



### Equal Sodium Study

S-Carb® is sodium sesquicarbonate ( $\text{Na}_2\text{CO}_3 \bullet \text{NaHCO}_3 \bullet 2\text{H}_2\text{O}$ ). On a chemical basis S-Carb, is capable of buffering approximately 10% more acid than sodium bicarbonate. S-Carb also contains more sodium than bicarbonate, 30.4% versus 27%. This provides a higher dietary electrolyte contribution than sodium bicarbonate.

Theoretically, feeding S-Carb at 90% of sodium bicarbonate levels would result in equal DEB, equal buffering capability and show equal metabolic efficacy. To test this, FMC Corp. supported the following research study.

Two fistulated cows were used in a switch back design study. Treatments were designed to be equal sodium from either S-Carb or sodium bicarbonate. Rations used were 50% concentrate diets designed to meet 1988 NRC Dairy Requirements for 55lbs of milk. The results are shown below:

**Table { SEQ Table \\* ARABIC }: Effect of Varied Sodium Additions on Metabolic Parameters**

Added sodium	0	Na 0.2 %		Na 0.5 %		Na 1.0 %	
Source of Sodium	Control	S-Carb 0.67%	Bicarb 0.75%	S-Carb 1.68%	Bicarb 1.87%	S-Carb 3.35%	Bicarb 3.73%
Added DEB		87 meq/kg	87 meq/kg	217.5 meq/kg	217.5 meq/kg	434.9 meq/kg	434.9 meq/kg
Venous pH	7.335	7.346	7.363	7.358	7.344	7.332	7.334
PCO <sub>2</sub>	51.7	51.1	51.8	52.3	51.6	55.5	54.9
HCO <sub>3</sub> <sup>-</sup>	26.6	26.9	28.6	28.3	27.1	28.0	28.0
Rumen pH at 4hrs post feeding	5.98	5.95	5.91	5.35	5.34	5.54	5.11
Fiber disappearance	38.0%	39.2%	38.9%	38.5%	36.9%	29.7%	33.1%

S-Carb additions are 90% of sodium bicarbonate, resulting in equal dietary sodium content.

**Conclusions:**

There was no significant difference in the effect of feeding S-Carb or sodium bicarbonate equal sodium levels. The addition of S-Carb at 90% of sodium bicarbonate level, resulted in equal DEB and similar metabolic responses. Measurements of metabolic acid / base status were not significantly different between buffers. When fed at the highest levels, S-Carb at 3.35% and sodium bicarbonate at 3.73%, both buffers were capable of producing a metabolic alkalosis. However, at normal and moderate levels there was no indication of acid / base disturbance.

The rumen parameters showed similar responses to either buffer. There were no significant differences noted in rumen pH by buffer type or level of buffer. The rumen disappearance of alfalfa hay was measured over a 24 hour period. As observed by other researchers, buffer fed at the highest levels significantly depressed the rumen disappearance. However, there was no difference between buffers, with significant depression occurring with both S-Carb and sodium bicarbonate only at the highest additions.

The results of this study show that feeding S-Carb at 90% of the sodium bicarbonate level, produce similar metabolic and rumen responses. This data agrees with previous trials that have indicated no differences in response to S-Carb or sodium bicarbonate when fed to provide equal sodium additions and dietary electrolyte balance. As a conclusion from this study, it is apparent that S-Carb can be fed at 90% of sodium bicarbonate levels to obtain equal buffering.