

Wealth from Poultry Waste: An Overview

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ABSTRACT

Poultry farming generates large quantities of waste from hatcheries, farms and processing plants creating environmental and public health concern when improperly managed. Poultry waste including hatchery waste, litter, feather and byproduct, contains valuable nutrients such as protein, fat and essential nutrients. Proper processing and recycling can convert this waste in to animal feed, organic fertilizers and renewable energy through biogas production. Such waste-valorization practices reduce pollution, recover valuable resources, and decrease dependence on synthetic fertilizers and conventional feed ingredients. Effective poultry waste management can contribute significantly to sustainable and economically efficient poultry production throughout the year.

INTRODUCTION:

The poultry industry is a highly efficient livestock sector, supplying a substantial share of global meat and egg demand to socio economic development. Despite their substantial socioeconomic contributions through egg and meat production and employment generation, poultry production systems, thereby passes significant risks to environmental sustainability, climate change, and human health due its large

quantities of poultry waste (Sakar *et al.*, 2009). Large quantities of nitrogen rich waste in the form of poultry litter and feather waste, comprise organic material, keratin, poultry waste can be used to yield beneficial products that could be used as alternative in many sectors by using a variety of developing technological processes. However, consideration the major production, serious environmental pollution and large amount of

utilization of poultry waste, usually dumping and blazing of poultry waste regularly practiced for treating poultry waste. Moreover, Hatchery waste and poultry by-product meal are rich in protein and fat, making them potential feed ingredients, while properly processed poultry manure can serve as an organic fertilizer. Anaerobic digestion of poultry litter offers an additional route for biogas production and waste management. Furthermore, chicken fat can be converted into biodiesel through transesterification, providing a potential renewable energy source. Thus, appropriate valorization of poultry waste can support feed production, nutrient recycling, renewable energy generation, and sustainable poultry production.

Types of poultry waste and their utilization

Poultry is a very efficient livestock species, converting feed to food and generates significant waste from hatching to slaughter, creating disposal challenges and environmental and health risks. Including, poultry litter waste (Broiler House Waste and Layer House Waste), hatchery waste, Slaughter house waste (Mata-Alvarez *et al.*, 2014; Brandelli, A *et al.*, 2015).

Poultry litter or manure waste

Poultry litter blend of manure, bedding (wood shavings, rice hulls), spilled feed, and feathers is the primary byproduct of broiler production. Approximately 1 kg of litter waste per bird per 47 days growing out cycle. Aerobic degradation of poultry manure takes 4-6 weeks to composting material. Poultry litter is an organic nutrient source, contains higher concentrations nitrogen, phosphorus, potassium and some others macronutrients, which enrich the soil productivity. In addition to that poultry litter is utilised in cattle and pig industry as alternative feed, ruminants are able to utilise the urea nitrogen (uric acid) in poultry manure. Furthermore, anerobic degradation of manure to produce biogas,

comprise 60% methane, 38% carbon dioxide and mixture of water vapour, ammonia and hydrogen sulphide, it can be used as a source of thermal energy to heat the chicken at the beginning of the batch (Oliveira *et al.* 2012). Similarly, poultry litter utilized as a source of vermicompost, in avoidance with environmental problem by converting Poultry waste to vermicompost is one of the best solutions to the problem.

Poultry feather waste

Feather waste is one more byproduct that is majorly produced by the poultry farm worldwide. A bird's feathers make up approximately 5% to 10% of its total body weight. Bird feathers are primarily composed of keratin a tough, though raw feather waste poses environmental pollution risks if mismanaged, thermal processing (high-pressure rendering, drying, and grinding) breaks down its rigid structure into digestible protein feather meal for ruminants and monogastric livestock. Additionally, processed keratin holds wide application across agriculture, textiles, biodiesel, cosmetics, and biodegradable plastics. Also, poultry feather waste is an affordable, slow-release source of nitrogen contains 12-15% nitrogen and functions as a potential organic fertilizer. In biodiesel production process feather meal is boiled in water at 70°C to extract its fat, extracted fat is then trans esterified to produce biodiesel, with a yield of about 7–11% on a dry-weight basis. As well as poultry feathers containing keratin, used to make biodegradable plastic, by treating the feathers with chemicals to join feathers molecule through polymerization and feathers material heated at 170°C and moulded into products like cups, plates and furniture.

Slaughter house waste

As an increasing industrial status of poultry other hand producing increasing amounts of organic solid by-products with poultry

slaughterhouses waste i.e. skin, bone, feathers, spoiled meat and their wastewater treatment yield waste such as screenings, fat from grease traps, settlings, excess activated sludge, and flotation tailings. Moreover, edible meat byproducts contain many essential nutrients, mostly used as medicinal purpose they contain special nutrients, such as amino acids, hormones, minerals, vitamins and fatty acids. By using rendering process, including dry and wet rendering at 133°C for a minimum of 20 min at 3 bars produces meat-bone-meal, which can be used in animal feed or as fertiliser or further processed via anaerobic digestion or composting. Composting is a common aerobic biological method to degrade organic material like, slaughterhouse wastes, grease trap residues, manure, litter, feathers by reducing pathogens and the resulting compost can be used as soil conditioner or fertiliser, However, wastes having high moisture with low fibre content need higher amounts of moisture-sorbing and structural support to compost well, it became an environmentally safe method of slaughter house waste management. Similarly, Bone meal (MBM) was widely recommended and used in animal nutrition as a protein source in place of proteinaceous feeds because of its content of available essential amino acids, minerals and vitamin B12. Moreover, have potential applications other than animal feed, use as a fuel or a phosphorus fertilizer. Most of the chicken legs and skin are wasted by the poultry producers or tanners due to lack of awareness and technology. The average area of a skin is around 60 cm² (0.065 sq. ft) neither consumed by the people nor converted into high value products. thus, it goes as waste, though chicken skins as a potential raw material for the leather industry.

Hatchery waste

Hatcheries expanding as the poultry sector is increasing apart from chicks, it produces large amount of waste such as solid comprises empty shells, infertile eggs, dead embryos; wet

including, late hatching, dead chickens, viscous liquid from eggs as well as decaying tissue. Furthermore, waste water comes from incubators, hatchers and chick handling areas, these, hatchery waste poses the risk of polluting environment unless it is disposed of safely. Conventionally, disposal of solid hatchery waste sent to land filling and composting, but sometimes utilizing rendering process and incineration to produce value added products. Egg shells are utilized in garden soil as fertilizer, mixed with seeds to offer aviary birds as feed and added in cement to increase its strength. Hatchery waste produce power generation source, by using incinerator system as a furnace to generate heat form solid and liquid waste to produce electricity. Similarly, produce alternative feed to animal from hatchery waste; dead embryos contain 36% CP, 27% ether extract, 17% ash, 10% calcium and 0.6% phosphorus. Some researchers studied that, eggs were mixed in a 1:1 ratio with formic and propionic acids for 8 weeks at room temperature, it became suitable source of ensiling such as fertile and dead embryos protein rich sources to livestock feed.

CONCLUSION

Poultry waste should not be viewed merely as a disposal problem but as a valuable resource. Through proper processing and waste-valueorization technologies, poultry litter, feathers, slaughterhouse by-products, and hatchery waste can be converted into animal feed, fertilizers, biogas, biodiesel, and other value-added products. Efficient utilization of these wastes can reduce pollution, recover valuable nutrients and energy, and improve the overall poultry farming more environmentally friendly, sustainable and profitable to the poultry industry.

REFERENCES

Brandelli, A.; Sala, L.; Kalil, S.J. Microbial enzymes for bioconversion of poultry

- waste into added-value products. *Food Res. Int.* 2015, 73, 3–12.
- Karuppannan, S.K.; Dowlath, M.J.H.; Raiyaan, G.I.D.; Rajadesingu, S.; Arunachalam, K.D. Application of poultry industry waste in producing value-added products—A review. Elsevier Inc.: Amsterdam, The Netherlands, 2020; pp. 91–121.
- Mata-Alvarez, J.; Dosta, J.; Romero-Güiza, M.; Fonoll, X.; Peces, M.; Astals, S. A critical review on anaerobic co-digestion achievements between 2010 and 2013. *Renew. Sustain. Energy Rev.* 2014, 36, 412–427.
- Oliveira, G., & Lindau, L. A. (2012). A framework for delivery scheduling in the poultry industry. *Journal of Scheduling*, 15(6), 757-772.