


Air Quality
Diet, Diet and Emission Estimates

Measurements and Control Strategies

AIR EMISSIONS FROM CATTLE FEEDYARDS AND DAIRIES



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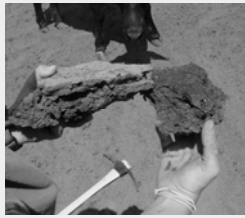


Dietary & Management Regimens to Decrease Feedyard Ammonia Emissions

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LPELC Webinar 3/27/2009



Ammonia Losses

Most feedyard ammonia is produced rapidly (< 3 days) from urine spots on the pen surface

Mechanisms to Decrease NH₃ Losses

$$\begin{array}{ccc} \text{O} & & \text{H}_2\text{O} \\ || & & \curvearrowright \\ \text{H}_2\text{N} - \text{C} - \text{NH}_2 & \xrightarrow{\text{Urease}} & 2 \text{NH}_3 + \text{CO}_2 \\ \text{Urea} & & \end{array}$$

| | | |
|--------------------|--------------------|---|
| Decrease excretion | Inhibit hydrolysis | Bind or convert to NH ₄ ⁺ |
|--------------------|--------------------|---|

Prerequisites

- Practices that decrease ammonia should not have adverse “unintended consequences”
 - Effects on animal performance & health?
 - Effects on worker health and safety?
 - Effects on air quality?
 - Particulates, Hydrogen sulfide, Odors, Greenhouse gases, etc.?
 - Effects on water quality?
 - Nitrates, etc.

Diet & NH₃ : Summary

- See LPELC Webcast – Jan. 16, 2009
- Daily ammonia emissions from beef feedyards may be decreased by
 - Decreasing dietary crude protein concentration
 - Limiting Ruminally Degradable Protein (i.e. urea) percentage in the diet
 - Phase feeding of protein
 - Feeding supplemental fat (2.5 – 3%)

Additional Conclusions

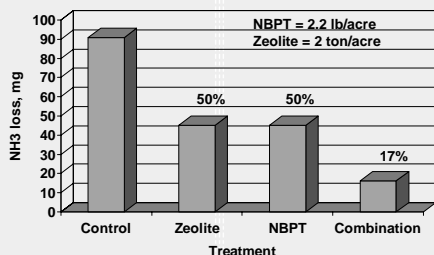
Feeding and management technologies that increase production efficiency

- Ionophores,
- Beta-agonists,
- Hormonal Implants,
- etc.

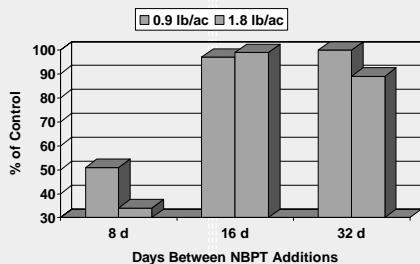
also tend to decrease NH₃ emissions per unit of beef production

In Vitro NH₃ Losses

NBPT & Zeolite Effects



Frequency of NBPT Addition and *In Vitro* NH₃ Losses



Parker et al (2005)

Summary

- Several potential surface amendments (alum, zeolites & urease inhibitors)
- Amendments may have to be applied frequently - approximately 8 days
- Mixtures of a urease inhibitor and NH₃ “binder” may have synergistic effect
- None are currently cost effective
- Dietary modifications currently best option

For More Information: NH₃ Control

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