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Effects of Sodium Bisulfate on Alcohol, Amine, and Ammonia Emissions from Dairy Slurry

Frank Mitloehner, Huawei Sun, Yuee Pan, Yongjing Zhao, Wendi A. Jackson, Lisa M. Nuckles, Irina L.Malkina, and Veronica E. Arteaga. University of California, Davis.

Species: Dairy Cows
Use Area: Animal Housing
Technology Category: Chemical Amendment
Air Mitigated Pollutants: Ammonia, Amines, Alcohols

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

System Summary:

Sodium bisulfate may provide an effective management practice for the reduction of alcohols and ammonia emissions from dairy housing conditions. Application of sodium bisulfate (Parlor Pal) has been demonstrated to be effective in the mitigation of both ammonia and alcohols (methanol and ethanol) emissions from fresh dairy slurry. Ammonia and alcohol emissions decrease with increasing levels of SBS treatment.

Product should be applied to at a rate of 50 - 75 lb/1000 ft^2 for control of ammonia, methanol, and ethanol emissions. However, SBS should not be spread evenly but rather topical around highly frequented cow areas (feed bunk, water troughs). Studies conducted at the University of California, Davis showed reduction of ammonia of 60% from fresh dairy slurry. Emission reduction potentials of 61 and 58% were obtained for methanol and ethanol respectively.

Applicability and Mitigating Mechanism:

- Emission of gaseous ammonia and alcohols from fresh slurry is dependent on pH, temperature, microbial activity and etc.
- Bedding/surface manure pH is important factor for controlling NH_3 volatilization
- Application of SBS lowers pH of slurry and as a result reduces ammonia, methanol, and ethanol fluxes
- Reduction in pH reduces bacterial populations

Limitations:

- Sodium bisulfate must be applied consistently to manure to maintain constant emission reduction as the substance looses 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 ft^2 2X / week equates to costs of between $33.00 – $49.50 / 1000 ft^2 / 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 ft^2 of pen area would be $2.48 - $3.71 / week treating only the heavy use areas.