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KOMPLEX EVALUATION OF DIFFERENT FERTILIZATION SYSTEMS IN THE CULTIVATION OF VEGETABLES ON DIFFERENT FIELD SOILS

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Abstract:

There are two anti-aging trends in the provision of high-quality agricultural products to the population of most countries. On the one hand, in order to preserve the health of people, it was announced the transition to "organic farming", which prohibits the use of chemical fertilizers, genetically modified drugs, growth regulators and pesticides in the world. On the other hand, in order to provide the population with a sufficient number of food products, intensive technology of vegetable cultivation is widely used, which allows to significantly increase the yield of agricultural crops. In the bun, mineral fertilizers are used, sometimes ground up to nanoparticles, fertilizing with ground fertilizers with drip irrigation, microelements and amino acids, etc. At present, the complete transition to the system of pure organic fertilizers for the cultivation of vegetables in our country is difficult due to the lack of high-quality organic fertilizers. In addition to the system of organic fertilizers, mineral, organo-mineral, mineral-biological systems are used, the effectiveness of which is assessed by the yield value of the product, commodity and biochemical quality. In addition to the information obtained from the scientific works studied in the period from 1990 to 2021, he conducted research on the application of fertilizers on the basis of the soils of the Surkhandarya region.The analysis of data obtained on the basis of long-term stationary experiments on the main soil - climatic zones of the region, the soil-podzol, alluvial Meadow, washed, typical and unpretentious black soils, as well as on brown forest soils was widely studied in the experiment. The quality of storage of vegetables during winter storage, damage due to diseases and changes in the basic quality indicators during storage were also taken into account. Such a detailed assessment of various fertilizer systems in the cultivation of vegetables in the region was taken and carried out for the first time on the basis of the studied experimental analysis. On its basis, the organo-mineral-biological system of fertilization of vegetable crops (NPK + gong + green Gong) was developed, which made it possible to evaluate the products produced according to an expanded list of indicators. The proposed fertilizer system improved the yield of vegetable-green manure crop rotation by 36-54 percent, the agrochemical and biological properties of the soil (density, structure condition, amount of humus, nutrients, heavy metals, biological activity), and the reduction in the loss of vegetables during storage on the basis of various diseases and other factors were studied.

Keywords: vegetable, fertilizer systems, organic – mineral - biological system, productivity, quality of vegetables, alluyvial

At the beginning of the 21st century, the global situation of providing the population of most countries of the world with high-quality agricultural products was aggravated. With a significant deterioration in the environmental situation in the world, the rapid growth of the world's population has come up with two trends that are anti-interdependent. On the one hand, the richest part of the population of Europe and North America announced the transition to "organic farming", which prohibits the use of chemical fertilizers, genetically modified organisms, growth regulators and pesticides. On the other hand, intensive technologies are widely used, which allow to significantly increase the yield of

crops, especially vegetables, such as fertilizing with ground fertilizers, fresh hybrids, drip irrigation, microelements and amino acids with ground fertilizers, up to NanoSystems. In this situation, the chemical industry of Uzbekistan supplies 90 percent of the mineral fertilizers produced to the regions with intensive agriculture, and due to the lack of fertilizers, imported mineral fertilizers are also used. In our country, when growing vegetables, there are still no approved standards for the production of organic products. In part, the technology of obtaining environmentally friendly vegetables that meet the requirements of healthy food has been developed . Until now, the products obtained using all systems of fertilization of agricultural crops were evaluated in terms of productivity, commodity and biochemical quality of the product. From 1990 to 2021, long-term stationary and short-term experiments were conducted on the study of various systems of fertilization of vegetable crops in different soil-climatic zones of the region. Organo-mineral-biological system of fertilization of vegetable crops has been developed, which allows to give a comprehensive assessment of the products produced according to the expanded list of indicators and compare it with other fertilizer systems. In addition to productivity, commodity and biochemical quality during storage in winter, it is necessary to take into account the disease resistance of products and the quality of their storage. Such a wide coverage assessment guarantees the ecological viability of the vegetables produced, as well as soil fertility and protection of the environment from contamination with nitrates and other toxic substances. At the same time, a comparative assessment of existing fertilizer systems in vegetable-forage or vegetable-green manure crop rotation was conducted. Detailed studies were conducted in the Surkhandarya region on soil fertility, trade and biochemical quality of products. A detailed assessment of the proposed different fertilizer systems in the cultivation of vegetables in our country was carried out at the first marotaba, which will provide a more reliable analysis of their effectiveness. The aim of the work is to Komplex-evaluate various vegetable crop fertilization systems in order to obtain high quality and ripened product while maintaining high soil fertility.

Evaluation of the system of fertilization of vegetables in our country and cultivation on the basis of new technologies were carried out on sod-podzolic, cultural grassy, alluvial soils in Shurchi District of Surkhandarya region. The agrochemical properties of soils in the main soil-climatic zones of the region are presented in the table. 1-the work was carried out on the basis of long-term stationary and short-term experiments.
method.

Soil name	Evaluation	The thickness of the humus horizon,cm	Moderate weight agrochemical properties				
			Ph-KCl	hymus	Total nitrogen	P2O5	K2O
				%		mg/kg	
Sod-podzolik, grown Saturated with alluvial grassland	Average sand	25-27	6,2	2,1	0,11	210-250	150-160
		70-80	6,9	3,6	0,22	200-250	110-170
Washed gray	the fertile soil	80-100	6,4	4,6	0,26	270-350	190-280
Ordinary black soil		60-80	6,2	3,5	0,21	60-100	250-600
Brown gray	muddy	22-25	4,8	5,5	0,30	60-100	140-180

Table 1. Agrochemical composition of experimental soils studied in the region

In this study, a comparative assessment of the system of mineral, organic and organo-mineral fertilizers of vegetable crops in the conditions of vegetable-fodder or vegetable-green manure rotation was carried out. In order to ensure a detailed analysis of soil fertility, commercial and biochemical quality of products in Surkhandarya region, the quality of winter storage of vegetables, disease damage and changes in key quality indicators during storage were also taken into account.

Based on the data obtained over the last 20 years, the results of taking into account the yield of vegetable crops in the rotation of experimental soils in different soil-climatic zones (Table 2) showed that the system of organic fertilizers increased the yield to 19-47, mineral content 21 -47 ha and organo-mineral - 19-53%, but the most promising was the organo-mineral-biological system (NPK + + manure + green manure), which not only increased the yield of vegetables, but also organo-green manure alternating planting (by 36-54%) had a beneficial effect not only on the system but also on the agrochemical and biological properties of the soil

Tuproq turi	Different fertilization systems of carrots t/ga -%					
	Without fertilizer (control)	organic	Mineral	Organo-mineral	Organo-mineral-biological	NSR05 yield
Sod-podzolik, grown	33.5	39,9/119	42,3/126	42,9/128	-/-	3,3/-
Saturated with alluvial grassland	44,6	54,8/123	63,4/143	66,6/150	68,2/154	3,2/-
Washed gray	32,5	38,9/119	39,2/121	39,1/120	-/-	3,6/-
	31,8	46,7/147	32,0/106	49,9/147	49,6/144	2,8/-
Ordinary black soil	30,3	39,2/127	44,7/130	32,0/119	41,3/136	3,9/-
Brown gray						

Table 2. The effect of basic fertilizers on the yield and quality of carrots on the basis of different varieties

Based on data from long-term surveys in Surkhandarya region, organic, organo-mineral and organo-mineral-biological fertilizer systems have shown that they have significantly improved the agrochemical and biological properties of soils. An organic fertilizer system has been found to reduce soil compaction, improve its structural condition, maintain an optimal humus content, increase the amount of mobile phosphorus, and increase the amount of exchangeable fertilizers. Only organo-mineral and organo-mineral-biological systems of fertilization of vegetable crops simultaneously help to increase yields, improve product quality and keep vegetables at a high level in winter. This can be helped by natural plant growth regulators, as well as the use of organic fertilizers such as manure, green manure and grain straw. It should be noted that these organic fertilizers can significantly alter the balance of humus and nutrients, as well as significantly reduce the loss of nutrients, especially nitrate nitrogen, from leaching into groundwater, i.e. perform an important ecological function of protecting the environment, soil and water bodies from nitrate pollution. In primary alluvial grassland soils, scientifically based doses alone with long-term use of mineral fertilizers are found to result in no significant accumulation of heavy metals. The same thing happened with pure organic fertilizer. A complex organic-mineral-biological system helps to reduce the amount of all major HMs in the soil. An important part of the vegetable crop, especially in the central and northern parts of the country, is stored for 5-6 months, so it was important to observe how different fertilizer systems affected the storage quality and disease resistance of vegetables.

Fertilizer system	Total amount applied t / ga			Soil content mg / kg				
	NPK	manure	local	Cd	Zn	Mn	Cu	Pb
Without fertilizer	–	–	–	0.19	21.9	156	10.5	7.65
NPK	19.4	–	–	0.20	16.3	135	14.4	4.37
Manure	–	250	–	0.23	16.8	132	12.8	1.52
NPK + green manure	19.4	150	–	0.17	12.4	128	12.4	0.00
NPK + salmon	19.4	–	20	0.19	15.8	125	14.3	1.14
NPK + talas	19.4	–	10	0.10	18.1	138	11.0	0.00
NPK + manure+ green manure	19.4	250	150	0.14	13.6	135	8.8	1.00
manure + green manure	–	250	150	0.16	12.1	124	8.9	0.00

Table 3. Heavy application of various fertilizers in long-term alluvial meadow soils effect on the amount of metals

Thus, their effectiveness, productivity, commodity and biochemical quality in the application of different fertilizer systems in vegetable rotation, storage of late vegetables during winter storage, as well as the impact of these systems on the biological properties of soils agrophysical, agrochemical and fertilizers should be evaluated in terms of. The most efficient fertilizer system in vegetable growing can be considered as an organo-mineral-biological system with a well-developed system. This is because vegetable manure has increased crop yields by 36% by rotating vegetables and crops. The agrochemical and biological properties of the soil have been proven to improve by 54%. In

winter, diseases during storage can reduce the effectiveness of mineral-organo-biological fertilizer systems in reducing crop losses by 10-14%. The proposed system of complex organic-mineral-biological fertilizers guarantees the ecological purity of vegetables, as well as the protection of soil fertility and the environment from pollution by nitrates and other toxic substances.

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