

Management of Poultry Waste

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Abstract— Disposing of poultry waste in India is one of the major tasks, as it is directly disposed free to atmosphere or buried directly. Direct burring the poultry waste may be a proper method of disposal of poultry waste but it has its own drawbacks such as the waste may be tackled by stray dogs, scavengers and other animals. Bin Composting is the ultimate solution to protect the waste from scavengers and best way to compost poultry waste. Compost is a rich source of nutrients with high organic matter content and use of compost can be beneficial to improve organic matter status. Physical and chemical properties of soil can be improved by using compost, which may ultimately increase crop yield. These important parameters are proper turning and oxygen, temperature, pH and moisture percentage of the compost heap. So the use of compost is the need of the time and beneficial to improve organic matter status. In this paper the management of poultry flesh (bin composting), poultry carcass (burring), egg shells and feathers is discussed.

Keywords: Poultry Waste, pH, Bin Composting, Carcass

I. INTRODUCTION

Poultry waste is generated in large amounts as a by-product of commercial poultry processing causing pollution load on the urban environment to unmanageable and alarming proportions. The existing poultry waste disposal is done directly in open areas almost all over the country under unsanitary conditions leading to pollution of water sources and spreading communicable diseases, foul smell and odors, the release of toxic metabolites, unaesthetic ambience, and eye sore etc[1][2][3].

Composting is a microbiological and non-polluting safe method for disposal and recycling of wastes by converting them into organic fertilizer. During composting, mixed microbial populations convert organic wastes into humus, which has significant value in agriculture. Anaerobic composting enhances nitrification processes and emits several green house gases to the atmosphere. It improves the physical characteristics of agricultural wastes making them easy to handle and use. During composting, various microorganisms promote biodegradation of toxic compounds and pollutants. It facilitates the recycling of humus and nutrients into the soil.[4][5]

II. LITERATURE SURVEY

Thomas Bass et al., (2012) mentioned that the manure can be composted in bunkers, piles or windrows. A bunker or large bin will minimize the area needed to compost, however passive aeration (natural airflow and convection currents) can be inhibited when compost is stacked up against solid sides. A bunker of slatted walls will help provide the natural airflow needed between turnings. A bunker or large bin type system is more feasible for smaller composting endeavors. Other systems such as forced aeration beds or rotary drums do exist,

though they are not covered in this publication. Composting of manure is a feasible practice for Montana animal feeding operations that may provide additional income or address other manure management concerns. On-site trial and error is necessary to establish composting at any location; however, the guidelines in this bulletin should provide a basis for getting started.[1]

Eldridge R. Collins. et al., (1998) conclude composting offers a convenient and environmentally acceptable method of disposal of normal poultry flock mortality. Careful attention to daily management will assure that all carcass tissue is exposed to the essential composting processes of heat and time. Disease and insect problems are minimal, and ground or surface water contamination as a direct result of composting is practically nil. The composting process stabilizes ingredients to a useful organic fertilizer that will not attract flies, rodents, or dogs. Table 1. Composition of dead poultry compost [2]

Analysis	Amount
Moisture, percent	46.10 +/- 2.19
Nitrogen, percent	2.20 +/- 0.19
Phosphorus (P ₂ O ₅), percent	3.27 +/- 0.23
Potash (K ₂ O), percent	2.39 +/- 0.13
Calcium, percent	1.33 +/- 0.15
Magnesium, percent	0.82 +/- 0.10
Sulfur, percent	0.40 +/- 0.02
Manganese, parts per million	122.00 +/- 18.00
Zinc, parts per million	245.00 +/- 32.00
Copper, parts per million	197.00 +/- 28.00

Table 1:

N Bharathy et al., (2012) mentioned that In this process, chicken feathers and cardboard bins can be formed into acoustic panels. The chicken feathers and cardboard are finely chopped and dipped with glue paste then melted and compacted to prepared sound absorbing sheets. From the results of these initial experiments it can be concluded that the composition of chicken feathers and cardboard, glue, and water can form acoustic panels so it can be recommended in advanced research. The conclusions are based on panel composition that produces panel form 22 x 22 cm with thickness 9 mm and 18 mm and panel diameter 10 cm with thickness 1,5 cm, 2,5 cm, and 5 cm.[3]

Gary A. Flory et al., (2002) mention that in-vessel composting offers poultry producers a variety of benefits: low operational costs, fast processing time, ability to process large breeder birds and an end product which can be sold or used. In-vessel composting also provides a viable option for producers who do not have a suitable site for incineration. Disadvantages include high purchase cost and the requirement for proper management. In-vessel composting may not be the ideal disposal solution for all producers, but it does represent an biosecure and environmentally viable alternative to rendering.[4]

D.Thyagarajan et al., (2013) stated that Poultry waste is one of the major pollutants if not properly disposed. Poultry feathers can be treated chemically or biologically with microbes to improve the nutritive value of feather wastes which can be used as animal feed. They can also be biologically converted into feed supplements, biodiesel, and biodegradable plastic and organic fertilizer. The offal's are utilized by various methods like rendering, incineration, burial, controlled land filling, composting and anaerobic digestion. Rendering produces meat-bone meal which may be used as animal feed or fertilizer. Composting reduces pathogens. The compost is used as soil conditioner or fertilizer. Poultry litter contains carbon, nitrogen, phosphorous, chlorine, calcium, magnesium, and sodium, manganese, ferrous, copper and arsenic. It is used as a very good source of fertilizer. Methane gas produced from poultry litter is converted into electricity using a patented technology. Altogether, poultry wastes can be effectively utilized if properly treated to reduce the ill effects and a range of value added products like fertilizer, biodiesel, animal feed, electricity, bone meal and biodegradable plastic can be produced.[5]

III. SUMMARY OF LITERATURE

Composting [1] of manure is a feasible practice for animal feeding operations that may provide additional income or address other manure management concerns. On-site trial and error is necessary to establish composting at any location. Compost will be highly variable in nutrient content depending upon the amount and composition of the manure and straw used, the age of the compost, and storage and handling. [2] Dead bird compost should equal, and probably exceed, fertilizer quality of most other composted materials.

The composting [3] indicated that, composting of slaughter waste combined with coir pith waste may be a hygienic and environmentally safe method of disposal of broiler slaughter house waste. In-vessel composting may not be the ideal disposal solution for all producers, but it does represent an biosecure and environmentally viable alternative to rendering.

Poultry litter contains [4] carbon, nitrogen, phosphorous, chlorine, calcium, magnesium, and sodium, manganese, ferrous, copper and arsenic. It is used as a very good source of fertilizer. Methane [5] gas produced from poultry litter is converted into electricity using a patented technology. Altogether, poultry wastes can be effectively utilized if properly treated to reduce the ill effects and a range of value added products like fertilizer, biodiesel, animal feed, electricity, bone meal and biodegradable plastic can be produced.

IV. CONCLUSION

As the composting of poultry waste (which includes decomposable intestine, unwanted body parts of poultry, egg shell and flesh) using bin is possible and more effective as it gives manure for farms. The other non-decomposable matter such as feathers can be further treated to make sound absorbing material. The bones and carcass of a chicken are the remains after the complete process which can be buried and the disintegration of it is left on nature.

REFERENCES

- [1] Willekens N Bharathy, R Sakthivadivu, K Sivakumar, V Ramesh Saravanakumar, "Disposal and utilization of broiler slaughter waste by composting", Veterinary College and Research Institute Namakkal, Tamil Nadu, India. *Vet. World*, 2012, Vol.5(6): 359-361.
- [2] Gary A. Flory, "Evaluation of In-Vessel Composting for Poultry Mortality" , Virginia Department of Environmental Quality,4411 Early Road,,P.O. Box 3000, Harrisonburg, VA 22801.
- [3] D.Thyagarajan, M.Barathi, R.Sakthivadivu , " Scope of Poultry Waste Utilization", Director of Distance Education, Senior Research Fellow, Assistant professor, TANUVAS e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 6, Issue 5 (Nov. - Dec. 2013), PP 29-35.
- [4] Thomas Bass, Livestock Environment Associate Specialist, MSU Extension; Julia Dafoe, Research Associate, Montana Agricultural Research Station; and Joel Schumacher, Extension Economics Associate Specialist "Manure Composting for Livestock & Poultry Production" Reviewed April 2017 812SA.
- [5] Eldridge R. Collins, Jr., Extension Agricultural Engineer., " Composting Dead Poultry", College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University, 2009, publication 424-037.