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INNOVATIVE MODELS AND TRENDS OF POULTRY MANURE IN VERMICULTURE TECHNOLOGY: AN ECOLOGICAL PERSPECTIVE

Li Yan¹, Viktor Lemiasheuski^{1,2}, Svetlana Maksimova³

¹*International Sakharov Environmental Institute of Belarusian State University, 220070 Minsk, Belarus*

²*All-Russian research Institute of Physiology, Biochemistry and Nutrition of animals – branch of the Federal Research Center for Animal Husbandry named after Academy Member L. K. Ernst, 249013, Borovsk, Russian Federation*

³*Scientific and Practical Center of the National Academy of Sciences of Belarus for Bioresources, 220070, Minsk, Republic of Belarus
Ly15993087502@163.com*

This paper summarizes the innovative mode and development trend of poultry manure in vermiculture technology, which includes the treatment method of poultry manure, the principle and advantages of vermiculture technology, the combination of poultry manure and vermiculture technology and the effect, and provides an outlook for the future development as well as the relevant theoretical basis for researchers.

Keywords: Poultry manure, vermiculture, recycling, environmental protection

Poultry manure is the solid waste excreted by chickens, ducks, geese and other poultry, which is an organic fertilizer resource rich in nitrogen, phosphorus, potassium and other elements and organic matter. However, improper handling and utilization of poultry manure can also pose a serious threat to the environment and human and animal health [Wychodnik K., Gałęzowska G., Rogowska J., et al., 2020]. Therefore, how to effectively treat and utilize poultry manure is one of the current urgent problems.

Vermiculture is a bioengineering technology that uses earthworms to convert organic waste into high-quality fertilizer. Through the ingestion, digestion, absorption and excretion of organic waste by earthworms, it can be converted into fertilizers rich in nitrogen, phosphorus, potassium and other elements and organic matter, trace elements, plant growth hormones and other active substances, i.e. vermicompost. Vermicompost can be used not only as a high-quality organic fertilizer, but also as a bio-pesticide, feed additives and other product development.

Innovative mode of poultry manure in vermiculture technology. Pre-treatment of poultry manure. In order to improve the suitability and safety of poultry manure, it needs to be pretreated in certain ways, such as adjusting the humidity, pH, carbon to nitrogen ratio, temperature, etc., in order to adapt to the needs of earthworms of different species and growth stages [Drózd D., Wystalska K., Malińska K., et al., 2020].

Mixing of poultry manure with other organic materials. This can increase the content of cellulose, lignin and other difficult-to-biodegrade substances in the substrate, prolonging the service life of the substrate, as well as increasing the number and activity of microorganisms in the substrate, promoting the digestion and absorption of earthworms [Mashur M., Bilad M. R., Hunaepi H., et al., 2021].

Application of poultry manure with other biological agents. This can enhance the biological activity and ecological balance in the substrate, accelerate the decomposition and stabilization of the substrate, and also improve the composition and proportion of organic and inorganic substances in the substrate, and improve the fertilizing effect of the substrate [Durán-Lara E F, Valderrama A, Marican A., 2020].

Resource utilization and recycling of poultry manure. Poultry manure in vermiculture technology can not only produce highly efficient organic fertilizer, but also other valuable by-products, such as earthworms, earthworm liquid, earthworm tea and so on. Moreover, poultry manure can form a closed loop system in vermiculture technology, i.e., organic fertilizers produced by poultry manure after vermiculture can be reapplied to poultry feeding or other agricultural production, thus realizing the recycling of poultry manure [Zhou Y., Xiao R., Klammsteiner T., et al., 2022].

Conclusion. Poultry manure in vermiculture technology is an innovative model of great significance and great potential, which can realize the efficient conversion and comprehensive utilization of poultry manure and provide new ideas and methods for agricultural production and environmental protection.