

THE PENNSYLVANIA STATE UNIVERSITY

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AN EQUAL OPPORTUNITY UNIVERSITY

SODIUM SESQUICARBONATE FOR EARLY LACTATION COWS FED CORN SILAGE BASED DIETS

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INTRODUCTION

The addition of buffers such as sodium bicarbonate to diets of early lactation cows is well documented and accepted. Research has demonstrated that sodium bicarbonate can improve feed intake, increase milk production, and enhance milk fat yield particularly in early lactation cows fed corn silage based diets. This improved response has been most dramatic during the first few weeks postpartum when cows switched from high roughage diets prepartum to high energy, corn silage based diet postpartum. Sodium sesquicarbonate has only recently been studied as a dietary buffer for lactating cows. Results from initial studies indicate that sodium sesquicarbonate is as effective as sodium bicarbonate in yield of 4% fat corrected milk (FCM). The purpose of this study was to determine the effect of added sodium sesquicarbonate on feed intake, milk yield, and milk composition in high producing, early lactation Holstein cows.

EXPERIMENTAL PROCEDURES

Thirty-two high producing Holstein cows were alternately assigned at calving to a control diet or diet containing .75% sodium sesquicarbonate (S-Carb) on a dry matter basis, thus 16 cows were assigned to each diet. The cows had completed at least one previous lactation, were paired by lactation number (2nd lactation cows and 3rd lactation or later cows), and within each group were randomly assigned to one of the two dietary treatments. The 305 mature equivalent production of the 3 cows was 18923 LB milk, 3.53% fat, and 668 lb fat.

Diets fed were corn silage and grain (50:50 ratio on a dry matter basis). The major ingredients in the grain ration were shelled corn (54%), soybean meal (30%), corn distillers (7%), and dried brewers grain (3.5%). Diets were formulated to meet or exceed National Research Council minimum nutrient recommendations. Cows were started on their respective diets within four days postcalving and continued trial through the first twelve weeks of lactation. Cows were fed individually twice daily with feed refusals recorded once daily. Diets were fed as total mixed ration

Daily milk weights were recorded. Milk samples were obtained twice weekly for consecutive PM and AM milkings and analyzed for milk fat, milk protein, and somatic cells. Body weights were recorded weekly. The results of the trial were analyzed by analysis of variance for a randomized complete block design. The two-year-old mature equivalent records of all cows were used as a covariate for milk yield, milk composition, and FCM yield.

RESULTS

The major results for the twelve week trial are summarized in Table 1. Dry matter intake was 1.8 lb/day higher and actual milk yield was 2.8 lb/day higher in cows fed S-Carb, although these differences were not statistically significant.

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TABLE 1. SUMMARY OF RESULTS FOR EARLY LACTATION COWS FED 0 OR .75% SODIUM SESQUICARBONATE (S-CARB) FOR A TWELVE WEEK TRIAL.

Measure	Diet.	
	Control	S-Carb
No. cows	16	16
Dry matter intake, lb/day	48.4	50.2
Milk production, lb/day	86.5	89.3
Milk fat, %	3.30	3.46
Milk fat, lb/day	2.82 ^a	3.06 ^b
4% fat corrected milk, lb/day	76.6 ^c	81.6 ^d
Change in body weight from week 1 to week 12, lb	-106	-48

a,b Means with different superscripts differ significantly ($P < .02$).

c,d Means with different superscripts differ significantly ($P < .08$).

Milk fat percent was higher (3.46 vs 3.30%) ($P < .11$) by cows fed S-Carb. Milk fat percent was "marginally low" on the control diet, possibly related to a low ration ADF of 18.5%. Daily 4% FCM ($P < .03$) and milk fat yield ($P < .02$) were 6.5 and 8.5% greater for cows fed S-Carb primarily because of the combined effects of higher milk yield and milk fat percent by cows fed the diet with S-Carb. Although a treatment with sodium bicarbonate was not included in this trial, the higher FCM yield found in this study is comparable to the responses found in other studies with cows fed sodium bicarbonate in early lactation. Cows fed S-Carb tended to lose less body weight during the trial.

Comparing the economic benefit, addition of S-Carb resulted in an additional \$.45 daily income over feed cost per cow during the first twelve weeks of lactation. This figure was calculated based on a 2.8 pound higher milk yield (\$.12 per pound) a .16% higher milk fat test (\$.17 for .1% fat test), 1.8 pounds higher daily feed intake (\$.06 per pound of feed), and .38 pound daily intake of S-Carb (\$.14 per pound).