

PH MATTERS

by JONES-HAMILTON CO

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MANIPULATE DAIRY SLURRY PH TO REDUCE EMISSIONS

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f the ammonia produced from manure, the amount volatilized into the atmosphere will depend on several factors including the overall amount of ammonia in the manure slurry and other slurry characteristics, such as:

- surface area
- temperature
- air flow
- pH

It is slurry pH that determines how much of the ammonia present is in the potentially volatile form (NH_3) and how much is in the non-volatile form (NH_4^+ / ammonium). As pH increases, so does the proportion of NH_3 . While pH will vary based on diet, average manure pH is 8.2. At this level 6% of ammonia present will be in the volatile form.



Sodium bisulfate (SBS), which has been used extensively in the poultry industry to reduce ammonia and odor-causing bacterial levels in litter since the 1990s, is also effective for reducing ammonia emissions on dairy farms. A study at the University of California, Davis, showed just how effective SBS, sold as ParlorPal[®], can be.

ParlorPal was applied to the surface of fresh dairy slurry at the rates of 25, 50 and 75 lbs./1,000 sq. ft. and emissions and pH were measured over four days. Surface application of ParlorPal to the slurry significantly reduced ammonia, methanol and ethanol emissions with the most significant reduction of ammonia emissions occurring during day 1 ([Table 1](#)).

It is notable that as ParlorPal application rate increased so did the level of emissions reduction. Over a 3-day average, slurry treated at the 75 lb. rate showed a 61% decrease in ammonia emissions, 56% decrease in methanol emissions and 53% decrease in ethanol emissions. The most effective reduction of methanol and ethanol emissions occurred during the first day, after which the reduction rate decreased with the increase of storage time.

Table 1: Average ammonia, ethanol, methanol emissions from ParlorPal treated and untreated slurry.

PARLORPAL APPLICATION (G/1000 FT ²)	0	25	50	75
AMMONIA				
Emission rate (mg/hr/m ²)	142	111	84	56
Reduction (%)	N/A	22	41	61
SD of average emission rate (mg/hr/m ²)	40	38	41	35
ETHANOL				
Emission rate (mg/hr/m ²)	58.6	48.3	36.7	25.5
Reduction (%)	N/A	17	37	56
SD of average emission rate (mg/hr/m ²)	14.0	10.9	12.1	11.4
METHANOL				
Emission rate (mg/hr/m ²)	92.9	78.7	63.4	43.9
Reduction (%)	N/A	15	32	53
SD of average emission rate (mg/hr/m ²)	21.9	18.6	20.2	21.3

SD = standard deviation

Slurry treated at the 75 lb. rate showed an average decrease in ammonia, methanol and ethanol emissions by 61%, 56% and 53%, respectively.

Within 15 minutes of ParlorPal application, the pH of the slurry decreased from an average of 7.8 to 3.3, 1.9 and 1.4, respectively. The decrease may deactivate the enzyme urease and micro-organisms in the slurry. The low pH helps to keep ammonia in the liquid phase and prevent the production of methanol and ethanol.

Table 2: Initial and final pH Parlorpal treated and untreated slurry

PARLORPAL APPLICATION (G/1000 FT ²)	0	25	50	75
Initial pH	7.8 ± 0.2	7.8 ± 0.3	7.8 ± 0.2	7.9 ± 0.3
pH after 15 minutes	7.8 ± 0.2	3.3 ± 0.8	1.9 ± 0.3	1.4 ± 0.1

Not only does ParlorPal provide a safe, effective and affordable solution to control ammonia and lower pH, it's on the **EPA's Safer Choice List of Chemicals** so it's safe for animals, workers and the environment.

Learn more about ParlorPal or request a consultation at **JonesHamiltonAg.com**.

Reference: Mitloehner et al, 2006



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