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Effectiveness of Litter Treatments for Reduction of Ammonia Volatilization in Broiler Production

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Species: Poultry (Broiler)
Use Area: Animal Housing
Technology Category: Chemical Amendment
Air Mitigated Pollutants: Ammonia

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System Summary:

Recently, poultry producers have come under increased regulatory scrutiny regarding the amount and type of emissions exhausted from poultry housing during the course of normal house ventilation. Ammonia and dust have both been discussed as potential problems with poultry house exhausts. Using a litter treatment will have a direct effect on improving litter management, nutrient enrichment, and reducing ammonia volatilization from poultry house litter. Recent research completed in the Department of Poultry Science at Auburn University has focused on a series of experiments to evaluate six litter treatment strategies in reducing ammonia volatilization during broiler production.

Poultry Litter Treatment (PLTTM), granulated aluminum sulfate (Al-ClearTM) (GA), Poultry GuardTM (PG), and Hydrated Lime (HL), were applied at 24.4, 48.8, or 73.2 kg/100 m² (50, 100, or 150 lbs/1000ft²); liquid aluminum sulfate (A-7TM) (LA), was applied at 81.4, 162.8, or 227.1 L/100m² (20, 40, or 60 gals/1000ft²); and concentrated sulfuric acid (98% H₂SO₄) (SA) was applied at 9.75, 19.50, or 29.26 kg/100m² (20, 40, or 60 lbs/1000ft²) on new pine sawdust bedding and tested against a non-treated control (CON). With the exception of lime, all agents were designed to reduce litter pH to control ammonia. Results show that increased levels of litter treatments can extend their ammonia control usefulness and most worked well with the exception of lime. In these experiments, ammonia levels were often controlled at the intermediate and highest level of application for 35 to 42 days. If more strict environmental regulations are put into effect regarding ammonia emissions from poultry facilities, litter treatments may become an important technique to allow producers to remain compliant.

Applicability and Mitigating Mechanism:

- Reductions in litter pH will effectively reduce ammonia volatilization
- Acidifying treatments performed longer at higher levels of application
- Lime application failed to produce any favorable results
- Litter treatment usage is an important management tool for suppressing ammonia emissions and contributing to bird health

Limitations:

- Most litter treatments lose their effectiveness within 21 days when applied at low levels, but this can be extended if higher rates of application are employed
- Acidifying litter treatments can be corrosive to handle
- Costs of litter treatment are variable and attributed to distribution and marketing logistics

Cost:

Delivered cost of a litter treatment is highly dependent upon transportation costs and competitive pricing offered among manufacturers and distributors. Also, costs for transporting, handling, and applying dry versus liquid products should also be considered. Due to the competitive nature of pricing among litter treatment products it is difficult to provide a reasonable and consolidated cost for the treatments tested in these experiments. However, it can be concluded that low levels only provide ammonia control during the brooding period (maybe for 3 weeks); whereas higher application rates will extend the effective period for ammonia control, but the producer must balance the cost of applying a higher level of litter treatment with benefits associated with longer ammonia control.