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Evaluation of Sodium Sesquicarbonate (S-Carb®) vs Sodium Bicarbonate for Dairy Cows Fed Corn Silage Based Diets in Early Lactation

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Intake of high forage diets by dairy cows is limited by the physical capacity of the cow's digestive tract because digestibility of forage is less than concentrates. This results in a shortage of energy that will not allow high producing dairy cows to achieve their maximum production potential. To increase energy intake in early lactation, it has become common practice to incorporate much greater proportions of concentrate in the diets of dairy cows. In addition to the reduction in amount of forage used, a larger portion of this forage consists of fermented feeds such as corn silage and alfalfa haylage which has been finely chopped. These changes have resulted in a much greater acid load on the cow and lower ruminal pH. This can lead to disorders such as depressed milk fat percentage, acidosis and off-feed problems. These changes in feeding practices have made it necessary in some cases to add buffers to the diet. Buffers most commonly used in dairy cattle rations are sodium bicarbonate and magnesium oxide. The use of sodium sesquicarbonate as a buffer in dairy cattle diets has not been evaluated. The purpose of this study was to determine if sodium sesquicarbonate was as effective as sodium bicarbonate in maintaining milk fat percent on a fat-depressing diet fed to Holstein cows in early lactation.

Twenty-four multiparous Holstein cows were grouped by calving date and lactation number into groups of three. Within groups, cows were randomly assigned to one of three dietary treatments. Treatments were a control diet (no buffer) composed of 40% corn silage, 35% ground ear corn and 25% of a protein-mineral-vitamin supplement on a dry matter basis; the control diet plus .75% sodium bicarbonate; and the control diet plus .75% sodium sesquicarbonate.

Cows were started on their respective diets immediately after calving and continued on treatment through the first twelve weeks of lactation. Cows were fed in individual tie stalls. Feed was provided as a complete mixed ration with the buffer hand-mixed into the daily ration just prior to feeding. Cows were provided feed to allow for at least 10% refusal and leftover feed was weighed daily to determine actual feed intake. Silage, grain and feed refusals were sampled weekly for nutrient composition.

Cows were milked twice daily at 4:00 AM and 2:00 PM in a double-four herring bone parlor and

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milk weights recorded. Milk samples were collected once weekly from consecutive PM and AM milkings and composited for analysis of total solids, percent fat and percent protein. Body weights were recorded for each cow at calving and at weekly intervals thereafter. Blood samples were collected from the tail vein of each cow at calving and at four week intervals for blood pH determinations.

Results were statistically analyzed by analysis of variance for a randomized complete block design. Treatment means were separated by single degree of freedom comparisons of control vs both buffers and sodium bicarbonate vs sodium sesquicarbonate

Measurement	Control	Sodium Bicarbonate	Sodium Sesquicarbonate
Dry Matter Intake, lbs/day	44.6	45.9	46.6
Milk Production, lbs/day	75.4	74.2	73.7
Mi1k Fat, %	3·36[a]	3.75[b]	3.81[b]
4% Fat-corrected Milk, lbs/day	68.0	71.1	71.2

a,b Means with different superscripts significantly different (P<.05).

Dry matter intake and milk production were not statistically different by treatment. The use of buffers with this high energy, fat-depressing diet significantly increased milk fat percentage. This increase in milk fat percentage is reflected in the higher production of 4% fat-corrected milk by the cows fed buffers.

Sodium bicarbonate and sodium sesquicarbonate were equal in their ability to significantly improve fat test in early lactation. If milk is priced based on fat content at a rate of $0.17 per .1% fat above 3.5%, or is penalized at the same rate below a fat test of 3.5%, in this study the use of sodium bicarbonate would increase income by $0.66 per hundred pounds of milk sold while sodium sesquicarbonate would increase income by $0.77 per hundred pounds of milk sold.

Throughout this trial it was also observed that sodium sesquicarbonate (S-Carb) was more free-flowing and easier to handle than sodium bicarbonate as it did not soak up atmospheric moisture to the extent that sodium bicarbonate did.

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