

Study of Agrochemical Effect of Obtained New Types of Complex Fertilizers Based on Karakalpakstan Agro-Ore with Various Mineral Fertilizers

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ABSTRACT

The research in this work is the agrochemical indicators of new types of organomineral fertilizers obtained on the basis of mineral salts and agricultural resources of Karakalpakstan. Experiments were also carried out on various soils of the Republic of Karakalpakstan. The contents of changes in nutrient components in the soil (humus, phosphorus and soil reaction) of various types have been studied. The relative content of water-soluble salts and soil salinity were investigated. Experiments were performed in 4 versions, with different ratios of components.

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I. Introduction:

Scientists have long come to the conclusion that glauconite-containing sands are an additional raw material resource as soil fertilizers, which positively affects their fertility, yield and quality of agricultural products, however, processing, enrichment and production of glauconite-containing fertilizers and their agrochemical assessment is not at a high level. It is necessary to conduct studies based on germination and germination energy of cotton seeds in order to identify the most promising options for the aqueous solutions of preparations synthesized by us, their biological activity, and ultimately, an experimental justification of the agrochemical assessment of new types of complex, organomineral fertilizers obtained on the basis of mineral salts and agricultural resources of Karakalpakstan. Changing the environmental situation causes damage, manifested in the reduction of soils suitable for agriculture, and a decrease in land productivity. The process of draining and drying the bottom of the Aral Sea led to pollution, the environment, salinity of soils, salinity, which depends on the areas of phased salt formations [1]. Due to the increase in the level of underground saline groundwater, the salinity of the surface part of soils and the deterioration of soil fertility increase [2]. It is possible to prevent these negative phenomena by improving the land reclamation state and developing a set of

agrotechnological measures aimed at enriching the soil with organic matter and nutrients based on local raw materials. Therefore, our main task is to process and use local raw materials and mineral fertilizers based on them. Sufficient application of organic fertilizers (manure, compost, straw, etc.) contributes to the improvement of all agronomic valuable soil indicators. However, at present there is clearly a lack of organic fertilizers, and manure is used about 3-5 t/ha per year, i.e. 8-10 times less due to the poorly developed livestock industry. This problem can be solved on the basis of fundamental changes in the existing farming system, by introducing a new agricultural technology, including crop rotations, expanding crop crops to green fertilizer, changing and alternating crops, and applying high standards of organic fertilizers (30-40 t/ha per year or more). These organic fertilizers are obtained from local resources in the form of animal manure, soil compost manure, manure-phosphorite compost consisting of manure, phosphorite and glauconite.

II. Research objects and methods:

The object of research in this work is the agrochemical indicators of new types of organomineral fertilizers obtained on the basis of mineral salts and agricultural resources of Karakalpakstan.

III. Research material and methodology:

Water extract of soils was prepared according to the generally accepted method-soil: water in ratio 1:5 [3]. The content of chlorine ions was determined by argentometric methods by sea; calcium and magnesium trilonometric; sulfate by titration; aqueous drawing with a sulfuric acid solution in the presence of a methyl orange indicator; sodium and potassium ions by the difference in the sum of anions and cations. The results of the analysis of aqueous extracts were expressed in milligram equivalents per 100 g of dry air soil, the sum of water-soluble salts in percent. The results of the aqueous extract analysis were monitored for a dense (dry) residue. The degree of soil salinization was assessed on a scale of [3-5].

IV. Research results:

Studies were carried out in the arid zone of the Republic of Karakalpakstan, occupied by irrigated soils in the farms of the Karauzyak region, which are located in the central part of the southern Aral region, the climate of the territory is sharply continental with dry and hot summers. Table 1 shows that the humus content increased from 0,48% to 1,56%. The phosphorus content increased from 80 mg/kg to 120 mg/kg. Acidity decreased from pH 8,5 (highly alkaline) to 8,0 (slightly alkaline). The type of soil chemistry (-Ch-S-), chloride-sulfate, dry residue is 0,537% before application, and after application it decreases to 0,471%. We have supplied experiments in 4 versions, with different ratios of components.

In the first test, in all versions, when tricalcium phosphate was introduced into the soil with a norm of 600 kg/ha, and glauconite 800 kg/ha, the following was observed:

- 1) The dry residue content decreased from 0,669% to 0,471%,
- 2) The total salt content decreased from 0,636% to 0,450%.
- 3) Humus content increased from 0,48% to 1,48%,
- 4) P₂O₅ content increased: from 80mg/kg to 120mg/kg
- 5) The acidity of the soil decreased: the pH (soil reaction) from 8,5 to 8,0 the soil reaction changed from highly alkaline to alkaline.

In the fourth version, tricalcium phosphate, saltpeter, ammonium sulfate, manure and glauconite were added to the soil.

Table 1: Nutrient components and content of water-soluble salts and soil salinization

| Samples | Fertilizerweight Kg/ha | Dryresidue (%) | | Sumofsalts (%) | | Humus (%) | | P ₂ O ₅ (kg/ha) | | pH: soil reaction | | Typeofchemistry: salinization | |
|---|---|----------------|-------|----------------|-------|-----------|-------|---------------------------------------|-------|-------------------|-------|-------------------------------|------------------------|
| | | before | After | before | After | before | After | before | After | before | After | before | After |
| I-option Soil + tricalcium phosphate + glauconite | | | | | | | | | | | | | |
| 1) Soil 2) Tricalciumphosphate 3) Glauconitis | 1 kg 300 kg/ha 800 kg/ha | 0,559 | 0,813 | 0,532 | 0,775 | 1,40 | 0,97 | 80 | 85 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| 1) Soil 2) Tricalciumphosphate 3) Glauconitis | 1 кг 600kg/ha 800кг/га | 0,669 | 0,775 | 0,636 | 0,738 | 1,08 | 1,49 | 80 | 117 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| Soil control | 1кг 0,0 | 0,731 | 0,658 | 0,704 | 0,628 | 1,21 | 0,89 | 80 | 80 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| II-option Soil + ammonium nitrate + tricalcium phosphate + glauconite | | | | | | | | | | | | | |
| 1) Soil 2) Ammonium nitrate 3) Tricalcium phosphate 4) Glauconitis | 1 kg 100 kg/ha 300 kg/ha 800 kg/ha | 0,565 | 0,543 | 0,539 | 0,519 | 0,46 | 1,09 | 80 | 95 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| 1) Soil 2) Ammonium nitrate 3) tricalcium phosphate 4) Glauconitis | 1 kg 300 kg/ha 600 kg/ha 800 kg/ha | 0,581 | 0,541 | 0,555 | 0,523 | 0,74 | 1,47 | 80 | 120 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| Soil control | 1 kg 0,0 | 0,610 | 0,546 | 0,528 | 0,528 | 1,05 | 1,05 | 80 | 80 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| III-option Soil + ammonium sulfate + tricalcium phosphate + glauconite | | | | | | | | | | | | | |
| 1) Soil 2) Ammonium sulfate 3) Tricalcium phosphate 4) glauconitis | 1 kg 100 kg/ha 300 kg/ha 800 kg/ha | 0,445 | 0,493 | 0,423 | 0,471 | 0,89 | 1,73 | 80 | 110 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| 1) Soil 2) Ammonium sulfate 3) Tricalcium phosphate 4) glauconitis | 1 kg 300 kg/ha 600 kg/ha 800 kg/ha | 0,628 | 0,591 | 0,599 | 0,564 | 0,72 | 1,45 | 80 | 105 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| Soil control | 1 kg 0,0 | 0,791 | 1,074 | 0,757 | 1,026 | 0,87 | 1,43 | 80 | 85 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| IV-option Soil + tricalcium phosphate + salt peter | | | | | | | | | | | | | |
| 1) Soil 2) Tricalcium phosphate 3) Salt peter 4) Ammonium sulfate 5) Manure 6) Glauconitis | 1 kg 300 kg/ha 100 kg/ha 100 kg/ha 5т/га 800 kg/ha | 0,571 | 0,825 | 0,545 | 0,789 | 1,17 | 1,56 | 85 | 100 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| 1) Soil 2) Tricalcium phosphate 3) Salt peter 4) Ammonium sulfate 5) Manure 6) Glauconitis | 1 kg 600 kg/ha 300 kg/ha 300 kg/ha 5т/га 800 kg/ha | 0,537 | 0,471 | 0,512 | 0,450 | 0,48 | 1,34 | 85 | 90 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |
| Soil control | 1кг 0,0 | 0,498 | 0,641 | 0,475 | 0,617 | 0,73 | 0,88 | 85 | 75,12 | 8,5 | 8,0 | -Ch-S- meansalinity | -Ch-S- meansalinity |

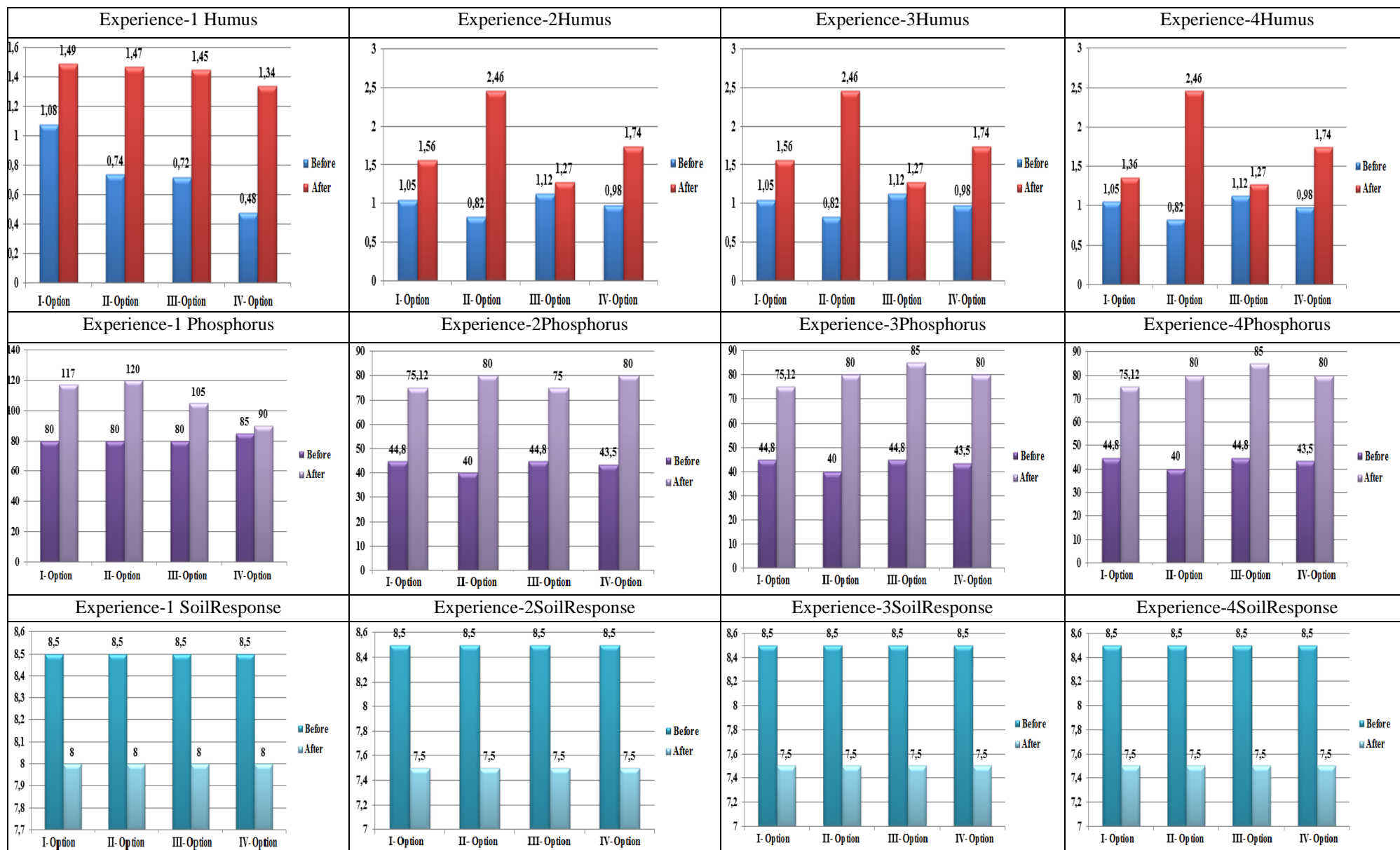


Fig.1 Content of humus, phosphorus and soil reaction before and after application of complex fertilizer

Soil fertility improved due to the addition of a fertilizing mixture of components: glauconite, tricalcium phosphate, nitrate, ammonium sulfate, and manure.

Tricalcium phosphate - 600 kg/ha; Glauconite - 800 kg/ha; Ammonium nitrate - 300 kg/ha; Ammonium sulfate - 300 kg/ha; Manure - 5 t/ha.

The content of mobile phosphorus and exchanged potassium was determined in 1% carbon-ammonium extract according to B.P. Machigin by colorimetric and flame-photometric methods [6]. The results of the use of phosphorus fertilizers on various soils showed that after 5 days of interaction with the soil, the amount of mobile phosphorus in all variants increased sharply. The content of mobile phosphorus with the introduction of tricalcium phosphate and glauconite in the 4-versions was 120 mg/kg, which significantly exceeds its initial amount of 80 mg/kg. Organic and organomineral fertilizers are able to adsorb and retain nutrients by increasing the total volume surface, and their high ability to adsorb moisture (up to 50% abs) prevents and eliminates the possibility of leaching the nutrients (nitrogen, phosphorus, potassium, calcium and others) into subsoil horizons. All this allows you to significantly (by 25-50%) reduce the rate of application of nutrients to the soil. The use of such fertilizers will reduce, and over time remove salinity and increase soil fertility.

V. Conclusions:

The preservation and improvement of soil fertility levels is becoming a critical issue due to the increasing density of the world's population. Thus, we obtained results with the same norm of components in all experiments. It was revealed that the soils differ in their mechanical composition and degree of salinity, which indicates the need to develop special rules for the selection and preparation of planting zones and crops to increase their engraftment. Various agrotechnical activities significantly wander on the growth and development of agricultural plants. Organic and organomineral fertilizers optimize microbiological processes responsible for environmental health and soil fertility. Therefore, the development of effective technologies for the production of organic and organomineral fertilizers and their implementation will allow to comprehensively solve the issues of raw materials, water and soil resources, environmental protection and ensure an increase in the volume of agricultural products and its quality.

VI. References:

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