

SCIENTIFIC APPROACHES OF HYGIENE IN POULTRY HOUSING : A REVIEW**Lakshya Jyoti Kakati^{1*} and Sudhanya Nath²**¹PhD Scholar, Dept. of LPM, College of Veterinary Science, AAU, Khanapara, Ghy-781022²PhD Scholar, Dept. of Animal Nutrition, WBUAFS, Belgachia, Kolkata-700037**REVIEW ARTICLE**

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Abstract: The livestock sector is an important subsector of Indian agriculture which plays a chief role in the Indian economy that gives a source of livelihood, draught power, manure, and energy. Over the last few decades, livestock production has been growing exponentially faster, making a significant contribution to the Indian economy and poverty alleviation. It has also been seen in the present time that unemployed rural youth and women are taking part in almost all types of livestock farm operations connected to feeding, breeding, management and health care of the livestock. However, there are a slew of issues that the livestock farmers are facing in starting their business venture such as, high mortality due to epidemic/pandemic or faulty practices, leading to economic loss. There is a need of introducing the concept of different scientific approaches which will further help our farmers to run a healthy farm business. This article will guide you through the different scientific hygiene methodologies and the scientific explanations behind it.

Keywords: Livestock, Feeding, Management, Faulty practices, Hygiene**INTRODUCTION**

Livestock are vulnerable to the deluge of invasive pathogens in their shelter and the area surrounding their sheds, pens, parlors, etc. An unhealthy environment is making way for many disease-causing agents such as bacteria, virus, fungi and parasites which are widely distributed in the environment. Stagnant manure, water in farm demesne and animal houses are favorable sites for blooming of mosquitoes which can transmit a variety of diseases to both animals and humans^[3].

The most likely form for disease-causing microbes to spread amongst farm animals is through the use of infected equipment or human contact with contaminated clothing and footwear. Disease-causing viruses and bacteria can be transmitted from one animal to another on transporting equipment, trucks, tractors, and other farm equipment. Humans and animals are important carriers of disease-causing microbes. Microbes that cause disease have been found on human clothing, shoes, skin, and hair^[8]. As a result, farmers in many developed nations adopt shower in and shower out protocols as part of their biosecurity measures. Disease-carrying animals include dogs, cats, mice, rats, and free-flying birds, as well as insects like flies, beetles, and mosquitoes. Another, but less perilous, mode of transmission is via air. The following steps are a summary of

common biosecurity precautions that producers can implement on their farms^[6].

1. Footbaths:

A footbath is a fairly simple kind of biosecurity that has the advantage of limiting pathogen transmission and spread through mechanical means on the farm. Footbaths should be capable of killing harmful organisms that can persist in the dirt entrapped at the bottom of personnel footwear for days or even weeks. One of the additional severe biosecurity threats is the spread of microbes by humans. Curtailment of undesired human traffic is the most significant aspect of an effective program. Pastured livestock producers have big chances to disease agents because their management practices are specifically designed to allow their animals the outdoor access. Introducing a footbath station on a pastured poultry farm could be an economical biosecurity measure. Once it is known how many disease-causing organisms travel onto and around farms, many flock owners consider the economic value of a footbath versus the cost of replacing an entire flock. The minimal cost and maintenance of a footbath station needs apt location. Teaching visitors and caregivers having known how to use the footbath allows farm owners to let more than one person to care for the flock without bothering footwear cleanliness. Wearing dedicated footwear is the best biosecurity

measure by using a dedicated pair of boots or shoes, flock owners avoid microbes on their regular footwear from coming into contact with their flock/hard^[5]. The standard procedure for using a footbath is as follows:

- Remove all debris (i.e. sticks, mud, leaves) before touching the footbath. Using the hose will aid in removal of debris.
- Keep the first shoe into the footbath. Make sure the entire tread, or bottom of the shoe, is immersed. Vigorously scrub the tread on the Astroturf mat on the bottom of the footbath.
- Sink the long-handled brush into the disinfectant bath and then scrub along the sides and top of the shoe.
- Place the first shoe on the other side of the footbath and place the second one into the footbath.
- Repeat steps 2 and three with the second shoe. Leave the disinfectant on the footwear after using the footbath. Proceed to your destination.

Disinfectants: The chosen disinfectant should be long lasting and able to fight organic material that is tracked through the footbath. In India, KMnO₄ or potassium permanganate is utilized as disinfectant in foot baths along with formaldehyde to fumigate farm premises. Here are the some of the commonly used disinfectants^[4]:

- Quaternary ammonium compound
- Bleach (Sodium hypochlorite)
- Potassium peroxy monosulfate
- Alcohol (usually in hand sanitizer)
- Chlorhexidine
- Phenolic disinfectants

Deactivating agents:

- UV radiation
- Pasteurization
- Flushing and water disinfectors

Choosing the Right Disinfectant based on:

- Cost
- Type of disease agent/s to be destroyed
- Quantity of contamination by organic matters such as: blood and manure, droppings left in the poultry house
- Active ingredient and the concentration.

Techniques of disinfectant application:

i). Mopping: The use of a rag or paper towel to mop or wipe on disinfectant is often less effective than spraying. However, this may be the only available option at times.

ii). Dry cleaning: Sweep or blow dust and other loose dirt onto the floor from ceilings, light fixtures, walls, freshly born boxes, fans, air inlets, and other surfaces. Take out all of the feed from the feeders. Scrape the manure off the perches and collect the dust. The best way to remove dry dirt from the floor is using a small coop, wet-dry shop vacuum.

iii). Wet cleaning: Wet cleaning consists of three steps: soaking, washing, and rinsing. Warm water is more efficacious.

iv). Spraying: When disinfectant is sprayed, it is not affected by organic material as it would be in a mop bucket. It is also faster than using a mop bucket, and commercial sprayers may be programmed to deliver the exact dilution automatically. Hand-held spray bottles are less competent than hose-end or high-pressure sprayers at coating the area to be cleaned.

v). Fumigation: Formaldehyde has been utilized as an efficient animal shelter fumigant over several years. Prior to implementing any cleanliness scheme, this chemical's human safety and legal use should be taken into consideration. The physical environment is crucial to the success of fumigation, and these are the points to remember^[1]:

- Elevate the relative humidity to 70-80%
- Maintain a temperature of at least 21°F (70°C) in the animal housing, as formaldehyde gas loses its effectiveness below this temperature.
- After fumigation, the house must be sealed and allowed to cool for 24 hours to promote uniform condensation.

Precautions to be taken by the handler:

- Wear a respirator as the gas is toxic.
- Wear a pair of gloves during handling to avoid irritation.
- Most importantly, do not add KMnO₄ to formalin; instead, incorporate formalin in KMnO₄ to avoid explosion.**

2. Minimizing Visitors in the Farm:

One of the most important dangers to biosecurity is the spread of microorganisms by humans. A sound program includes reducing needless staff in farm. Growers should limit visitation and ensure that everyone who comes to the farm has a valid purpose to be there. Visitors should be provided with protective clothing such as boots, coveralls, and headgear by the grower. Friends, neighbors, family, as well as equipment and utility service people, fit into this category. Visitors should never be let into a poultry house without prior permission. In a poultry house, mobility should always flow from younger to older birds. Keeping visitor records is one of the most

appropriate approaches. If an issue emerges, records will aid in the prevention of further flock diseases. Growers may place signs at the farm's entrance restricting access to the farm and its facilities. Poultry farmers work to enlighten members of the local community about the perils to their flocks and the necessity of limiting traffic on their farms. The importance of biosecurity measures should be communicated through an article in the local newspaper/ leaflet/ brochures/ posters. This can help to educate people about the solemnity of this issue.

3. Limiting Visits to Other Poultry Farms:

Poultry farmers should avoid visiting other poultry enterprises unless it is absolutely necessary. Growers should take extra care while visiting another farm, such as having a shower and changing attire before arriving, and washing their vehicle prior to entering a farm. Growers must use safety gear such as boots, coveralls, and helmets, as well as clean and disinfect all clothing and equipment before taking a leave.

4. Avoiding Other Animals into Poultry Sheds:

Poultry disease-causing pathogens can be carried by animals. So pets should not be welcomed in growers' dwellings. To keep wild birds out, poultry houses should be kept as closed as possible.

5. Practicing Rodent and Pest Control Programs:

Microbes can be carried and transferred by rats, mice, and insects. Growers should communicate with their poultry company and implement appropriate rodent and pest control strategies. Eradicating or minimizing the risk of developing an illness lowers the risk of contracting a disease.

6. Avoiding Contact with Non-Commercial Poultry or Wild Birds:

Backyard flocks, fanciers, fairs, poultry exhibitions, and markets are the types of non-commercial sources of poultry that poultry breeders should avoid. These birds are rarely fully vaccinated and exposed to a variety of species and flocks. Staff members should not be permitted to retain their own poultry, and neighbors with backyard flocks should be made aware of the significance of reporting unwell or diseased birds to a diagnostic laboratory. Ducks, geese, and turkeys should also be avoided by growers. Growers with agricultural ponds should be conscious of the risks of wild bird droppings being carried around the ponds. Avian influenza virus, as well as, a variety of other poultry diseases, is known to be spread by wild birds.

7. Daily Inspection of Flocks:

Flocks should be inspected regularly by the handlers. Daily death records should be maintained and disposed of in a timely

and appropriate manner. The risk of disease propagation is increased by stockpiling mortality and allowing carcasses to degrade before disposal. Handlers should immediately notify their farm management if there is an increase in mortality or indicators of health concerns. It is critical to diagnose the condition quickly in order to save healthy flocks. To ensure good flock health, handlers should administer vaccinations, drugs, or drug treatments on a timely basis. Reporting health issues on a farm in a reasonable timeframe will assist to prevent more infections and reduce losses to both the handler and the firm.

8. Maintaining Sound Environment in Farm and its Surroundings:

Pathogens can be controlled by keeping litter relatively dry (20-30%) and ensuring proper ventilation. Wet circumstances combined with warm temperatures provide an ideal ambience for the growth of the majority of disease-causing organisms. Clean air entering and leaving the house, dilutes and eliminates microbial populations, which helps to minimize microorganisms. Birds' respiratory tract can get irritated as a due to poor ventilation, making them more susceptible to bacterial and viral diseases. To keep rodent and insect populations under control, grass and weeds, discarded equipment, and waste from around poultry houses should be removed. Feed spills should be cleaned up on a regular basis and should not be left to collect for longer durations because it will entice birds, rats, mice, and insects.

9. Recognizing Disease Symptoms:

Early detection of contagious diseases can significantly limit the disease's impact and spread to other flocks. The possibility of disease is associated with the following clinical signs:

- Loss in appetite
- Decrease in egg production
- Soft-shelled eggs or misshapen eggs
- Swelling of head, eyes, comb, wattles and hocks
- Purple discoloration of wattles, combs and legs
- Nasal discharge
- Coughing, wheezing and sneezing
- Lack of coordination in mobility
- Diarrhea
- Sudden or excessive mortality without clinical signs

Poultry farmers should consult a veterinarian immediately after observing any symptoms of the disease.

10. Animal Feed Hygiene:

All feed enterprises who manufacture, use, or market animal feed are subject to certain rules and regulations. The feed hygiene laws establish safety and traceability measures for animal feed. The following are the requirements:

- Registration of all feed businesses
- Hygiene provisions to prevent feed contamination and spoilage, as well as to keep equipment clean.
- Maintaining records
- Fair practice

Operators of feed businesses must adhere to community legislation, applicable national law, best practices, and particular hygiene criteria.

11. Buildings and Feeding Equipment:

- Cleanliness of livestock buildings must be planned.
- To avoid contamination, the animal production unit and feeding equipment must be cleaned completely on a regular schedule.
- Cleaning and disinfecting chemicals must be used according to instructions and kept separate from feed and feeding locations.
- A pest management system must be implemented to prevent pests from gaining access to feed and bedding materials.
- Manure, waste material, and other possible sources of feed contamination must be removed from buildings and feeding equipment.
- Feed and bedding materials must be replaced on a consistent basis to avoid mouldiness^[2].

Conclusion:

In the commercial poultry production setup, protecting poultry flocks against microbial infection is crucial. An incredibly hazardous, infectious disease-causing organism being introduced into poultry flocks could have tremendous effects on the economy. Regional engagement can enhance the efficacy of a biosecurity program. Though any level of biosecurity is beneficial, the program as a whole will be more effective if all poultry producers in a given area adopt best management methods. Executing sound biosecurity protocols on a daily basis will definitely assist to lessen the risk of developing and spreading a disease^[7].

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