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Ecological Bases of Use of Organic Waste As Fertilizers

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Abstract: Based on the conducted studies, it is established that in Azerbaijan there is a large amount of unused organic waste that accumulate polluting the environment. These wastes can be processed and used as organic fertilizers. The waste contains a large amount of organic matter and mineral nutrients that improve the fertility of soils and the yield of agricultural plants (Artyushin et al., 1984). Works on chemicalization and land reclamation are carried out on an unprecedented scale. At the same time, environmental protection and the rational use of natural resources are becoming increasingly important for the environment. The food program developed in accordance with the decision to develop the country's agriculture provides for the full and rational use of all the resources of organic fertilizers available in our republic with a total volume of their production in 2017 of about 30 million tons. Preserving a deficit-free balance of humus in the soil, increasing its fertility and increasing the yield and quality of agricultural plants with the intensification of agriculture will require the expansion of production and the use of not only all types of animal husbandry and poultry farming and peat, but also the mobilization of other sources of organic matter. Among them, an important place should be given to household, agricultural and industrial waste, waste from the biochemical and woodworking industries, etc.The full and efficient use of all resources of organic fertilizers simultaneously solves a number of economic tasks: obtaining maximum yields while maintaining and increasing soil fertility, protecting the environment from pollution by waste and waste from industry, public utilities, animal husbandry and crop production (Zamanov et al., 1990).

Keywords*:* Organic waste, Ecology, Compost, Environment, Soils.

Introduction

On the basis of the conducted studies, it was established that in Azerbaijan there are a large number of unused resources that need to develop a scientifically based technology for the use of industrial, domestic and agricultural waste, which remain inactive and in many places pollute the environment and degrade the environment (Dre, 1976). These wastes include: urban household waste - 500,000 tons, tops and remains of agricultural plants - 720,000 tons, litter and litter of forest plantations and landscaping of residential areas - 180,000 tons, waste from industrial processing of agricultural products and chemical plants - 320,000 tons, salts of mineral and thermal waters and sewage sludge 100,000 tons, waste and waste from tea and vineyards - 117,000 tons, sewage and sewage sludge - 100,000 tons, sowing green manure crops - 20,000 tons. Of all public and private farms of various types of manure and bird droppings - 19 million tons annually. The analyzes found that the above tops, agricultural and industrial wastes contain about 170,000 tons of nitrogen, 77,000 tons of phosphorus, 220,000 tons of potassium, about 6 million tons of organic matter and 5 million tons of other ash elements, a significant amount of microelements and beneficial microorganisms. Therefore, on the basis of these wastes, a technology has been developed for the preparation of new types of organic fertilizers, which create an opportunity to increase the amount of organic fertilizers applied to the soil in the republic, increase soil fertility and the yield and quality of crops. Complete decomposition of compost, depending on the material used, occurs within 4-12 months. Finished products contain: 4.8% N, 1.0% P2O5, 1.5% exchangeable K2O, 60% organic matter, 30% ash elements and a certain amount of trace elements. It is recommended to use 10-30 t/ha of compost for crops of corn, tobacco, cotton, cereals, vineyards and vegetables. After the introduction of compost

for the main plowing in the crop rotation under irrigation conditions in the second and third years, its efficiency does not decrease.

Material and Methods

The composition of the new organic fertilizer (compost) includes: Waste Waste taken for mixing in % Annual stocks in the republic in tons Manure 20 19000000 Industrial processing waste agricultural products 10 320000 Municipal household waste 15 500000 Agricultural waste 10 720000 Ash and lime 3 40000 Forest litter 10 180000 Bird droppings 10 115000 Simple superphosphate and ammonium sulfate 2 Dry residue of sewage 10 500000 Sediment of river and lake waters (sapropel) 10 500000 New organic fertilizers (composts) are prepared directly in the field, at the places of their application. Compost heaps should be laid in places protected from winds and not flooded with rain, melt and irrigation water. For this purpose, they dig trenches 3 meters wide and 0.5 m deep, the length is arbitrary. For good air penetration into the compost and faster decomposition of waste, the height of the pile should not exceed 1-1.5 m. Composts are prepared in layers and at any time of the year. Before laying the compost in a pre-dug trench with a layer of 10-15 cm, humus soil is laid or covered with a strong plastic film. Then, in layers of 20-30 cm, various wastes intended for composting are laid. When laying the dry material, it is well moistened with slurry or homogenized manure, other liquid waste suitable for soil application, or water. If the composted material does not contain lime, then carbonate or burnt lime, lime tuff, dolomite flour are added to each layer in the amount of 2-3% by weight of the composted material. Instead of lime, you can use furnace ash, which is a special addition to the compost. Ash can be increased up to 10% of the weight of the compostable material. Ash is especially valuable because it contains a large amount of phosphorus and potassium. Each layer of compost is covered with earth or humus 5-6 cm thick, another layer not thinner than 10 cm is applied on top. It is desirable to mix the compost after 1-2 months. If the material decomposes slowly, the compost should be mixed again after 1-2 months. For proper maturation of compost, it is important to maintain normal humidity in it: the optimal moisture content of materials during composting is 50-60%. Therefore, when drying, the pile must be moistened. On the third and fourth days after laying the stack, the temperature in it rises to 60-70°C, which causes the death of helminth eggs and a number of other pathogens of infectious diseases. Compost maturation occurs within 4-12 months depending on the material. When the compost becomes uniform and takes on a dark color, it is suitable for fertilizing the fields. The terms of decomposition, the place of manufacture and determination of the readiness of the compost for use by the biological method are being studied.

Results and Discussions

It has been established that when composting urban household waste with manure, bird droppings and adding KOMU and DDV, the temperature increased to 70-80°C after 2-4 weeks and decreased after turning the compost. In the process of compost maturation, the content of carbon (C), the ratio of carbohydrate to nitrogen (C:N), and the content of cellulose and hemicellulose decreased in its composition. The content of total nitrogen, ash, and lignin increased. After 5 months, the content of all elements of the compost became stable. To determine the main indicators, samples were taken in all samples, the ratio C:N, the content of total nitrogen and the ratio of carbon to reducing sugars were determined. The C:N ratio in the compost was determined based on the ash content and total nitrogen content according to Kjeldahl in the compost according to the formula: where a is the ash content (in % of dry matter); 100 – a - content of organic matter in %; e-a - the content of total nitrogen in the compost (in% of absolutely dry weight). Composts were considered ready when the C:N ratio in its composition was below 20, the nitrogen content in the dried material was 2%, the ratio of carbon (C) in the composition of reducing sugars was below 35% to total carbon. The cation exchange capacity was below 60 meq. per 100 g of compost. In order to determine the readiness (ripening) of a new organic fertilizer for use, a biological method was used for the first time, where the seeds of individual agricultural plants are grown in a solution of this fertilizer and the readiness of the fertilizer for application to the soil is established. New organic fertilizers (composts) “Absheron, Zakataly, Nakhichevan, Lankaran, Ganja, Mugan-Salyany, Cuba-Khachmaz, Shirvan-Karabakh.” The compositions were developed, the compositions were determined, the effectiveness and the contained nutrients, as well as their effectiveness for various agricultural crops, were studied (Popov, 1988; Pokrovskaya, 1991). Since 2000, new types of organic fertilizers (composts) have been introduced under the main agricultural crops in the republic. The compost was introduced under corn and tobacco in the Zakatala region on an area of 200 hectares. From the use of this fertilizer at the rate of 10 t/ha, the yield of corn cob increased - 10 centners per hectare, dry tobacco leaf - 4.0 centners per hectare, compared with the control. Compost "Absheron" was used at the rate of 10 t/ha for a vineyard, where the yield of grapes increased by 15 centners/ha, and the sugar content of berries also increased by 3.6%. Also, compost was used on an area of 100

hectares for corn in two farms of the Zagatala region, where the economic efficiency was from 82 to 110 manats. Compost "Lenkoran" was used on an area of 200 hectares, in the Lankaran region at the rate of 10 t/ha; the increase in the yield of green tea leaves averaged 250-300 kg/ha, or the economic effect - 250-300 manats per hectare.

Conclusion

New types of organic fertilizers were also introduced in the subtropical region of 100 ha at the rate of 100 t/ha, where an additional green tea leaf yield of 265 kg/ha or 250 man/ha of additional cash income per hectare was obtained. Compost "Mughan" at the rate of 10 t/ha was used for cotton in the Neftchala region, where the yield of cotton increased by 3.2 q/ha, the economic efficiency was 192 man/ha. The use of waste polluting the environment improves the environment and makes it possible to increase soil fertility, as well as increase the yield of agricultural plants.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the author.

Acknowledgements or Notes

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