

Litter Management in Poultry

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ABSTRACT

The poultry industry is one of the largest and fastest growing agro-based industries in the world. This can be attributed to an increasing demand for poultry meat and egg products. However, a major problem facing the poultry industry is the large-scale accumulation of wastes including manure and litter which may pose disposal and pollution problems unless environmentally and economically sustainable management technologies are evolved. Most of the litter produced by the poultry industry is currently applied to agricultural land as a source of nutrients and soil amendment. However environmental pollution, resulting from nutrient and contaminant leaching can occur when poultry litter is applied under soil and climatic conditions that do not favor agronomic utilization of the manure-borne nutrients. This review discusses basics of litter management and its recycling.

Keywords: Poultry litter; Litter management; Ammonia; Potassium

INTRODUCTION

Poultry litter is organic waste such as manure, spilled feed, feathers, and bedding materials provided by chickens and turkeys. This litter is high in plant nutrients including nitrogen, phosphorus, and potassium, but the total composition can vary depending on the type of poultry, the amount of litter used, and how the litter is collected and stored. Poultry litter has some uses which prevent it from having to be sent to the Landfill. First, it can be utilized as a source of fertilizer for plants due to its high amount of plant nutrients. Once it has been properly treated to eliminate foreign materials and toxins, it can be used as livestock and fish feed. Poultry litter may also be burned as a source of heat or energy and deposited in an anaerobic digester to be converted into biofuel since it contains less than 15% moisture. In many places, poultry farms are sited and intensively managed in the residential areas with little welfare improvement and major concern of poultry waste disposal. The average amount of poultry litter produced per bird per day was estimated to be 0.11 kg, resulting in millions of metric tons of poultry manure produced per year. Poultry farm waste is a public health threat as well as a possible cause of conflict between neighbors. Aside from the environmental implications, poultry waste has a significant impact on the health and productivity of poultry. Suitable poultry droppings and moist absorbents referred to as litter materials were later discovered. Traditional bird cages have recently been deemed unethical, traditional litter materials are seasonally available, wood-based litter materials are now being diverted for the manufacture of other wood products, and the use of poultry litter as fertilizer and livestock feed supplement

has increased, resulting in a rise in demand and price for litter materials. Adequate litter materials cannot be easily met by farmers and non-environmentally friendly alternative litter materials may be sought by farmers creating negative socio-economic impacts on poultry and the environment. Therefore, careful selection, adequate management and proper storage and utilization of poultry litter are here given due attention.

On any poultry farm, keeping the litter dry is an essential part of overall management. Litter conditions have an effect on bird efficiency, which in turn has an impact on grower and integrator profits. Dry litter helps regulate ammonia levels, encourages a stable flock environment, and decreases hock and footpad burns, as well as breast blisters, which can lead to condemnation. Ammonia levels in the home are often increased by caked litter. Negative effects of ammonia on broiler health, welfare, performance, and carcass quality have been well documented by numerous researchers [1-3]. Poultry are most susceptible to elevated ammonia levels at one to 21 days of age, which is the early brooding period [4]. Ammonia is also a problem since high levels over extended periods of time can have harmful effects on the atmosphere and human health. Because of the high cost of litter and the fact that its disposal is becoming more of an environmental concern, keeping it in good condition and preventing caking are crucial. In some areas, many growers still practice a traditional total cleanout once a year. This method results in broiler litter that usually tests approximately 60-60-50 (N-P-K) pounds per ton [5]. This litter is then used locally as fertilizer on pastures and hay meadows, or shipped out of the area for use as fertilizer elsewhere.

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Received: April 6, 2021, **Accepted:** April 20, 2021, **Published:** April 27, 2021

Citation: Anupoju R (2021) Litter Management in Poultry. *Poult Fish Wildl Sci.* 9:215.

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FACTORS EFFECTING

Ventilation

Is an important factor in moisture regulation in poultry houses because it allows for sufficient air circulation, which aids moisture evaporation. Reduced litter moisture will result in lower levels of free NH₃ and CO₂, which could lead to higher levels of air dust in poultry houses [6].

Temperature

It has a major impact on the clumping of litter materials into layers, a process known as caking. When a normal litter is squeezed, it can split quickly, but if the moisture content is high, it will stay moulded, and if the temperature is high, it will cause caking.

Water spillage

When using manual drinkers in poultry handled on a deep litter scheme, it is difficult, if not impossible, to prevent water spillage. Water lines with nipple drinking points will have some water spillage in semi-automated control systems, while water lines with nipple and cups will have limited water spillage.

Quantity of the litter material

If litter content is applied liberally to a desired thickness, the litter can absorb moisture enough, making birds more relaxed and allowing them to display some of their natural behaviors, thus improving bird health, efficiency, climate, and welfare [7].

LITTER MANAGEMENT

Although litter will function more efficiently on an earthen floor, a concrete floor is advised for a perfect disinfection at the end of each batch. About 3"-5" of litter should be put into the house initially and, as this breaks down, more should be added till a depth of about 8"-12" is reached. Before adding fresh litter material, remove the caked up and wet litter material. Rack the litter thoroughly to break the clumps with the help of the litter racker and allow it to dry. Sprinkle a mixture of wood ash and fertilizer grade superphosphate in the ratio of 4:1, at the ratio of 5 kg per 10 m² area, before racking the litter to prevent ammonia gas release from litter. Addition of slaked lime may be avoided that will increase the pH of the litter which in turn release more ammonia from the litter and also favors the growth of *E. coli*, the most common pathogen of poultry. At the beginning the litter contains only 12% moisture. If the moisture level exceeds 30% due to poor ventilation, too many birds, irregular stirring or damp floor, the litter will cease to function efficiently. Because the manure digesting bacteria can be active only within 30% moisture level of the litter. Sometime many birds will bear "balls" made of litter materials at their claw tips. Ball formation is a sign of bad litter management. Built-up litter has a very important role in providing warmth to the birds in winter. In winter the litter depth can be increased to 10"-12" while in summer it may be reduced to 2.5"-4".

RECYCLING OF NUTRIENTS IN DEEP LITTER SYSTEM

The dropping from chicken when mixed with litter synthesizes Riboflavin (Vitamin B2) and Vitamin B12 by the chemical and bacterial actions. The built-up litter also contains niacin, phosphorus, potassium, magnesium, sodium and calcium. Deep litter bird often pecks and eats a small quantity of litter material

which contains above nutrients. This phenomenon is known as recycling. Even if the poultry feed is slightly deficient in some of the nutrients, the deep litter birds will not show any deficiency symptoms due the recycling of nutrients. In cage rearing the recycling of nutrients is completely absent. So, all the nutrients including calcium, phosphorus and sodium must be balanced meticulously in poultry ration.

QUALITIES OF GOOD LITTER MATERIAL

It must absorb moisture from droppings quickly. It must release moisture and dries up rapidly. It must have least tendency to form cakes. It must be free from mould growth. It must be free from sharp objects and other objectionable materials. It must be non-toxic, inert and compressible. It should possess good insulating properties and protect chicks from extremes of climate. It must be cheap and locally available. It must be biodegradable, supply some nutrients to the birds and form a good quality manure later. It must have medium particle size, soft and light in weight. A hand full of litter material is gathered up and squeezed closely to assess its consistency. When the hand is open, good litter material splits up, and a litter material with more moisture forms a ball in the hand. The farm becomes dusty because there is so much dry litter content.

CONCLUSION

Increasingly, economic gains as a result of poor litter control and use are a matter of concern. The cost, supply, and consistency of litter content should all be considered when making a decision. The quest for the best storage conditions for poultry litter and the exact inclusion rate of poultry litter in plants and animals should proceed. The basic technology of feed compounding using poultry manure and its conversion to useful biofuel can be developed and transferred to farmers.

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