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TECHNOLOGY OF THE PURCHASE OF ORGANIC-MINERAL LIQUID AND AMELIORATIVE SUBSTANCES

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Abstract

Article is dedicated to the technology of obtaining organic-mineral liquid fertilizer and solid chemical meliorants from solid household waste with the presence of nitric acid.Articlebased on the data of nitric acid from solid household waste and the dynamics of decomposition with late participation, extensive information was given about the technology of making liquid fertilizers and chemical meliorants, and the technological scheme and its explanation were broadly explained based on the technological process for both experimental and production conditions. It was concluded that it is possible to buy high-quality liquid fertilizer rich in microelements and chemical ameliorant rich in organic substances based on solid household waste, late and nitric acid. According to the data obtained from the conducted agricultural tests, the purchased liquid fertilizer increases the productivity of plants, the chemical ameliorants in solid state improve the water-physical properties of the soil through the organic substances and gypsum contained in them. This has a positive effect on soil fertility indicators [1].

Keywords: liquid fertilizer, chemical ameliorant, melioration, salinization, granulometric composition, absorbed bases.

Introduction. At present, our republic was in the stage of strong development. The rapid development of oil and non-oil industries has given a strong impetus to the improvement of the standard of living of the population. In such conditions, in order to reduce dependence on foreign countries, ensuring the food security of the country's population is one of the main issues put before us by our state. The solution to this problem can be achieved by improving the land by increasing its meliorative condition and agronomic properties [3,4].

One of the main issues is the supply of fertilizers for agriculture. The composition of the fertilizer prepared by us is rich in organic fertilizers and trace elements, along with N, P, K. Its production in the republic will stimulate the development of agriculture [2,5].

Purpose of work. It is the development of the technological bases of the purchase of organic mineral complex fertilizers on the basis of various wastes and minerals generated in the territory of the Republic and its application to production [7].

Research methodology. The research was conducted on the basis of widely used methodologies in the territory of the republic. The method of preparation of liquid fertilizer and solid chemical ameliorant is explained in detail in the "analysis and discussion" section.

Raw materials and materials used:

The chemical composition of solid domestic waste is given in table 1.

Table 1.

Chemical composition of solid domestic waste, in %

Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	SO_3	K_2O	CaO	Fe_2O3	TiO_2	MnO	Cl^-	YTI
1.70	1.02	2.56	16.49	0.58	2.56	1.31	27.11	2.63	0.25	0.10	0.82	42.5

Other raw materials used are nirtic acid (GOST 4461-77) and late.

Table 2

Chemical composition of gypsum rocks extracted from different deposits, in %

Substances	Ganja bed		Bed of Khans	Jeyranchol field
	1st field	2nd field		
CaO	26.81	23.72	28.80	25.79
SiO2	15.6	21.39	9.40	17.51
Al2O3	3.01	1.87	4.90	4.45
Fe2O3	2.16	3.12	0.50	2.31
MgO	1.17	1.09	0.21	2.06
N2O	0.88	0.43	–	–
Na2O	0.61	0.39	1.25	–
P2O5	11.34	–	–	–
SO3	35,67	29,24	38.21	34.28
H2O	2.39	1.05	1.51	0.64

Analysis and discussion.

Under experimental conditionssolid household waste and organic mineral liquid fertilizer and solid chemical ameliorant based on 10% nitric acid are purchased according to the following scheme:

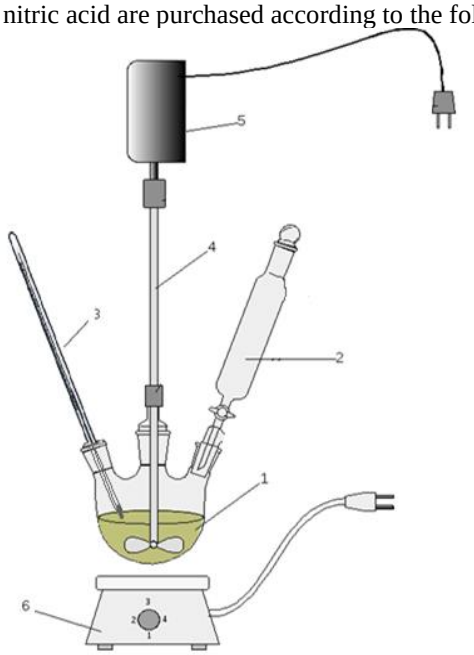

Figure 1. Scheme of the laboratory equipment for the production of organic-mineral liquid fertilizer. 1-three-necked flask; 2-separating sleeve; 3-thermometer; 4-mixer; 5-electric engine; 6-electric heater.

50 grams of sorted and chopped solid household waste is poured into a flask with a volume of 200 ml, and 150 ml of 10% nitric acid is added to it (figure 1). The mixer is turned on and the mass is mixed at a speed of 60 revolutions/minute [6]. After stirring for 20 minutes, 50 g of tar is added to the flask and stirring is continued. Stirring is continued for an additional 40 minutes. After the total mixing period of 1 hour, the mass obtained in the form of horra is neutralized with milk of lime, removed from the flask and filtered. The solid residue is placed in a thermostat with a temperature of 105^0C for drying. Drying is done within 1 hour. The composition of the prepared liquid fertilizer is as follows (%): organic substances -21-26; NO_3 -10.65-11.75; P_2O_5-0.22-0.23; K_2O-0.17-0.19; $CaSO_4$ –2.5-3.5;the rest is water.

After filtration, the solid part that remains in the form of waste can be used as an ameliorant with organic-mineral content in agriculture for the ecological improvement of salinized-salinized soils and for the restoration of their fertility. CaSO4·2H2O, which is used as an additive, and organic mixtures are indispensable components for improving the physico-chemical properties of soils and increasing their fertility.

The composition of the solid part is as follows (%); Organic substances – 74-79; NO_3-0.8-1.5; P,K – 0.03-0.04; $CaSO_4$ – 35-40;the rest is water.

Organic residue enriched with calcium nitrate, which has an acidic environment, can be used as a chemical ameliorant.

In production conditionsliquid fertilizer and solid chemical ameliorant based on solid household waste, late and 10% nitric acid are made according to the following technological scheme:

Sorted and shredded solid household waste is placed in the reactor (1) and 10% nitric acid is added to it (figure 2). The ratio of BMT to acid solution supplied to the reactor should be 1:3. After 10 minutes of starting the stirrer, 1 part by weight is added to the reactor. Stirring 60 cycles/min. continues for 1 hour. The horra-shaped mass neutralized with milk of lime is fed to the auger (5) for dehydration. Here the solid part is separated from the liquid part.

As a result of neutralization, the filtered liquid has a pH of 6.5-7.0, which allows it to be used as a liquid fertilizer in agriculture. The purchased liquid fertilizer is filled in 5 and 10 liter polyethylene containers for use.

The received liquid fertilizer has the following composition (in %): organic substances 21-26; NO_3 -10.65-11.75; P_2O_5-0.22-0.23; K_2O-0.17-0.19; $CaSO_4$-2.5-3.5 the rest is water.

The solid material from the auger is fed to the drying drum (6) for drying. The solid residue, which consists mainly of organic matter, gypsum and a small amount of calcium nitrate, is dried to a moisture content of 15-20%. This substance obtained during the process can be applied to improve salinized and salinized soils as an organic-mineral melioration agent.

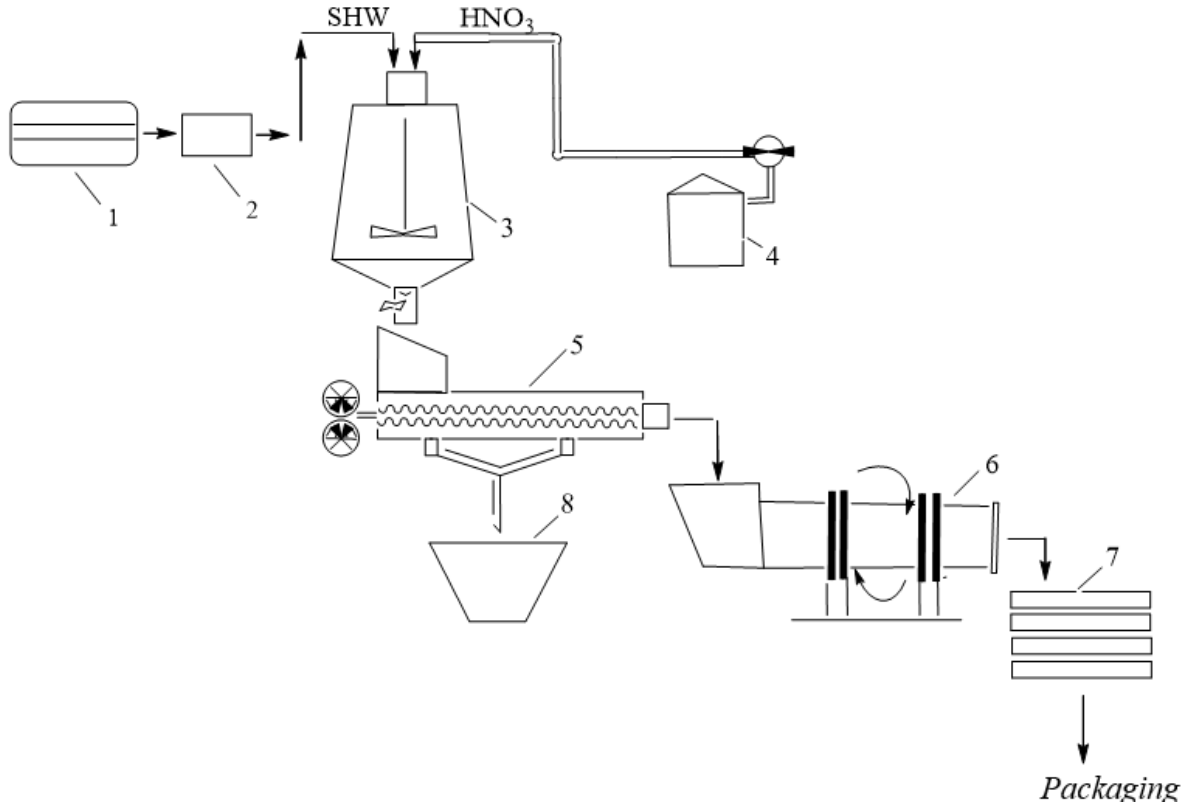

Figure 2. Acquisition of organic-mineral complex fertilizer under production conditions.
1. Sorting shop; 2. Chopper; 3. Reactor; 4. Acid tank;
5. Auger; 6. Drying drum; 7. Sieve; 8. Liquid fertilizer tank.

The received chemical melioration substance has the following composition. Organic substances - 74-79%; NO_3-0.8-1.5; P,K – 0.03-0.04; $CaSO_4$ – 35-40;the rest is water.

Based on the data obtained from the research, the following conclusions can be reached:

CONCLUSION

1. It is possible to buy high-quality organic-mineral complex liquid fertilizers and chemical ameliorants based on solid household waste, manure and nitric acid.

2. Since it contains both NPK, organic substances, and trace elements, the prepared fertilizer has a positive effect on the productivity of agricultural plants and the increase in the fertility of salinized-salinized soils.

3. Due to the fact that it is made on the basis of industrial waste, it is very economically efficient.

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