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VERMICULTURATION AND ITS DEVELOPMENT PROSPECTS

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Abstract
Reclamation products such as vermicompost and vermiculture are often used as feed additives and natural fertilizers. In addition, the most common methods and technologies for their production are relatively simple and inexpensive. This is a huge advantage over existing and currently used fertilizers and organic additives.

Introduction

Urbanization, the constant growth of the world's population, and people's consumer lifestyles are leading to an unprecedented increase in production and the accumulation of large volumes of industrial, agricultural, and household waste. They have the potential to increase global environmental pollution.If these wastes are converted into useful materials for agriculture, a huge amount of nutrients can be saved for plants. Therefore, there is growing interest in using organic wastes as fertilizers, soil conditioners, and energy sources.

Vermitechnologies, i.e. technologies based on the use of compost (manure) worms, combine all these advantages and benefits.

Traditional compost is a product of decomposition of plant and organic remains at temperatures of 40 - 70° C.

It should be noted that such high temperatures are destructive for beneficial microorganisms. At the same time, there is another of its main disadvantages in formation - the loss of nitrogen. Vermicomposting is the cultivation of compost worms in an organic substrate to obtain high-quality organic fertilizer. It is called differently: vermicompost, worm compost, coprolite or biohumus. In addition, vermicomposting accelerates the decomposition of organic matter by 2-5 times. At the same time, vermicompost, when optimal conditions are observed, never heats up above the ambient temperature and surpasses conventional composts in many characteristics.

No less important is the correct equipment of the vermifarm. In order for the worms to reproduce and not die, it is necessary to follow the rules for care, feeding and maintenance. Temperature, humidity and other vital indicators for worms must be kept under control. Selective breeds of invertebrates are obtained by crossing natural species, thereby improving their productive and adaptive characteristics.Technological worms, unlike wild ones, have perseverance in the substrate, increased reproduction rates, longer lifespan, are active in the disposal of waste, which is usually taken to landfills. Reproducing, worms produce a protein substance for feeding farm animals - their own biomass.This feed contains 60-70% valuable protein and up to 10% fat. Worms give up to 60% of the eaten substrate in the form of excrement. This valuable, unique in structure organic fertilizer is called biohumus. Its composition fully provides nutrition for cultivated plants,

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and its stable lumpy structure improves the structure of the soil.A device for keeping earthworms for the purpose of recycling household waste is called a vermicultivator (or vermicomposter). Plastic or wooden boxes, barrels, baskets; plots of land fenced with boards, etc. can serve as such. The substrate prepared for vermicomposting must be fully matured (fermented), otherwise the worms will die from the gases released and the high temperature.

The technology of processing organic raw materials into fertilizer by earthworms is called vermicomposting.

The compost obtained after processing waste by worms is called biohumus, or vermicompost.Humus in compost is formed by the processing of various organic remains by worms. Worms accelerate their decomposition, creating an earthy, structural nutrient mass from waste. In terms of nutrient content, biohumus surpasses manure and other organic fertilizers. The nutrients of biohumus are available to plants. It does not acidify the soil.It should be applied 10 times less than manure. Omnivorous worms utilize any organic waste - plant remains, spoiled vegetables, waste from woodworking and cellulose industries, waste from treatment facilities, manure and excrement of herbivorous animals, etc..

The finished fertilizer contains everything needed for plant nutrition and soil health: microelements, enzymes, amino acids, vitamins, etc.

Table 1 - Chemical characteristics of compost and vermicompost

Options	Compost	Vermicompost
pH	7,80	6,80
The total amount of nitrogen, including that found in organic compounds, %	0,80	1,94
Nitrate nitrogen (the kind that is ready for direct use by plants), parts per million	156,50	902,20
Phosphorus, %	0,35	0,47
Potassium, %	0,48	0,70
Calcium, %	2,27	4,40
Sodium, %	0,01	0,02
Magnesium, %	0,57	0,46
Iron, parts per million	11690,00	7563,00
Zinc, parts per million	128,00	278,00
Manganese, parts per million	414,00	475,00
Copper, parts per million	17,00	27,00
Boron, parts per million	25,00	34,00
Aluminum, parts per million	7380,00	7012,00

Vermiculture is the only method that allows continuous use of arable land without deteriorating its structure and fertility. Care for worms is limited to maintaining temperature, loosening and watering the beds (boxes). One of the leading conditions in the life of compost worms is the moisture content of the substrate.

They are very sensitive to humidity fluctuations, especially to its decrease. Watering to maintain the compost humidity at 75 - 80% is carried out with water at a temperature of 20 - 24 degrees. The first feeding of worms is carried out a few days after settling in the compost. During the first three months, the worms must feed and reproduce intensively. They consume an amount of food equal to their weight per day, and their weight doubles every week, so periodic feeding of the population with recycled substrate is necessary.To stimulate the activity of worms and maintain optimal living conditions, chalk, crushed clay, various feed additives containing protein - milk powder, soy flour, etc. can be added to the feeding mixture. If the activity of the worms is normal, then the first feeding is carried out a month after the start of vermicomposting.The suitability of the feed for feeding worms is determined in advance in a test analysis of their activity and survival, carried out over the course of a month in small boxes in which feed is poured and several dozen worms are placed. Methods for express testing the suitability of substrates for vermiculture have also been developed. Thus, according to one option, several specimens of worms are placed on the surface of a sample of prepared substrate and their behavior is observed for 30 minutes.It is believed that if the worms burrow into it for 5-10 minutes, then the substrate meets all the requirements necessary for the normal life of worms, but if the worms crawl along the surface and do not burrow into it, then the substrate is not suitable for worms and requires further preparation.Worms get used to compost of a certain chemical composition, and it takes a considerable amount of time to adapt to a new substrate, so it is advisable to ensure a constant composition of raw materials in the technological process.

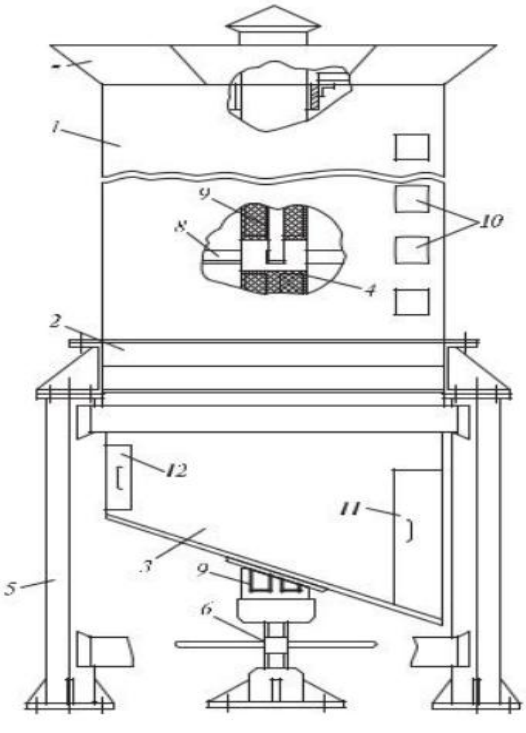

Fig. 1. Schematic diagram of the vermiculture reactor design: 1 - reactor body; 2 - discharge gate; 3 - discharge compartment; 4 - aeration pipe; 5 - supports; 6 - aeration pipe drive; 7 - loading neck; 8 - discharge elements; 9 - aeration holes; 10 - inspection windows; 11 - discharge hatch; 12 - process hatch.

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Worms need oxygen, so after the substrate layer reaches a thickness of 20 cm or more, regular loosening is carried out by piercing the ridge, for which a wooden stake with a diameter of 2 - 3 cm or a special vermicompost pitchfork is used. Loosening is carried out 2 times a week to the depth of the worms and cocoons without mixing the compost layers.

With a stable mode of operation of worms in the box (bed), the compost is stratified into three zones. The first zone - the surface horizon (5-7 cm) is a fresh substrate, which is food for worms. Its quantity is constantly changing, since the worms feed on it constantly, and this layer is applied periodically.The middle zone - 10 - 30 cm - is the working zone, where the bulk of the worms live. The third zone - the biohumus storage area - constantly increases in height as the worms work.

Conclusion:

Vermicomposting is the most environmentally friendly and environmentally friendly biotechnology for processing and recycling biodegradable organic or organo-containing waste and converting it into materials with added value.Vermiculture can recycle organic waste materials, converting organic waste into humus and earthworm biomass. The accumulation of organic matter in public landfills leads to an ecological disaster, while most of this waste can be recycled into compost.

REFERENCES

1. Бабенко А. С. Перспективы использования вермикомпоста в защите растений. Вестник Томского государственного университета. Биология. Томск: НИТГУ. 2010. 1 (9). С. 105-110.
2. Батищева Н. В. Инновационные способы утилизации пивной дробины.
Научное обозрение. Технические науки. 2016. № 6. С. 10-14.
3. Горбунов В. В. Дождевые черви для повышения урожая. М.: Астрель, 2012. 250 с.
4. Городний Н. М. Биоконверсия органических отходов в биоиндустриальном хозяйстве. Киев: Урожай, 1990. с. 256.
5. Джакупова И. Б. Биогумус – экологически чистое органическое удобрение. Вестник Алматинского технологического университета. Алматы: 2014. № 2. С. 55-58.