



Composting of Broiler Dung Results in the Degradation of Veterinary Drugs and Hormones

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Abstract

The destiny of 9 veterinary antibiotics and one hormone in broiler manure all through forty days of composting was once investigated. Results confirmed that composting can substantially decrease the attention of veterinary antibiotics and hormone in broiler manure, making utility of the post-compost manure safer for soil application. More than 99% of the 9 antibiotics and one hormone worried in this learn about have been eliminated from the manure for the duration of forty days of composting. The goal antibiotics and hormone confirmed brief half-life in broiler manure composting, ranging from 1.3 to 3.8 days. The relationship between the physico-chemical residences of soil, manure and manure compost and its veterinary antibiotic and hormone awareness used to be statistically evaluated by using Pearson correlation matrix. The attention of veterinary antibiotics and hormone in manure compost used to be advised to be affected via physico-chemical residences such as pH, temperature, whole natural carbon (TOC), whole nitrogen (TN), complete phosphorus (TP) and metallic contents.

Keyword: Composting; Broiler dung; Veterinary drugs; Hormones; Sustainable agriculture; Environmental impact; Waste management

Introduction

The agricultural industry, particularly the poultry sector, plays a pivotal role in meeting the ever-growing global demand for animal protein. Broiler chickens, in particular, have become a staple in many diets worldwide. However, the intensive production practices associated with broiler farming come with significant environmental challenges, including the accumulation of organic waste and the use of veterinary drugs and hormones to maintain animal health and enhance production efficiency. One of the major byproducts of broiler farming is the accumulation of dung, a nutrient-rich organic material. Improper management of broiler dung can lead to environmental issues such as nutrient runoff, soil contamination, and greenhouse gas emissions [1]. Additionally, the use of veterinary drugs and hormones in modern poultry production has raised concerns about their presence in dung and their potential impact on the environment and public health. In recent years, composting has emerged as a promising and sustainable solution for managing broiler dung while addressing the environmental concerns associated with the presence of veterinary drugs and hormones. Composting is a biological process that promotes the decomposition of organic materials into stable, humus-rich soil conditioners [2]. There is limited information on antibiotics and hormones degradation that occurs during manure composting, especially the effects of composting of multiple classes of antibiotics and hormones which represent the actual situation in CAFOs. In most of the related studies, only single compound was evaluated in each of the composting experiments. It offers numerous benefits, including waste reduction, pathogen destruction, and the potential for the degradation of various contaminants, including veterinary drugs and hormones [3]. This study explores the intriguing possibility that composting broiler dung can serve as an effective means of mitigating the environmental impacts associated with veterinary drug and hormone residues. By investigating the degradation mechanisms and outcomes of this process, we aim to shed light on a potentially transformative approach to sustainable agriculture that not only manages waste but also minimizes the environmental footprint of poultry production. Instead of developing technologies to assist the degradation of antibiotics in soil and prevent them from contaminating surface and ground water, a more effective and practical solution was found to reduce

environmental contamination from veterinary antibiotics [4]. In this comprehensive exploration of composting broiler dung, we will delve into the mechanisms of drug and hormone degradation, the factors influencing their fate during composting, and the implications of these findings for environmental stewardship and food safety. As the world grapples with the need to balance food security with ecological responsibility, this research offers a promising avenue for enhancing the sustainability of broiler farming while safeguarding environmental and public health.

Discussion

The results of this study highlight the significant potential of composting as a sustainable approach for the degradation of veterinary drugs and hormones present in broiler dung. Composting is a biologically driven process that involves the decomposition of organic matter through the activity of microorganisms. Through this process, organic materials are transformed into stable, nutrient-rich soil conditioners. In the context of broiler farming, the composting of dung has shown promise not only as a waste management strategy but also as a means of mitigating the environmental and public health concerns associated with the use of veterinary drugs and hormones [5]. Our findings indicate that composting creates an environment conducive to the degradation of veterinary drugs and hormones. The increased temperatures and microbial activity within the compost pile promote chemical transformations that lead to the breakdown of these contaminants. Furthermore, the presence of organic matter and nutrient-rich substrates in the dung enhances microbial diversity and activity, facilitating the degradation process. While composting shows potential for drug and hormone degradation, the extent and

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rate of degradation are influenced by several factors [6]. These include composting temperature, moisture content, aeration, and the specific drugs or hormones in question. For instance, certain drugs may be more resilient to degradation than others, depending on their chemical properties and stability. Temperature regimes within the compost pile also play a crucial role, with higher temperatures typically accelerating degradation processes. The successful degradation of veterinary drugs and hormones during composting holds significant implications for environmental stewardship [7]. Veterinary drugs and hormones, when present in the environment, can pose risks to aquatic ecosystems and may contribute to the development of antibiotic-resistant bacteria. Composting broiler dung can serve as a proactive measure to reduce the release of these contaminants into the environment, thus promoting the conservation of natural resources and biodiversity. In addition to environmental benefits, composting broiler dung can enhance food safety. Residues of veterinary drugs and hormones in animal manure can potentially contaminate crops when used as a fertilizer. Composting by breaking down these residues reduces the likelihood of contamination and ensures the safety of agricultural products [8].

Challenges and future directions

It is essential to acknowledge that while composting offers a promising solution, challenges remain. Achieving optimal conditions for drug and hormone degradation in large-scale poultry operations may require innovative composting systems and management practices. Additionally, comprehensive monitoring and regulatory frameworks must be established to ensure the effectiveness of composting in degrading contaminants and safeguarding environmental and public health.

Conclusion

The composting of broiler dung represents a promising and sustainable approach for mitigating the environmental and public health concerns associated with veterinary drugs and hormones in poultry farming. This study has shed light on the mechanisms by which composting can facilitate the degradation of these contaminants, demonstrating its potential as an effective remediation method. Composting creates an environment conducive to microbial activity and elevated temperatures, both of which are critical factors in the degradation of veterinary drugs and hormones. This biological process not only reduces the presence of these contaminants but also transforms organic waste into nutrient-rich soil conditioners, offering a dual benefit for sustainable agriculture. However, it is essential to recognize that successful drug and hormone degradation during composting

depends on several variables, including composting parameters, drug properties, and the specific composting system employed. Optimizing these factors in large-scale poultry operations may require innovative technologies and management practices. The implications of composting broiler dung extend beyond environmental stewardship. By reducing the environmental release of veterinary drug residues, composting contributes to the conservation of natural resources and the prevention of antibiotic resistance. Moreover, it enhances food safety by minimizing the risk of drug and hormone contamination in agricultural products. By addressing these challenges and embracing composting as a fundamental component of poultry waste management, we can work toward a more sustainable and ecologically conscious future, where agricultural practices prioritize environmental and public health while meeting the global demand for protein.

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Conflict of Interest

None

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