

Dietary Buffers and Swine Ulcers

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With the current concerns over the occurrence of ulcers, in finishing swine – we felt that a review of the following article may be of help to our readers.

A research paper published in the Journal of Animal Science (JAS 195. 73:414-420) by K. Wondra evaluated the effect of feeding 1% sodium bicarbonate (NaHCO₃) or potassium bicarbonate (KHCO₃) on the development and severity of gastric ulcers in finishing pigs. The pigs were fed a finely ground corn-soybean meal based diet for 66 days from approximately 120 to 250 lbs.. Results of the first portion of the study are shown below:

	Control	1% NaHCO₃	2% NaHCO₃	3% NaHCO₃
Ave. Daily Gain (lbs)	1.98	2.00	1.92	1.85
Ave. Daily Intake (lbs)	6.50	6.50	6.48	6.17
Gain/feed	0.305	0.308	0.296	0.300
Back Fat Thickness mm	31.9	32.9	32.2	32.2
Dressing %	75.1	74.4	74.7	74.3
Stomach Ulceration Score				
Normal	8	10	7	8
Erosions	1	1	2	2
Ulcers	6	4	7	5
Severe Ulcers	1	1	0	1
Mean ulcer score	2.0	1.75	2.06	2.02

The results indicate that the addition of 1% sodium bicarbonate (NaHCO₃) to the diet, reduced the number of ulcers, as well as the overall mean ulcer score. This level of inclusion also did not impact the performance of the animals. The addition of higher levels of sodium bicarbonate did not appear to effect the incidence of ulcers.

A second portion of the study compared the addition of 1% sodium bicarbonate or 1% potassium bicarbonate, with similar results. Again, the diets utilized were fine ground corn-soybean meal. The summary results are shown below:

	Control	1% NaHCO₃	1% KHCO₃
Ave. Daily Gain (lbs)	2.03	2.00	2.00
Ave. Daily Intake (lbs)	6.44	6.50	6.41
Gain/feed	0.315	0.308	0.313
Back Fat Thickness mm	24.8	25.7	24.0
Dressing %	70.6	71.3	70.8
Stomach Ulceration Score			
Normal	11	14	14
Erosions	3	4	5
Ulcers	7	5	3
Severe Ulcers	3	2	3
Mean ulcer score	2.24	1.89	1.96

As shown, there was no advantage to using potassium bicarbonate over sodium bicarbonate. The addition of either dietary buffer resulted in a lower incidence of ulcers and reduced mean ulcer scores. As summarized by the author, *“These data indicate that 1% addition of either NaHOC3 or KHCO3 may help to reduce the severity of gastric ulcers in finishing pigs without adversely affecting growth, performance or nutrient digestibility.”*

Practical Usage:

Although not widely used in the swine industry, a sodium buffer may have some economic and health advantages when included when conditions favor ulcer formation. Since S-Carb and sodium bicarbonate have been shown to have similar metabolic effects on acid / base balance, it is expected that they will have similar effects on swine ulcers. Economic criteria should be used to determine the most advantageous buffer addition.