**Poultry litter and its effect on environment and soil health**

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The biggest and fastest growing industries in the world is the poultry industry due to which there is accumulation of poultry litter in large scale. Due to relatively low cholesterol content in poultry meat, there is constant increase in demand of poultry meat. As there is persistent increase in poultry population, there is rise in production of poultry wastes which is generated by intensive production. Every day nearly 6,000 tons of poultry litter is generated in India (Sujatha, 2010). If these wastes are not properly disposed, then it will have an adverse effect on the environment and health of the human beings. The litter produced by the poultry industry can be utilized in agricultural land as a source of nutrients and soil amendment but there are certain climatic conditions which will adversely affect the agronomic utilization of the manure-borne nutrients. The agriculturist must know the nature of the soil and composition of the poultry litter in terms of nutrient content and environmental contaminants, its value as a nutrient source, soil amendment, animal feed and fuel source so that cost-effective innovative technologies for improving its value can be formulated. Poultry wastes are rich in nitrogen (N), phosphorus (P) and potassium (K) and if managed correctly, land application is a viable way to recycle the nutrients in manure. The productivity, proﬁtability, and sustainability of the poultry industry largely depends on the formulation of best management practices to mitigate environmental consequences associated with air and water quality parameters that are impacted by land application. There are certain environmental problems which are related with the land application of manure by-products from intensive poultry operations which include leaching losses of N in sub-surface drainage and to ground water, contamination of surface water with soluble and particulate P, reduced air quality by emission of greenhouse gases and volatile organic compounds, and increased metals input. To reduce the environmental risks of manure land application and offsite contamination, land application guidelines should be developed that consider the total composition of the manure by-products rather than only one component, i.e., N and/or P concentration. Further, the concentration of trace elements in poultry litter and its by-products could be minimized by controlling the quality of raw feed materials and reducing mineral additives in poultry diet.

The air quality has become a major environmental concern of the poultry industry as it gives rise to dust, odours and bio-aerosols (e.g. microbes, endotoxins and mycotoxins suspended in air) generated at production, manure storage facilities and during land spreading of poultry litter. If uncontrolled decomposed manure is used then it produces odorous gases, including amines, amides, mercaptans, sulphides, and disulphides. These noxious gases can cause respiratory diseases in animals and humans. Further, greenhouse gases, such as carbon dioxide, methane and nitrous oxides are also released from manure handling and storage facilities, which are implicated in ozone depletion and global warming.

The Endocrine-disrupting compounds (EDCs) are other point of concern which may affect the environment adversely. These are the group of compounds which either synthesized or naturally present in the environment which have adverse effects in animals and humans. The Endocrine-disrupting compounds include several natural hormones which are excreted by the birds, and include pesticides, herbicides, plant oestrogens, and other compounds that disrupt endocrine systems. The EDCs mimic the functions of natural hormones thereby interfering the binding of hormones to their receptors and disrupting the endocrine functions. Broiler litter contains EDCs in the form of steroid hormones like 17β-oestradiol, oestrone, oestriol, and testosterone that persist in measurable concentrations.

Poultry litter contains large population of microbes which includes viruses, bacteria, fungi and protozoa. Among all these microbes, gram positive bacteria (i.e. Actinomycetes, Clostridia/Eubacteria, Bacilli/Lactobacilli) account for nearly 90% of the microbial diversity. Because of the presence of these microbes different enzymatic and metabolic processes take place within the litter environment. There are two major microbial groups which are of importance are nitrogen mineralizing microbes and pathogens. Due to mineralization of organic nitrogen in the poultry litter, namely uric acid and urea, ammonia volatilization takes place. Fungi, speciﬁcally Aspergillus spp., mineralize the predominant forms of organic nitrogen in poultry litter. Pathogens are other group of bacteria which are of much of importance to the poultry industry. Pathogen destruction may be required in some situations prior to land spreading which is a potential major source of pathogen introduction into the environment. The poultry litter is a reservoir for several zoonotic pathogens, including Escherichia coli, Salmonella spp., Campylobacter jejuni, Listeria monocytogenes, and Clostridium perfringens. The major route of contamination is through contact between the birds and the litter which acts as dominant source of pathogen introduction into the meat processing plant.

A layer bird generates litter of around 50 grams a day and the 3.5 crore layer birds in the district produce 1,600 tonne litter per day. whole country as nearly 6,000 tonne poultry litter is generated in India every day. It is benefiting the farmers as they get to earn around Rs 13 per layer bird in its lifetime from just its litter. It is actually 30% of the profit that a farmer earns through a layer bird in its lifetime of 1.5 years.

S Sujatha, ET Bureau May 31, 2010

Each chicken produces around 100 gm of slushy dropping daily.

Nidhi Nath Srinivas, ET Bureau Mar 17, 2013

Irrespective of dosage, an estimated 75 percent of antimicrobial agents administered to confined poultry may be excreted back into the environment (Addison, 1984).

major potential impacts of intensive livestock production on land and water resources: • eutrophication of surface waters, caused by the input of organic substances and nutrients either through wastewater from production, runoff or leakages from storage and handling facilities – affecting aquatic ecosystems and drinking water quality; • leaching of nitrate, and possible pathogen transfers to groundwater – affecting the quality of drinking water; • accumulation of nutrients and other elements in soil due to continuous application of excess quantities of manure; and • impacts of pollution on nutrient-sensitive ecosystems resulting in biodiversity losses.

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To,

I/c PME Cell,

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Sub.: Submission of popular article- reg.

Sir,

With reference to the subject cited above, I am submitting a popular article for publication in Poultry Fortune which is a monthly NRS monthly publication. A copy of the article is attached herewith.

This is for kind information please.

Thanking you,

Yours sincerely,

(R. K. Mahapatra)

P.S., DPR