

Ammonia Emission Reduction BMPs

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BMP Forum



Ammonia Emission Reduction

BMPs

- In-house Litter Treatment (alum)
- Exhaust Biofilter
- Permeable Plastic Lagoon Covers

Applicable NRCS codes

- Atmospheric Resource Quality Management (370) - A combination of treatments to manage resources that maintain or improve atmospheric quality.
 - Report actual technique

Litter Treatment (alum)

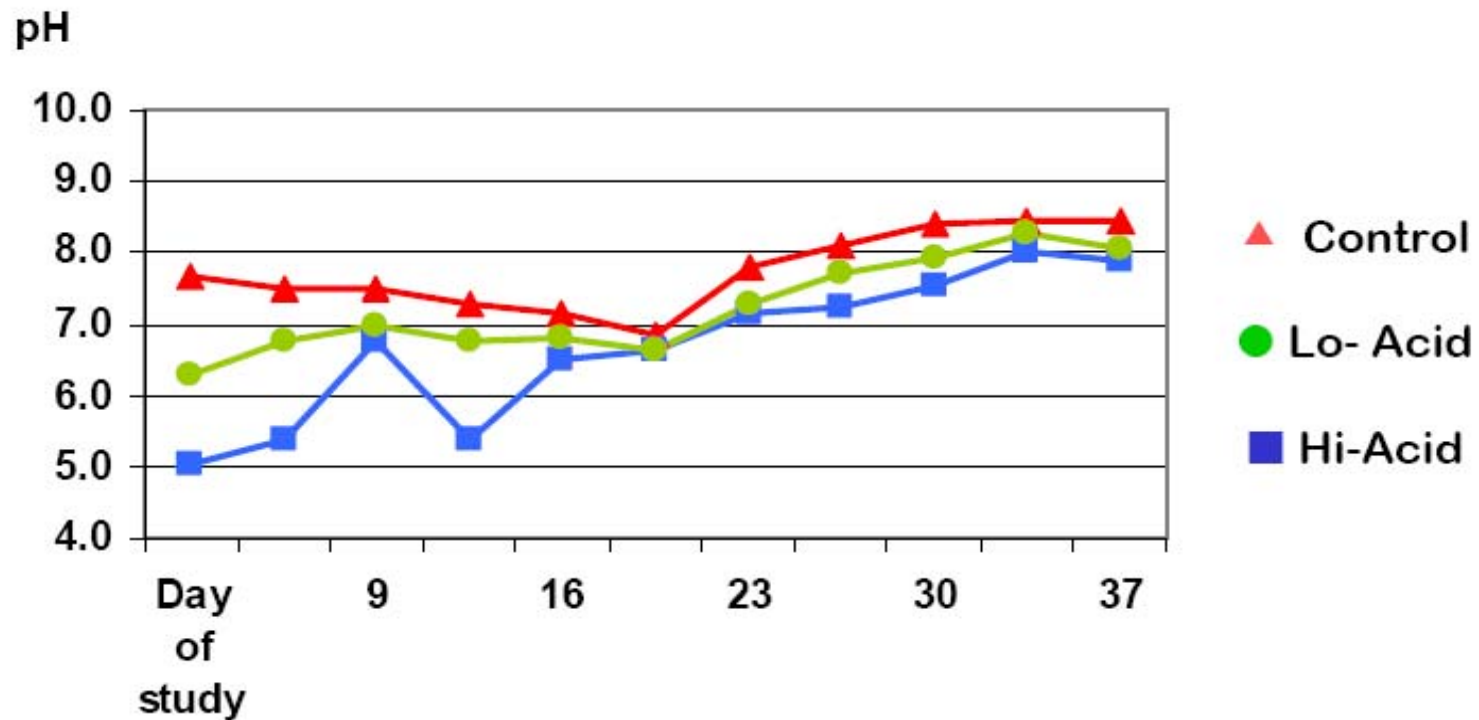
- A surface application of an acidifier, alum, to poultry litter to acidify poultry litter and maintain ammonia in the non-volatile ionized form (ammonium).
- Applies to poultry operations
- Rate of 250lbs/1000 sq feet
- Amendments for treatment of agricultural waste (591)
- 50% Ammonia Reduction



Alum: pH over time

- Rate of ammonia emissions rising exponentially over flock life
- Timeframe not proportional to the scale when the majority of ammonia emitted
- Future Research Needs:
 - Account for entire flock lives' emissions, how much total ammonia loss occurs in the last week of flock life?
 - When birds are removed from the house and air is circulated to ventilate the house, how much ammonia is lost between flocks?
 - Time release properties for the litter treatment need to be investigated (longevity)

Figure Two. Litter pH Over Time



Est. NH3 Emissions Flock 1

(the two lines are likely uncertainties in estimate)

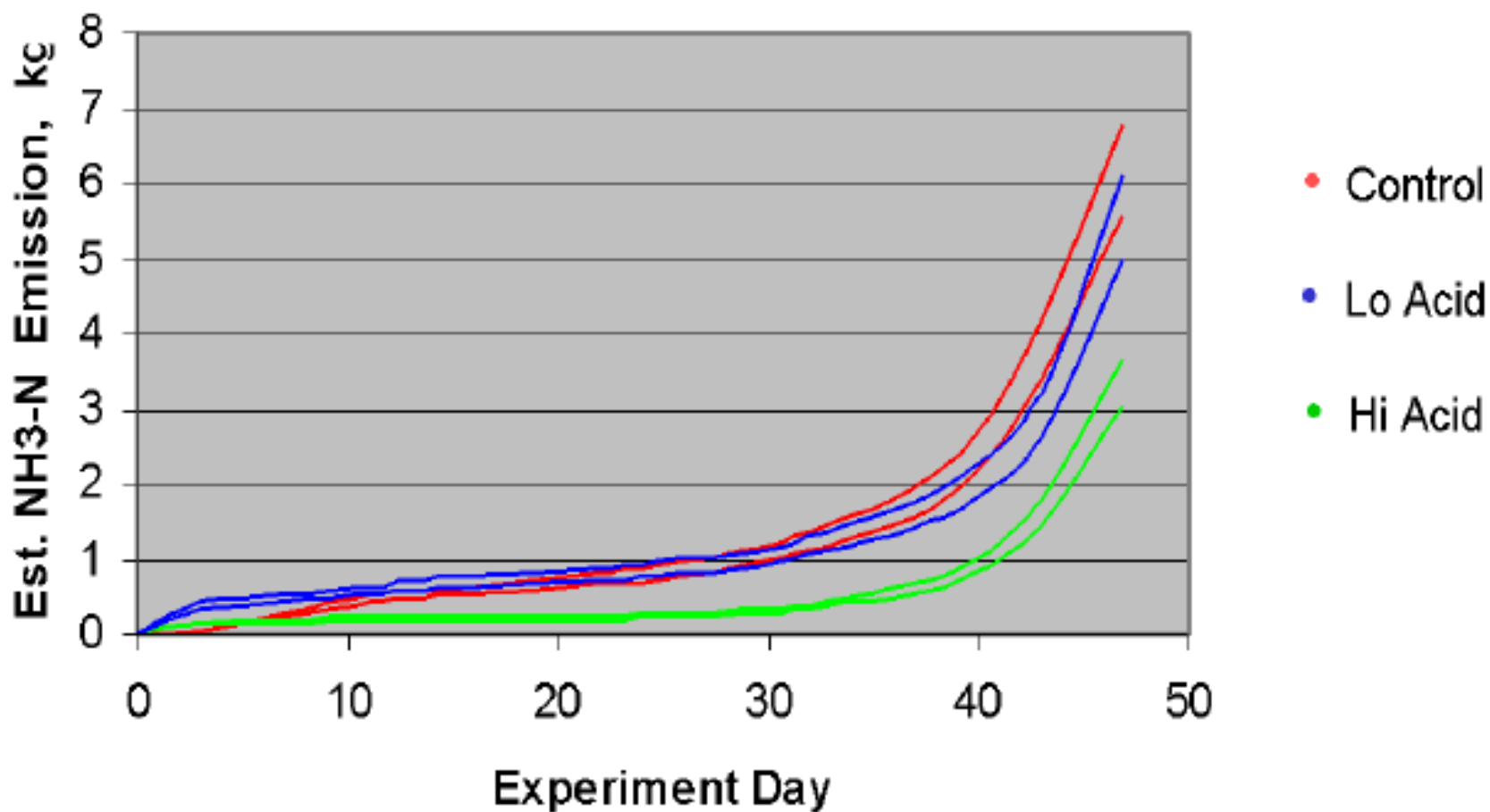
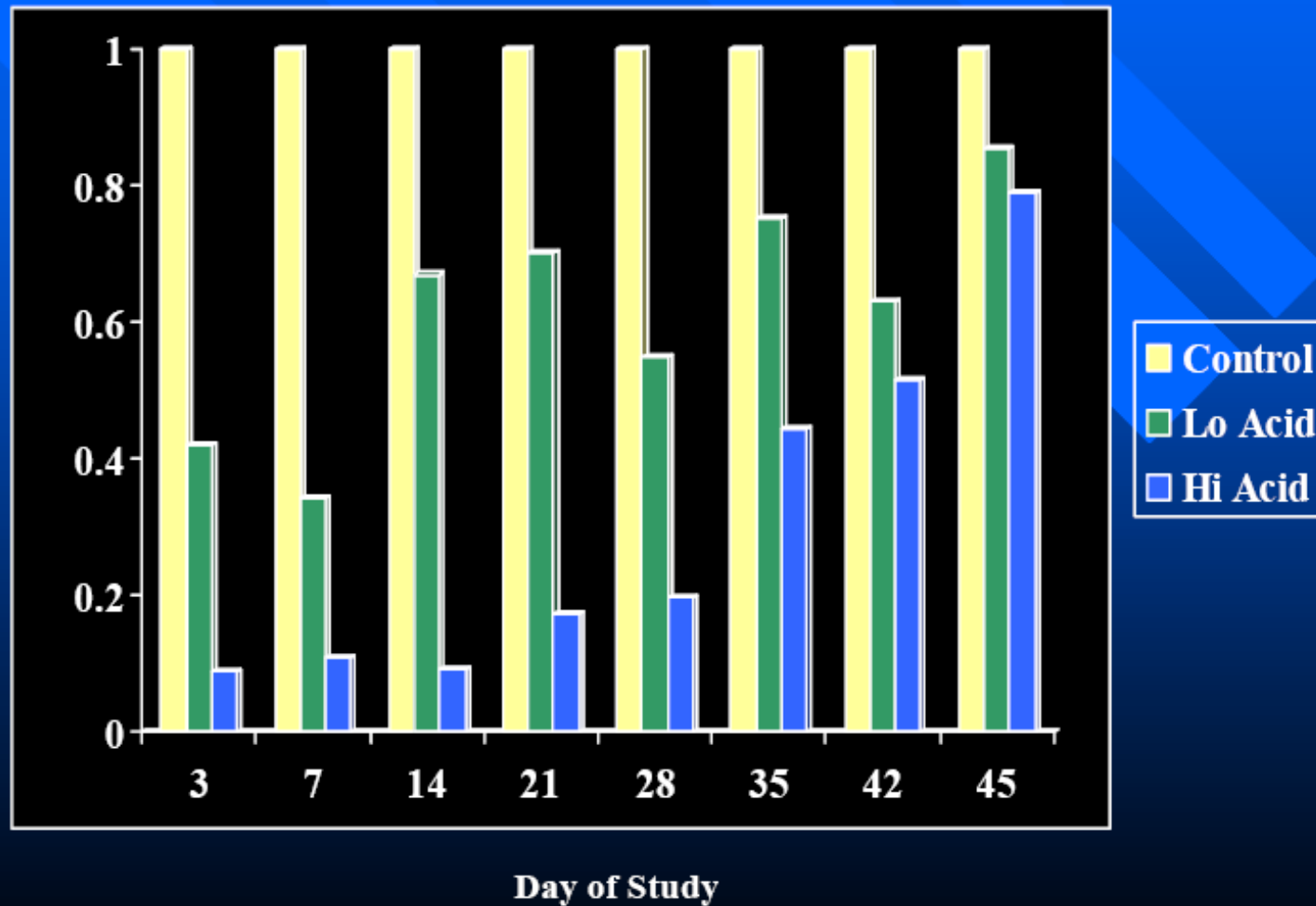


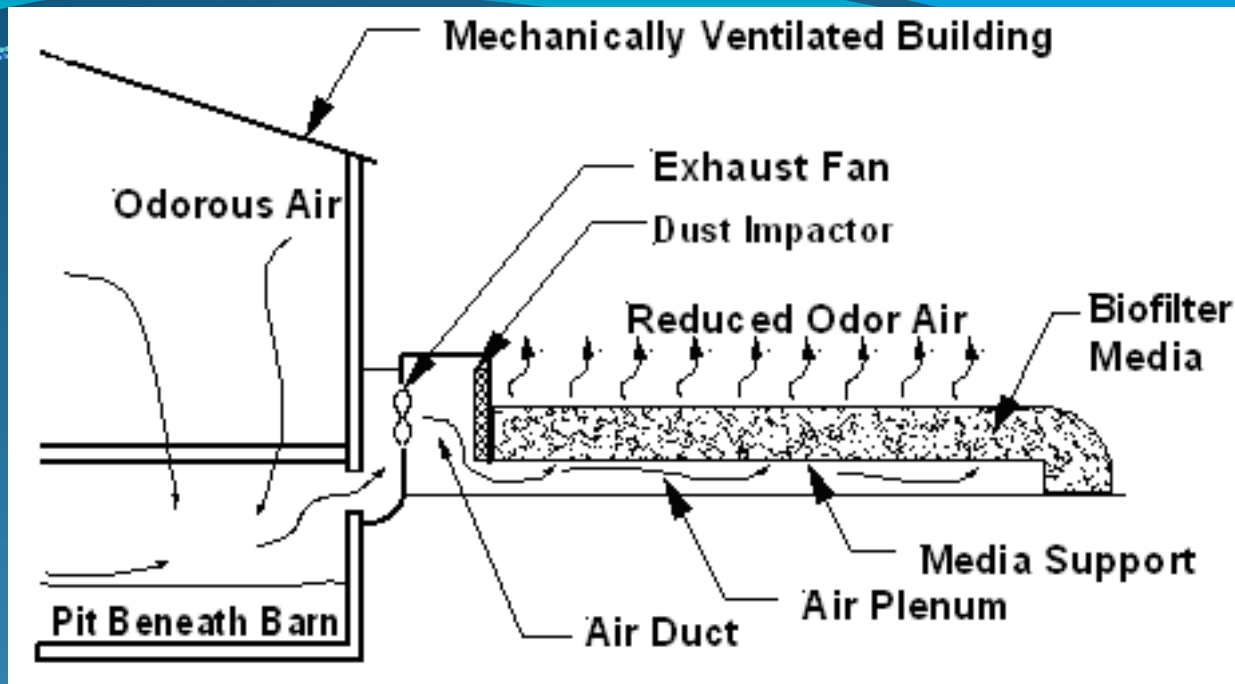
Figure Three. Exhaust Ammonia Concentration as Ratio to the Control



Biofilters

- Are comprised of housing ventilation systems that pass air through a biofilter media that incorporates a layer of organic material that supports a microbial population and reduces ammonia emissions by oxidizing volatile organic compounds into carbon dioxide, water and inorganic salts.
- Applied to poultry, swine and potentially dairy





- 5 second detention time
- Media mixture range from 30:70 to 50:50 ratio by weight of compost and wood chips or other inert fill materials
- Moisture content of 50-70%
- Dust removal system on poultry operations

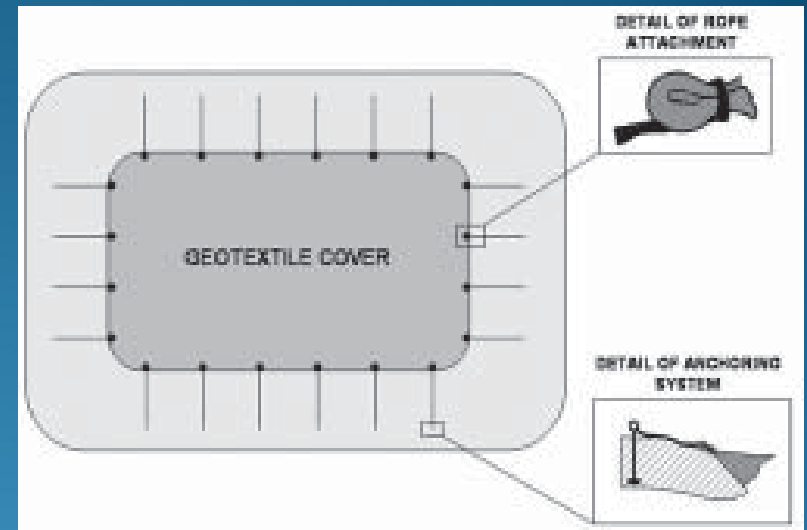
Biofilters

- Maintenance:
 - moisture control, weed control, rodent control and pressure maintenance
- 60% Ammonia Reduction
- Future Research Needs:
 - How do you dispose or use (apply) spent material? Is it regulated under a nutrient management plan?



Plastic Permeable Cover: Geotextile

- Create a biologically active zone where the emitted ammonia and other gases will be aerobically decomposed by microorganisms
- Straw covers are not recommended
 - The literature is not clear on the ultimate fate of ammonia and the opportunity for release during land application.
- Waste facility cover (367)
- 15% Ammonia Reduction
- More land may be needed to apply manure at agronomic rates



Geotextile Cover

- Maintenance:
 - Repair tears, holes or punctures
 - Remove ponded rain and biomass growth
- If manure is to be land applied installation and maintenance of an agitation and pumping system is required
- May release ammonia if cover has smooth underside texture



How Modeled

- 40% of remaining emissions randomly distributed over land, 60% emitted to atmosphere
- Must report technique to Bay Program
 - MD assumes biofilter as practice
 - PA assumes lagoon covers for as dairy lagoon practice
 - If no technique is reported the technique with the lowest effectiveness estimate is assigned