



## Efficient Management of Poultry Waste: A Comprehensive Guide

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### ABSTRACT

Poultry is one of the fastest-growing industries in the world. The ever-increasing demand for poultry meat and eggs across the globe is attributed to their high protein value. Since the last two decades, there have been multiple folds of growth in poultry production. Especially in countries like China, India, the United States, and Brazil, poultry production has increased astonishingly. With this growth, the amount of poultry waste has also increased significantly. Poultry excreta, feathers, bedding materials used on the floor, spilled feed materials, poultry carcasses, used medicines, etc. constitute poultry waste. If not managed properly, poultry waste will pollute water, air, and the environment. There will be outbreaks of several diseases if these poultry wastes are not utilised and managed properly. Modern techniques and technologies can utilise and manage poultry waste in a better way than the previous conventional methods. Anaerobic digestion can be used in beneficial ways, like producing biogas from poultry waste. This biogas production will reduce greenhouse gas emission levels. And anaerobic digestion can be used in manufacturing phosphorous-rich fertilisers, which will help the agriculture area. Biomass technologies can be used to utilise poultry waste for energy generation. The use of a better and proper method for disposing of the poultry carcasses is an important and critical measure in the management of poultry waste, as these carcasses can cause problems like disease outbreaks.

### Introduction

The poultry industry has experienced remarkable growth in recent years, driven by the increasing global demand for poultry meat and eggs, which are valued for their high protein content. However, this growth has also led to a significant increase in poultry waste, posing environmental and health risks if not

managed properly. In this comprehensive guide, we will explore modern techniques and technologies that can efficiently utilize and manage poultry waste, contributing to the betterment of the environment and mankind.

### Components of Poultry Waste

Poultry waste consists of various elements,

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including feathers, manure (faeces and urine excreta), litter material, and poultry offal and carcasses. Each component has its potential utility and requires specific management methods to minimize its impact on the environment.

### **Poultry Plumages (Feathers)**

Poultry feathers, also known as plumages, are composed of approximately 90-92% protein, 1-2% fat, and the remaining water. These feathers contain keratin, a scleroprotein that can withstand chemical, physical, and biological agents. Feathers are rich in amino acids such as serine, cystine, glutamine, and proline, with serine being the most predominant.

### **Potential Utility of Plumages**

Plumages can be utilized in various ways that benefit the environment and mankind. They can be processed to manufacture organic fertilizers due to their high protein content. Modern technologies enable the scientific processing of feathers, making them suitable as a source of protein in animal feeds. Additionally, feathers can be used to generate biofuel, thanks to their organic nature and composition. The tensile nature of feathers also makes them suitable as raw materials in the textile industry. Furthermore, poultry plumages can be utilized in the production of biodegradable plastic,

addressing the ecological damage caused by non-biodegradable plastics.

### **Manure (Faeces and Urine Excreta)**

Poultry manure consists of faecal waste and urine waste from poultry birds. Improper management of manure can result in water, air, and land pollution. Manure contains compounds capable of causing cytotoxicity and is rich in nitrogen. If not managed correctly, the nitrogen-rich waste can contaminate water bodies and pose health risks to humans.

### **Potential Utility of Manure**

Manure is a valuable resource for maintaining soil fertility due to its richness in nitrogen and other essential macro-elements. Its use enhances the soil's water-holding capacity and provides nutrients that are often absent in costly commercial fertilizers. However, it is crucial to utilize manure promptly as its nutritive value declines over time. Drying is an efficient method of processing manure, especially in countries like India with a suitable climate. Dried manure contains protein and essential elements like calcium, phosphorus, potassium, zinc, and iron. It can be added to animal rations as a nutrient source. Additionally, poultry faeces and urine can be utilized in the production of biofuels through anaerobic digestion, with the byproducts being used in cropland applications.

## Litter Material

Bedding materials used in poultry farms, including spilled feed, feathers, and faeces, constitute litter material. Commonly used bedding materials include straw, husks, and hulls from different crops. Litter material is rich in organic matter and can be utilized as a source of nutrients for growing crops. However, efficient management of litter waste involves recycling it for reuse in subsequent batches of poultry farming. Litter material can also be utilized in generating bioenergy through direct burning, incineration, and fluidized bed combustion. The carbon-rich byproduct, ash, can be used as fertilizer in croplands.

## Poultry Offal and Carcass

Poultry offal refers to the non-edible parts of poultry meat, such as the head, feet, claws, and viscera. These offal parts can be incorporated into poultry diets as a source of protein. Poultry carcasses, on the other hand, need to be disposed of properly when they cannot be utilized as meat. During disease outbreaks, appropriate measures like culling are taken to prevent the spread of pathogens. Dumping carcasses in open areas can lead to disease transmission through scavengers. Carcasses act as reservoirs of pathogens, posing animal health and public health risks if not disposed of effectively.

## Different Methods of Disposing of Poultry Carcasses

**Burial Method:** Mass disposal of poultry carcasses during disease outbreaks, such as Avian Influenza, is carried out through the burial method. Large pits are dug, and the carcasses are dumped inside. Care must be taken to select a site at least 92 meters away from water sources to prevent groundwater contamination. The carcasses should be buried at a depth of 91 cm to 244 cm below the surface.

**Burning:** Burning is a common method of poultry carcass disposal, but it raises concerns about air pollution. Carcasses affected by infectious diseases should not be burned to prevent the spread of pathogens. Incineration should take place on isolated, flat land far from human accessibility. However, burning carcasses may release carcinogens into the air, making it a less desirable method.

**Incineration:** Incineration involves complete burning of poultry carcasses at high temperatures. It is the safest method but can be costly for large-scale disposal. Incomplete burning can lead to air pollution, so careful execution is necessary. The resulting burned residue is harmless and can be used as a source of nutrients for crop growth. However, incineration may cause foul odors due to burning carcasses.

**Rendering:** Rendering involves the conversion of body tissues into usable materials. The carcass is cut into small pieces, blended, and cooked. Fat is melted, water is removed, and the protein portion is processed for use in feeds. Meat meals and bone meals are manufactured from the final products of carcass rendering.

**Composting:** Composting is the decomposition of carcasses using saprophytic bacteria at high temperatures to convert organic matter into nutrients. The final product can be used as an organic fertilizer, rich in essential macronutrients for crop growth.

### Conclusion

Efficient management of poultry waste is essential to mitigate its impact on the environment, animal health, and public health. By utilizing modern techniques and technologies, poultry waste can be transformed into valuable resources. Feathers can be used for organic fertilizers, animal feeds, biofuel, and even in the textile industry. Manure can enhance soil fertility and serve as a source of biofuel. Litter material can be recycled and used for bioenergy production. Proper disposal methods for poultry offal and carcasses, such as burial, burning, incineration, rendering, and composting, are crucial to prevent disease outbreaks and minimize environmental risks. By implementing these efficient waste management strategies, the poultry industry

can contribute to a sustainable and healthy future.

