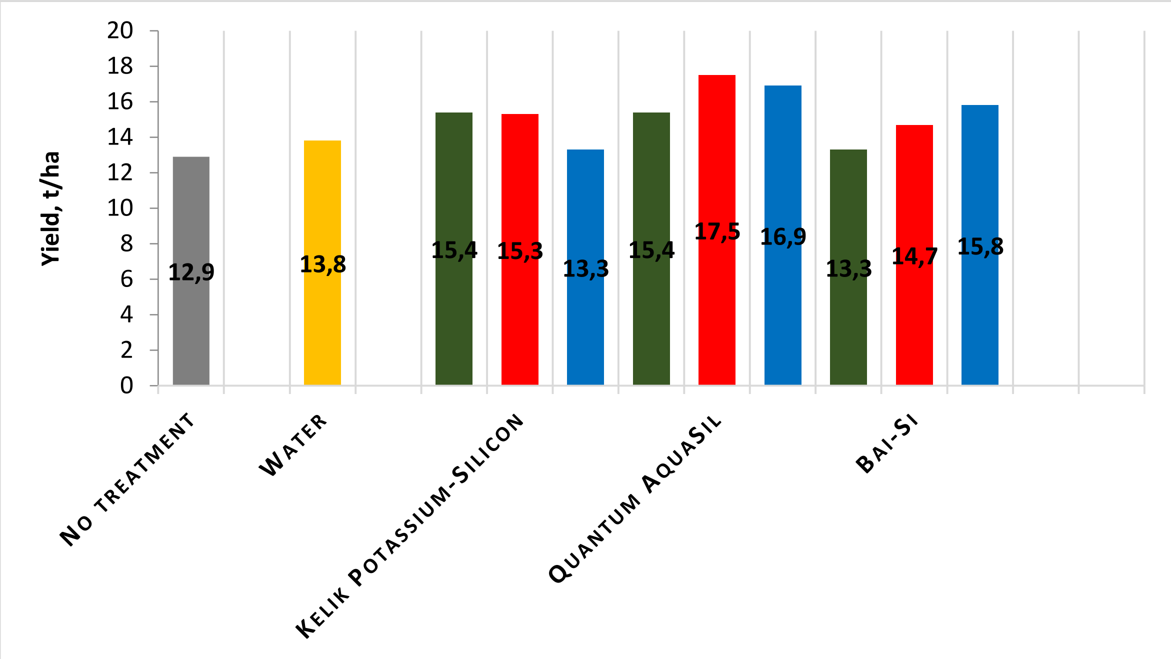

Figure 3. Performance of melon plants depending on pre-sowing treatment with silicon-containing fertilizer solutions, mean for 2020–2022

5 % and 10 % Kelik Potassium-Silicon solutions increased the plant performance by 19.4 % and 18.6 %, respectively. Pre-sowing soaking of seed in 10 % and 15 % Bai-Si solutions increased the yield by 14.0 % and 22.5 %, respectively. Thus, the highest yields of watermelon and melon were achieved with 10 % Quantum AquaSil fertilizer solution (the $LSD_{0.95}$ was 0.4).

The experience of economically developed countries shows that high and stable yields of agricultural crops are only possible provided intensification of their growing technologies. The essence of intensive technologies is to create optimal conditions for growing field crops, with due account for natural environmental factors. The southern regions of Ukraine are most suitable for growing watermelons of high commercial quality. This is attributed to light- and medium-textured soils, which are warm up well and have the average daily temperature and relative air humidity close to the optimal values in addition to adequate lighting. At the same time, there is a threat of crop failure because of droughts and high air temperatures during intensive anthesis and growth, so it is necessary to constantly search for ways to compensate these risks with assessments of the crop not only from the point of view of its performance, but also from an economic point of view, because economic evaluation of a technological process of production or individual branches of the economy allows for detection of specific opportunities for improving the efficiency of their functioning through certain measures and methods.

Therefore, one of our objectives was to evaluate the economic efficiency of the studied techniques in watermelon cultivation. The main efficiency criteria were: production costs per hectare, cost of 1 ton of fruits, net profit per hectare, and profitability. The production costs per hectare and the cost of 1 ton of fruits were calculated on the basis of compiled technological charts and current methodical recommendations in compliance with standards and prices that are currently valid at enterprises. The production costs per hectare were determined by purchase wholesale prices. The net profit was defined as difference between the yield cost and its production costs.

The experimental data (Tables 1, 2) indicate that the gourd cultivation in the Southern Steppe of Ukraine is profitable.

The results of analysis of the economic efficiency of watermelon cultivation are summarized in Table 1. The total production costs for watermelon cultivation were 15,210–15,810 UAH/ha; the operating profit was 10,670–19,220 UAH/ha; the profitability amounted to 70–122 %.

Table 1. Efficiency of watermelon growing depending on pre-sowing treatment of seeds with solutions of the silicon-containing fertilizers, mean for 2020–2022

Pre-sowing soaking of seeds		Yield, t/ha	Cultivation cots, UAH/ha	Cost of sold products, UAH/ha	Operating profit, UAH/ha	Profitability, %	Economic effect (additional profit), UAH/ha
Formulation	**Concentration, %**						
No treatment (control I)	-	17.3	15,210	25,880	10,670	70	x
Water (control II)	-	17.9	15,550	26,850	11,300	73	0,660
Kelik Potassium-Silicon	5	20.7	15,710	30,980	15,270	97	4,600
	10	20.5	15,720	30,680	14,960	95	4,290
	15	17.8	15,680	26,70	11,020	70	0,350
Quantum AquaSil	5	20.6	15,720	30,900	15,180	97	4,510
	10	23.4	15,810	35,030	19,220	122	8,550
	15	22.6	15,800	33,900	18,100	115	7,430
Bai-Si	5	17.8	15,650	26,700	11,050	71	0,380
	10	19.7	15,720	29,550	13,830	88	3,160
	15	21.2	15,770	31,800	16,030	102	5,360

The greatest economic effect from watermelon cultivation (19,220 UAH/ha) was achieved via pre-sowing soaking of seeds in 10% Quantum AquaSil solution: plus 8,550 UAH/ha to control I. The profitability was 122 %, or by 52 % higher than in control I. 15 % Bai-Si solution allowed gaining the operating profit of additional 5,360 UAH/ha. The profitability was 102 %, or by 32% more than in the control. When watermelon was grown with Kelik Potassium-Silicon, the best result was obtained with 5 % solution for seed soaking. Under these conditions, the operating profit of 15,270 UAH/ha was secured, meaning plus 4,600 UAH/ha to control I. The profitability increased by 27%. With 10 % solution, the there was a 25 % rise in the profitability.

In Table 2, the economic efficiency indicators of melon cultivation with pre-sowing treatment of seeds with solutions of the silicon-containing fertilizers are summarized. The total production costs for melon cultivation were 25,930–26,250 UAH/ha; the operating net profit was 12,770–26,340 UAH/ha; the profitability was 49–101 %.

The greatest economic effect from melon cultivation (26,340 UAH/ha) was obtained from pre-sowing soaking of seeds in 10 % Quantum AquaSil solution: plus 13,570 UAH/ha to control I. The profitability was 101 %, or higher than control I by 52 %. 15 % Bai-Si solution allows one to gain the operating profit of additional 8,460 UAH/ha compared to control I. The profitability was 81 %, or by 32 % higher than in the untreated control. When melon was grown with Kelik Potassium-Silicon, the best result (operating profit of 19,950 UAH/ha) was achieved with 5 % solution; the increase was 7,180 UAH/ha compared to control I; the profitability increased by 27 %.

Table 2. Efficiency of melon growing depending on pre-sowing treatment of seeds with solutions of the silicon-containing fertilizers, mean for 2020–2022

Pre-sowing soaking of seeds: Formulation	Pre-sowing soaking of seeds: Concentration, %	Yield, t/ha	Cultivation cots, UAH/ha	Cost of sold products, UAH/ha	Operating profit, UAH/ha	Profitability, %	Economic effect (additional profit), UAH/ha
No treatment (control I)	-	12.9	25,930	38,700	12,770	49	x
Water (control II)	-	13.8	26,020	41,400	15,390	59	2,620
Kelik Potassium-Silicon	5	15.4	26,250	46,200	19,950	76	7,180
	10	15.3	26,140	45,900	19,760	76	6,990
	15	13.3	26,050	39,900	13,850	53	1,080
Quantum AquaSil	5	15.4	26,130	46,200	20,070	77	7,300
	10	17.5	26,160	52,500	26,340	101	13,570
	15	16.9	26,220	50,700	24,480	93	11,710
Bai-Si	5	13.3	26,170	39,900	13,730	52	0,960
	10	14.7	26,160	44,100	17,940	69	5,170
	15	15.8	26,170	47,400	21,230	81	8,460

Conclusions. The maximum percentage of fruit set was recorded for seed treatment with 10 % Quantum AquaSil solution. Thus, this parameter was 67 % in watermelon 'Charivnyk' and 87 % in melon 'Didona'.

Watermelon 'Charivnyk' produced the maximum yield (23.85 t/ha) when its seeds were treated with Quantum AquaSil, while the lowest yield (17.66 t/ha) in the experiment was harvested upon sowing untreated watermelon seeds. Melon 'Didona' gave the maximum yield (17.88 t/ha) after treatment of its seeds with Quantum AquaSil.

Pre-sowing treatment of seeds with silicon-containing fertilizer solutions, Kelik Potassium-Silicon, Quantum AquaSil, and Bai-Si, significantly increased the watermelon and melon yields and economic efficiency of watermelon and melon growing in the South of Ukraine. Due to using the complex silicon-containing fertilizers in the gourd cultivation technologies, the profitability of production increased by 32–52 %.

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ЕФЕКТИВНІСТЬ ВИРОЩУВАННЯ БАШТАННИХ КУЛЬТУР ЗА ВИКОРИСТАННЯ КРЕМНІЄВМІСНИХ ДОБРИВ В УМОВАХ ПІВДНЯ УКРАЇНИ

[1]Шабля О. С., [1]Косенко Н. П., [2]Куц О.В., [2]Рудь В.П.
[1]Інститут кліматично орієнтованого сільського господарства Національної академії аграрних наук України
вул. Маяцька дорога, 24, сел. Хлібодарське, Одеська обл., Україна, 67667
[2]Інститут овочівництва і баштанництва Національної академії аграрних наук України
вул. Інститутська, 1, сел. Селекційне, вул. Інститутська, 1, Харківська обл., Україна, 62478
E-mail: icsanaas@ukr.net
https://doi.org/10.32717/0131-0062-2023-73-72-80

Мета досліджень. Визначити вплив передпосівного замочування насіння на продуктивність рослин та ефективність вирощування кавуна і дині за краплинного зрошення на півдні України. **Методи.** Польовий, вимірювально-розрахунковий, порівняльний, математично-статистичний методи, аналіз економічної ефективності. **Отримані результати.** Встановлено, що передпосівне замочування насіння у розчинах кремнієвмісних добрив сприяє отриманню ранніх і повноцінних сходів кавуна та дині, збільшенню довжини і кількості бокових пагонів, зав'язування плодів. Дослідженнями доведено, що збалансоване живлення рослин сприяє формуванню високої продуктивності рослин кавуна і дині в умовах півдня України. Визначено, що найбільшу врожайність плодів кавуна (23, т/га) і дині (17,5 т/га) отримано за використання препарату Квантум АкваСил (концентрація розчину 10 %), збільшення над необробленим контролем становить 35,3 і 35,7 % відповідно. Застосування кремнієвмісних добрив Bai-Si (концентрація 15 %) на посівах кавуна забезпечує збільшення врожайності плодів на 22,5 %, за обробки Келік Калій-Кремній – на 19,7 % порівняно з контролем. Найбільший економічний ефект при вирощуванні плодів кавуна і дині отримано за передпосівного замочування насіння у 10% розчині Квантум АкваСил, рівень рентабельності становив 122 і 101 % відповідно. **Висновки.** Передпосівне замочування насіння у розчинах кремнієвмісних добрив сприяє формуванню високої продуктивності рослин і дозволяє підвищити економічну ефективність вирощування. Встановлено максимальні значення відсотку зав'язування плодів за обробки насіння препаратом Квантум АкваСил з концентрацією 10 %. Так сорт кавуна Чарівник за даної взаємодії забезпечив даний показник на рівні 67 %, диня Дідона – 87 %. В умовах відкритого ґрунту півдня України економічний ефект вирощування кавуна збільшився на 16,03–19,22 тис. грн/га, дині – на 21,23–26,34 тис. грн/га.

Ключові слова: кавун, диня, оброблення насіння, кремнієвмісне добриво, врожайність, економічна ефективність, рентабельність

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