

TECHNOLOGY SUMMARY

Full paper is published in the proceedings of:

MITIGATING AIR EMISSIONS FROM ANIMAL FEEDING OPERATIONS CONFERENCE

Iowa State University Extension
Iowa State University College of Agriculture
and Life Sciences

Conference Proceedings Sponsored by:

NRI Air Quality Extension & Education
U.S. Pork Center of Excellence
Iowa Farm Bureau Federation
Iowa Egg Council
Iowa Pork Industry Center
Iowa Pork Producers Association

The Effects of Acidifier Applications in Reducing Emissions from Dairy Corrals

Kim Stackhouse¹, Jeffrey McGarvey², Yuae Pan¹, Yongjing Zhao¹, and Frank M. Mitloehner¹
¹University of California, Davis, ²USDA-ARS, Albany, CA

Species: Dairy Cows
Use Area: Animal Housing
Technology Category: Chemical Amendment
Air Mitigated Pollutants: Methanol, Ethanol,
Methane

Point of Contact:
Frank Mitloehner
University of California, Davis
One Shields Ave., Davis, CA 95618
USA
(530) 752-3936
fmmiltoehner@ucdavis.edu

System Summary:

Acidifier (SBS, sodium bisulfate) application may provide an effective management practice for the reduction of alcohol emissions from dairy housing. Application of sodium bisulfate has been demonstrated to be effective in the mitigation of alcohols (methanol and ethanol) emissions from dairy drylot corrals that are used to house dry cows and growing heifers. Methanol and ethanol emissions decrease with an increase in the amount of SBS applied. SBS has also shown to have the potential for reducing pathogens and fly larvae.

Product should be applied to dairy drylots with a fertilizer spreader twice per week at a rate of 50 - 75 lb/1000 ft² for control of methanol and ethanol emissions. However, SBS should not be spread evenly but rather topical around highly frequented cow areas (feed bunk, water troughs). Application to enclosed drylots at the University of California, Davis showed reductions of methanol and ethanol of 15-30%. The 75 lb SBS treatment reduced methane emissions from waste as well.

Applicability and Mitigating Mechanism:

- Emission of gaseous alcohols from fresh manure and urine is dependent on pH, temperature, microbial activity and etc.
- Application of SBS lowers pH of slurry and as a result reduces methanol, and ethanol fluxes
- Reduction in pH reduces bacterial populations
- Reduction of pathogens and fly larvae due to the acidic environment induced by SBS application

Limitations:

- Sodium bisulfate must be applied consistently to manure to maintain constant emission reduction as the substance loses its effectiveness over time
- In locations that are sensitive to salt or areas with existing high salt loading in soils, applications of SBS should be considered with care because sodium is one of its components
- SBS is a mineral acid. Appropriate measures, as defined by the chemical supplier, should be used during the handling of SBS

Cost:

Bulk cost of product delivered to the farm is \$660.00/ ton. Application at 50 – 75 lb / 1000 ft² 2X / week equates to costs of between \$33.00 – \$49.50 / 1000 ft² / week. Treatment of heavy use areas, approximately 30% of the total pen area, reduces total pen cost by 70%. Cost / cow assuming 4 cows / 1000 ft² of pen area would be \$2.48 - \$3.71 / week treating only the heavy use areas.