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BIRD LITTER AS AN ORGANIC FERTILIZER

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Nowadays modern environmental problems in the Turkestan region are associated with local accumulation of livestock waste (bird droppings, cattle manure). If untreated litter and other livestock wastes are used, enterprises pollute the soil with helminths, pathogens, toxic chemical compounds. In recent years, the region continues to experience a steady decrease in the amount of humus in the soil, and this leads to a decrease in fertility, and soil properties such as physical, chemical, and water-physical are also deteriorating.

If we make conditions for an accelerated process of biofermentation of organic waste by composting, then all these problems can be solved. The composting process, on the one hand, makes it possible to obtain valuable organic fertilizer, on the other hand, it is a cleaning process,

since the resulting final product becomes less hazardous to the environment. The final product that is obtained by composting is environmentally friendly, stably humified, it quickly comes into balance with the ecosystem, into which it was introduced, and does not cause serious disturbances in it.

In agricultural production, the main direction where bird droppings are used is its use as an organic fertilizer. If we consider the types of organic fertilizers, bird droppings are of the greatest value, the content of nutrients, and their availability for farmed crops. As fertilizer, poultry manure is 9-10 times superior to manure and, in terms of its effect on crop productivity, is not inferior to an equal amount of nutrients from mineral fertilizers. The rate of introduction of bird droppings is up to 30 times lower than the rate of application of manure.

Bird droppings - the final product of birds, colloidal consistency of the substrate, gray-green color.

According to the norms of litter output, it was found that at a cage from an adult livestock, 60–70 kg per 1 head accumulate per year, from chickens - 35–40 kg per 1 head. With the free keeping of the bird, this norm decreases several times and amounts to 10–12 kg per head. The amount of nutrients in bird droppings varies depending on the type of bird, age, breed, feeding and mode of maintenance. Chicken droppings contain a little more phosphorus, nitrogen and potassium than cattle manure (table 1).

Table 1

The chemical composition of the litter and bedding manure, %

Composition	Chicken droppings		Cattle
	Raw	Thermally dried	
Dry matter	35,0	84,0	10,5
Nitrogen	2,20	4,64	0,53
Phosphorus, P_2O_5	1,55	3,75	0,38
Potassium, K_2O	0,74	1,84	0,60

The bird droppings also have a large number of trace elements. 100 g of its dry matter contains (mg): iron 370 - 900; zinc 15-40; Manganese 20-40; copper - 0.5; cobalt 1–1.2. A large number of these elements are in water-soluble form.

The aim of the research is to improve technology to accelerate the processing of bird droppings into organic fertilizers. The solution of this goal will not only reduce the shelf life of livestock waste, but also get high-quality organic fertilizer, reduce the cost of mineral fertilizers and the construction of capital facilities [1].

Studies were conducted at the Shymkent-Kus commodity farm; laying hens are grown on a farm; the livestock is 11231. Chemical analyzes of bird droppings and other organic fertilizers were also carried out: cattle manure (table 2).

Table 2

Agrochemical characteristics of organic fertilizers

Fertilizer	pH	Dry, %	Content % natural humidity		
			N	P_2O_5	K_2O
Markometurine Unprotected	7,3-7,5	32-37	0,76-1,73	1,15-2,50	0,39-0,97
Litter of cattle half-ripe	6,5-6,8	28-32	0,58-0,65	0,22-0,25	0,59-0,73

Composts	6,4-7,2	52-65	0,95-1,70	0,32-0,68	0,30-0,98

The content of heavy metals in various types of fertilizers, as well as standard concentrations are presented in table 3.

Table 3

The amount of heavy metals in organic fertilizers, mg / kg dry matter

Fertilizer	Cd	Cu	Pb	Zn	Ni	Cr
Chicken litter unprotected	0,30	8,40	1,25	128,9	5,80	3,42
Cattle manure	2	134	132	210	-	-

It should be noted that during storage, the composition of the litter undergoes significant changes, plant nutrients are lost. The number of lost items in most depends on the methods and conditions of its storage. Since the raw litter has high humidity, this does not allow it to be folded, and if it is stored in small heaps, it begins to dry out, cracks appear, this contributes to the loss of nutrients not only from the surface, but also from the deep layers. If semi-liquid litter is stored in the field for 5 months, 30 to 45% of phosphorus, 55 to 85% of nitrogen, and 45% of potassium are lost.

Bird droppings need to be stored in litter storages; this is the most appropriate way to store it. With this storage method, the amount of loss of nutrients for plants can be significantly reduced. To reduce the loss of nutrients, when storing the litter, it is still necessary to use various processing methods: mixing with substances that can destroy an unpleasant odor and fix nitrogen, adding various chemicals. Bird droppings used to enrich the soil with nutrients and nitrogen must be preliminarily neutralized (composting, thermal drying, etc.) [2].

The composting process is a complex interaction between microorganisms, organic waste, oxygen and moisture. In addition to water and oxygen, microorganisms for reproduction and growth need sources of nitrogen, carbon, phosphorus, potassium and certain trace elements that are often provided by the substances contained in the waste these needs. Microorganisms, consuming organic waste as a food substrate, multiply and produce carbon dioxide, water, organic compounds and energy. In the biological oxidation of carbon, the energy received is consumed in metabolic processes, the rest is released as heat. Compost contains organic compounds, the most stable decay products, the biomass of living and dead microorganisms, as well as the products of the chemical interaction of these components.

Organic fertilizer, obtained as a result of decaying of bird droppings for 6 months in the litter repository, will be used for needs for application to the farm fields. Table 4 presents data on the areas of cultivated crops on which organic fertilizers are applied.

Table 4 - sown area of crops using organic fertilizers

Table 4

№	Cultivated crop	Area, ha
1	Perennial herbs	420
2	Winter wheat	1450
3	Winter barley	220
4	Sunflower	580
6	Corn	1000
7	Soya peas	620
8	Rape	170
TOTAL		4460

Organic fertilizer is applied in the autumn (after harvesting of agricultural crops) and spring (before

sowing of agricultural crops) periods.
The introduction of bird droppings gives a guaranteed increase in yield from 1.2 to 1.5 times (for some crops 2 or more). The rate of introduction of liquid manure is up to 30 t / ha (table 5).

Table 5

Approximate application rates of organic fertilizers (bird droppings) for various crops

№	Name of culture	Norm, t / ha	Application time	Termination method
1	Winter cereals (wheat, barley)	12–15	Before basic processing	Plow
2	Perennial grasses on green forage	17–20	Before sowing By spraying on the surface of the soil or after mowing in the form of fertilizer irrigation	Disc cultivator, solid cultivator, harrowing after mowing
3	Corn for grain or green feed	16–20 12–15	In the fall - before the chaffinch In spring - before sowing	Plow, Disc cultivator, solid cultivator

Fertilizing should take into account the properties of soils, the nature of moisture, the type of treatment of soils and cultivated crops, which will significantly reduce unproductive losses of nutrients and increase their utilization rate.
Depending on the needs of the fertilized culture for nutrients, doses of organic fertilizer are established. To introduce liquid droppings in high doses, this leads to a decrease in the quality of the obtained crop, the biological properties of soils deteriorate, and environmental pollution by nitrates also occurs [3].

What should be taken into account when calculating application rates: first of all, what soils and how many nutrients are contained in them; further predecessors and at what range will be transported.The maximum permissible dose of litter is determined by the amount of nitrogen that is needed to obtain the planned crop yield with appropriate compensation due to phosphorus and potassium fertilizers.

Organic fertilizer obtained from bird droppings can be applied in three different ways: inside the soil, superficially with its subsequent incorporation into the soil and during irrigation. The most environmentally friendly and rational way of introducing subsoil, this method greatly reduces the loss of nitrogen and other nutrients. If organic fertilizers are applied in this way, intra-soil fertilizer losses will decrease by 8–10 times and, accordingly, the yield of fodder crops will increase by about 15–20%. When using organic fertilizers, it is especially necessary to ensure uniform application and immediate incorporation into the soil, as the litter contains a large amount of nitrogen, which is lost during surface application of fertilizer. Uniform application is necessary to avoid foci with a high concentration of nutrients, leading to lodging and even death of plants. The most desirable dates for

applying organic fertilizers are autumn and spring-summer. Autumn fall plowing is also effective. When making manure as an organic fertilizer during the growing season, the waiting time from the time of the last application to the harvest of crops or its use should be observed.

The increase in productivity due to organic fertilizers should provide a recoupment of the costs of their use. The advantage of organic fertilizers compared to mineral fertilizers is their long-term aftereffect. Organic fertilizers affect the yield and quality of the crop within 3-4 years after their application, in contrast to mineral fertilizers, which have a positive effect on plants only one year, less often two years.

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ASSESSMENT OF THE RISK OF ACUTE AND CHRONIC INHALATION LOAD ON THE HEALTH OF THE POPULATION OF THE CITY OF BALKHASH

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Maintaining and strengthening the health of the population in the conditions of man-made environmental pollution over the past decades remains an urgent hygienic and medical-demographic problem [1]. Of particular importance, from the perspective of the Concept of development of the health system in the Republic of Kazakhstan until 2020, is the reduction of risks to public health based on the prevention and elimination of harmful effects of human environment factors [2, 3].

In the conditions of multi – component environmental pollution of the city of Balkhash with a developed mining and metallurgical industry, the role of hygienic research aimed at preventing health risks, predicting the environmental and hygienic situation and scientific justification of prevention directions is increasing.

In this regard, the most important area of research in the field of human ecology and environmental hygiene is the development of highly informative non-invasive methods for diagnosing early changes in human health that occur under the influence of adverse factors [4].

Keywords: risk assessment, public health, mining and metallurgical industry, diagnostic methods, factors.

The degree of pollution depends on emissions of harmful substances and their chemical composition, from the height at which emissions are made, and on the meteorological conditions that determine transport, dispersion and transformation of emitted substances. With constant emission parameters, the level of atmospheric pollution depends significantly on climatic conditions: the direction, conditions for the transport and distribution of impurities in the atmosphere, the intensity of solar radiation that determines photochemical transformations and the occurrence of secondary products of air pollution. Ensuring a normal environment from an