

POULTRY HOUSE MANagements TO REDUCE AMMONIA EMISSION

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Abstract: The chickens have no storage mechanisms for amino acids consumed beyond the requirement for protein synthesis, so the excess amino acids are deaminated and the derived nitrogen is excreted in the urine mainly as uric acid (80%), ammonia (10%) and urea (5%). The in modern poultry production systems contain a large variety of air pollutants, such as ammonia and carbon dioxide, dust and micro organism. Among that ammonia creates serious problem for the poultry farm and environment. Ammonia can negatively affect the flock performance and can create health problems for those who work in poultry house. Increased levels of ammonia have an impact on feed and body weight gain.

Keywords: Ammonia, Poultry, Production, Emission, Toxicity.

Introduction

Ammonia is colourless, water soluble, alkaline and highly irritant gas. It is of two types: Environmental ammonia and Intestinal ammonia.

Environmental ammonia: It is a natural by product of the chemical reaction between manure in the litter and moisture. Microbial degradation of uric acid in the litter is the primary source of ammonia formation by the *bacillus pasteurii* urocolytic bacteria. The formation ammonia continues with the microbial break down of manure under both aerobic and anaerobic conditions .the factors that contribute to the formation of ammonia include warm temperature, moisture, pH and organic matters.

Intestinal ammonia: It is the by product of the urea by the bacterial enzyme urease.when there is a high intestinal ammonia concentration ,the bloodstream's pH is altered, as well as the blood's capacity to transport oxygen leading to characteristics of the ascites syndrome.

Effects on bird's health

Higher concentration of ammonia causes health problems to the bird. That includes,

- Birds at high densities may be more susceptible to contact dermatitis.

- High incidence of contact dermatitis in foot, hock and breast burns that can be a predisposing factor for bacterial growth.
- Ammonia is a irritant which readily impacts the eyes and respiratory tract of poultry increasing their susceptibility towards respiratory infections. Because it destroys three primary mechanism which are the ciliate epithelium, mucous secretion and the alveolar macrophages.
- Foot pad dermatitis is suspected to interfere with mating efficiency. Fertility of breeders reduced up to 50%.
- Trachea and lung lesions which are associated with fluid accumulation and low blood oxygen rendering the birds more susceptible to bacterial infection such as E.coli.
- Exposure to 50 ppm results in kerato conjunctivitis.
- Ascites
- Gastro intestinal irritation.
- Exposure to 100 ppm leads to increased chick mortality.

Effect on human health

People living nearby poultry house or operations have an high levels of tension, depression, anger and fatigue. Higher incidence of headaches, running nose, sore throat, excessive coughing, diarrhoea and burning eyes.

NUTRITIONAL MANAGEMENT

Protein diet

Increase of 1% crude protein in diet results in a 3% increase in water intake and 10% increase in nitrogen excretion. Final product of protein synthesis is uric acid that gives four molecules of ammonia. Diets with lower crude protein contents are energetic advantage for poultry and it reduces the ammonia level up to 31% (Liang et al., 2003).

Phytogenic feed additives

Supplementation with the phytogenic components that have various effects on the bird's health. As a natural digestibility enhancer the phytogenic flavour stimulates the internal secretions of enzymes and bile acids and enhances the nutrient absorption. It reduces the ammonia content in the stall air by the process of reduction in the diet specification and nutrient utilisation. For an example *yucca schidigera* plant extract is used a feed additive in a poultry industries. It contains two important biochemical components and those are saponins and glycocomponents. Saponins plays a role in nutrient absorption through intestinal walls and because of being tensioactive they allow for better nutrient absorption by the

animals. Glyco components highly thermo stable and its bind with ammonia and convert into non-toxic nitrogenous compound.

LITTER MANAGEMENT

- Litter moisture level increase from 30% to 40% that leads to increasing ammonia production in the litter become dissolved in to the litter moisture preventing the ammonia more from being released as gas in to the air. If the litter starts to dry the ammonia will be released in to the air. So the litter moisture level should be kept around 20-25%.
- Adding fresh litter has an immediate effect on ammonia production because it forms a dry, physical barrier which prevents ammonia release into the air.
- An about 10 cm deep litter base will also encourage water to drain away from the litter surface and help keep the ammonia trapped in the litter pack.
- Dropping the barn air temperature below 18°C will cause a noticeable decline in the growth of ammonia producing bacteria and this decline will continue if temperature is reduced even more.
- The litter may need to be tilled twice a week to avoid releasing large quantities of ammonia each time the litter is turned.
- Remove cake with a house keeping machine between flocks.
- Application of bacillus based microbial additives and in litter material which decreases Gram Negative bacterial population helps in nitrogen retention and reduced ammonia production.
- Application of ferric sulphate in litter material leads to reduction in ammonia level but it does not interfere with body weight gain (Moore P., 2008)

OTHER MANAGEMENT

- Maintain adequate ventilation, with high enough static pressure to get good air mixing. Humidity levels must be maintained below 70% to prevent caking.
- Use nipple drinkers, check and manage water systems to avoid leaks and spills that would wet litter. Remove wet litter from the house if major spills occur.
- To monitor the ammonia level in the poultry house the air samples must be taken at the bird's level.
- Rearing density should be maintained according to the ventilation capacity of the building.
- Keep a good ventilation rate in winter.
- Providing a good tree belt around the poultry house.

Conclusion

Control of ammonia in poultry house is essential that it protects both the bird and the human health. It is vital that it prevents much of the economic losses which occur due to ammonia emission. Hence, measures should be taken to control ammonia emission in poultry houses.

References

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