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Litter Management Strategies in Relation to Ammonia Emissions from Floor-Raised Birds

Eileen Wheeler¹, Kenneth Casey²
Richard Gates³, Hongwei Xin⁴, Yi Liang⁵, Patrick Topper¹
Pennsylvania State University¹, Texas AgriLife Research, Texas A&M System²
University of Kentucky³,
Iowa State University⁴, University of Arkansas⁵

Species: Poultry (Broiler & Turkey)
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Technology Category: Management and
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Air Mitigated Pollutants: Ammonia

Point of Contact:
Eileen Fabian Wheeler
Pennsylvania State University
Agricultural & Biological Engineering
228 Agricultural Engineering Building
University Park PA 16870
USA
814-865-3552
efw2@psu.edu

System Summary:

Managing floor-raised poultry offers options for providing a suitable environment for the bird productivity and an opportunity to reduce environmental pollution. Reduction of aerial ammonia (NH₃) concentration within the poultry house will benefit bird health for improved production and reduce emissions from the building. Three management options are discussed: 1. new bedding every flock; 2. built-up litter; 3. built-up litter with acidifying product.

Indoor ammonia level and emissions are most improved with use of new litter every flock. Adoption of this practice is very limited in the USA. Built-up litter is most common in the USA. Acidifying treatments are applied to built-up litter in an attempt to reduce litter pH below 7 to overcome the substantial ammonia volatilization

Acid treatments have offered variable results under field conditions in reducing in-house aerial ammonia levels and associated emissions. Variable results are due, in part, to reduced ventilation rates to lower supplemental heat expenditures after application of acid treatment. Reduced ventilation fresh air exchange results in increased house humidity and ammonia concentration within the building. Attention to litter pH and aerial humidity after application of acid-treatment should improve results for more consistent aerial environment improvement.

Applicability and Mitigating Mechanism:

- Reducing ammonia during brooding improves bird productivity and lowers emissions to atmosphere.
- Litter pH below 7 inhibits ammonia production and volatilization
- New bedding every flock provides ~0 ppm ammonia in-house and NH₃ emission for the first week

Limitations:

- Acid effectiveness lasts two to three weeks with re-application impractical
- Affordable sources of suitable new bedding not available in all regions
- Ammonia held in litter by acid is released later in flock for limited overall flock emissions reduction

Cost:

Labor cost of implementing new litter every flock is close to the labor (16 hours) for managing built-up litter. Cost of new bedding material every flock may be equal to, but usually greater than acid treatment between flocks. New litter benefit reported here does not account for the savings from reduced energy use during the brooding period (lower ventilation rates possible) and increased bird placement numbers with the improved environment versus flocks raised on acid-treated built-up litter.