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Ozone Application for Mitigating Ammonia Emission from Poultry Manure: Field and Laboratory Evaluations

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Species: Poultry

Use Area: Animal Housing

Technology Category: Other Treatment

Air Mitigated Pollutants: Ammonia

System Summary:

House ozonation is a controversial technique that has been used in the literature for broiler house cleaning and in-house air contaminant control. Field evaluation in this reported study suggests that ozonation cannot effectively remove ammonia from air inside the broiler houses. Moreover, it caused a negative effect on feed conversion in two of the five flocks evaluated and in the average of five flocks. The laboratory study on this technique indicates that ozone does not react with NH₃ in days even at ozone concentration above 1 ppm, which was more than 10 times higher than the health safety limit set by OSHA. The laboratory tests also show significantly higher level of fine/ultra fine particles / aerosols in the ozone treated environment as compared with the environment without ozone treatment. The direct application of ozonation technique for ammonia mitigation in the animal facilities is not recommended.

Applicability and Mitigating Mechanism:

- Ammonia may be oxidized by ozone.
- The direct application of ozonation technique for ammonia mitigation in the animal facilities is not recommended.

Limitations:

- In-house ozonation at the threshold limits for public health standards is not effective at mitigating ammonia concentration inside the broiler houses
- Ozone treatment had positive effects on broiler performance in two broiler flocks and adverse impact in two flocks
- Higher level of fine / ultra fine particles / aerosols was observed in ozone treated environment.

Cost:

In-house ozone application caused a negative effect on feed conversion in two of the five flocks evaluated and in the average of five flocks. After 5 flocks the ozonation treatment resulted in an economical loss of \$345. Taking in consideration that installation costs are close to \$20,000 for two houses, it is very unlikely that the use of ozonation is economically feasible to be used in the poultry industry