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# Evaluation of 2 Sodium Chlorite (Base/Activator) Pre- Post Milking Teat Dips on Teat End / Teat Skin Condition and Health

## A.S. Leaflet R2522

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### Summary and Implications

Objective of this study was to evaluate 2 sodium chlorite pre-post teat dips on overall teat end and teat skin condition and health using a split udder design. Both dips showed excellent teat skin and end condition, a low % of rough teats, and no differences were seen between dips.

### Introduction

Maintaining good teat end / skin health is recognized as an essential element in mastitis prevention and animal welfare. In addition to excellent germicidal activity, all teat dips should have both teat end and teat skin health data evaluation, and show excellent teat health prior to commercialization. Objective of this study was to evaluate 2 sodium chlorite pre-post teat dips (base and activator mixed each milking) on overall teat end and teat skin condition and health using a split udder design. A split udder design study was performed to minimize risk of experimental bias and maximize chances of seeing teat dip effects.

### Materials and Methods

**Dips used:** 2 sodium chlorite based pre-post dips where a base and activator were mixed in equal proportions before every milking were used in this study. Control dip was 0729 base and activator (4XLA, Ecolab, Inc.) and Treatment Dip was 2383 base and activator (BiSept, GEA Westfalia Surge)

**Cows:** All protocols were approved by ISU Committee on Animal Care (IACUC # 10-06-6228-B). 48 early-mid lactation cows at the ISU dairy were used for the study.

**Trial design and farm practices:** Trial used a split udder design. Left teats of 48 cows (Pen 1: primarily Holsteins) were pre and post dipped with Dip 0729 (control) while right side teats were dipped with 2383 dip (treatment). The trial was 5 weeks in duration where dipping with these dips was done for 4 weeks (7/8 – 8/4/2009) sandwiched between .5 week periods where the herd used its standard herd commercial pre and post dips (pre milking teat dip was a 0.25% iodine, 2% skin conditioning product (BacStop, IBA) and post dip was a .5% iodine, 12% emollient iodine barrier dip (Transcend, IBA)). All other farm and milking practices were similar across all 5 weeks.

Cows were milked twice a day in a double 12 parallel parlor. Cows were forestripped (3 strips/teat) and pre-dipped (6 cow sequence), then dried with terry cloth towels prior to milker unit attachment. Automatic detachers were

set at 1.8 lb. flow rate and 1 second delay. All cows were housed in a single pen in a free stall barn with mattresses and separated manure solids bedding.

**Teat skin and teat end evaluations:** Data collection was initiated on July 3rd and continued until August 9, 2009. Test products were applied starting July 8 or on the 5th<sup>h</sup> day of the trial following 2 baseline evaluations. Trial dips were discontinued on August 4<sup>th</sup> with 2 after trial baseline evaluations (return to herd's usual dips). Teat skin and teat end scoring was performed using a variation of the Goldberg and Timms methods, respectively, by a single trained grader (Tables 1 and 2). Scoring was performed twice per week. Data was entered into an Excel database. Results were compiled and analyzed using SAS.

**Statistical models:** SAS was used in all data analysis. Mixed procedure of SAS with repeated measured (mixed model with quarter within cow as a repeated measure) were used to analyze teat skin and teat end data, with  $p < .05$  considered significant. GENMOD procedures of SAS with repeated measures (generalized linear model with quarter within cow as a repeated measure) was used to analyze % cracked/rough teat end data.

### Results and Discussion

**Teat skin scores** over the trial period for control and treatment dipped teats are shown in Figure 1.

- There were no significant differences among dips with regards to teat skin health. Some teats showed improvements in teat skin health (similar across dips) and no adverse effect of dips were seen. Overall teat skin scores / health were excellent.

**Teat end scores** over the trial period for control and treatment dipped teats are shown in Figure 2.

- There were no significant differences among dips with regards to average teat end scores and teat end health, and no adverse effects of dips were seen. Overall teat end scores and health were excellent in this trial.

**Percentages of rough / cracked teats** over trial period for control and treatment dipped teats are shown in Figure 3.

- There were no significant differences in % rough/cracked teats between trial dips!
- All rough teat ends in this study scored 3.5 (some roughness or cracking but very minor hyperkeratosis)
- % cracked rough teats before and after trial (normal herd dips) were 5-7%. This usually represented < 10% of cows which is excellent.
- There was a trend for % rough teats to decrease with both trial dips (very small # of cows/ teats involved or rough) so both dips showed excellent properties.

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### Overall Summary

Overall teat end and teat skin health were excellent going into this trial. There were no significant differences in teat end and teat skin health between control (0729) and treatment (2383) pre-post sodium chlorite dips. There was a slight trend to lower % rough teats end with both trial dips. Overall, both trial dips (control and treatment) showed excellent teat health (skin and ends).

Although some differences look large over time on the graphs, critically examine the y axis scales. Graphs were drawn in Excel based on data and based on minimum and maximum average scores (range of change was very small in this study). Overall teat skin and end scores were excellent in this study (before, during, and after study).

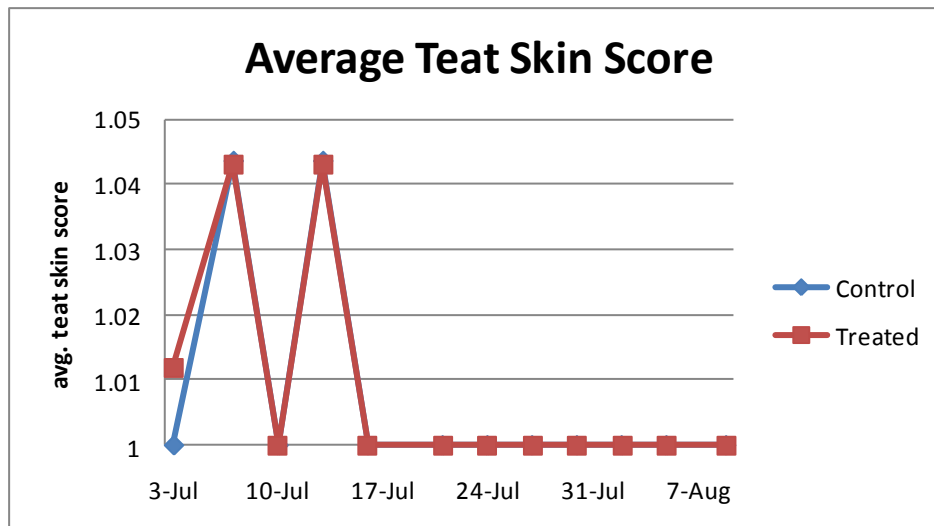
**Table 1. Teat Skin Scoring Scale.**

Score	Description
0	Teat skin has been subjected to physical injury (stepped on/ frost bite)
1	Teat skin is smooth, soft and free of any scales, cracks, or chapping.
2	Teat skin shows some evidence of scaling especially when feeling (areas of dryness by feeling drag when sliding a gloved hand along the teat barrel &/or seeing areas of lower reflective sheen to the surface of the skin).
3	Teat skin is chapped. Chapping is where visible bits of skin are visibly peeling.
4	Teat skin is chapped and cracked. Redness, indicating inflammation, is evident.
5	Teat skin is severely damaged / ulcerated / open lesions.

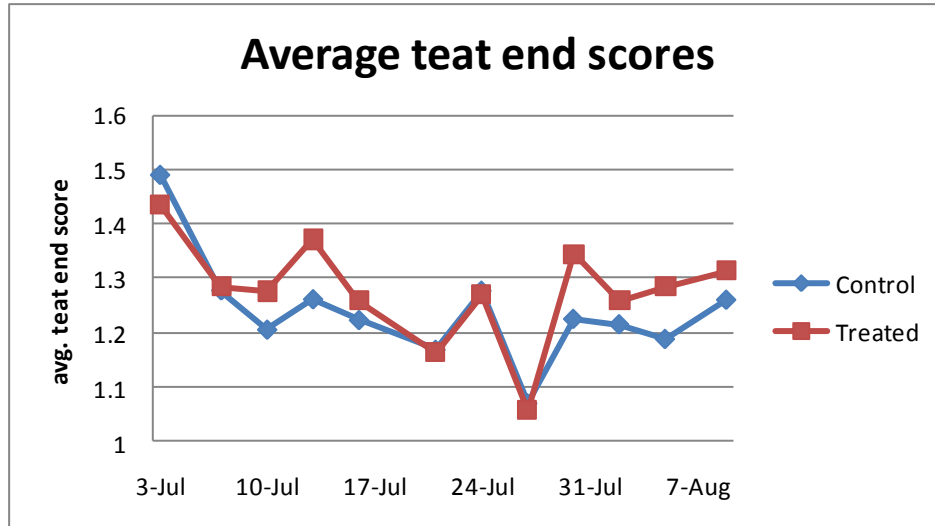
**Table 2. Teat End Scoring Scale (0\*- 5).**

Teat End Scoring system	Degree of hyperkeratosis or callousing				
	none	minor	mild	moderate	severe
Cracking					
No cracking	1	1.5	2	2.5	3
Cracked	---	3.5	4	4.5	5

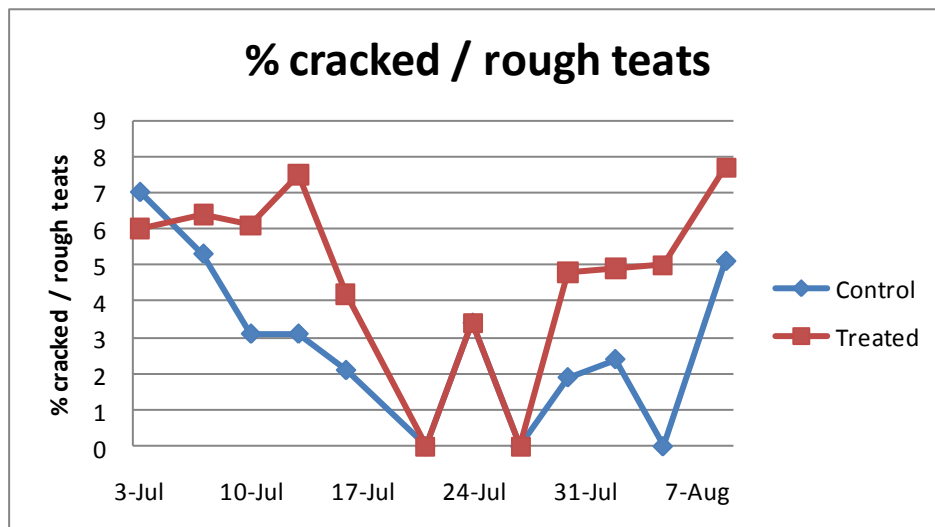
0\* zero score – physical injury of teat not associated with trial



**Figure 1.** Average teat skin scores for control teats (left side teats – 0729 Dip) and treated teats (right side teats – 2383 dip). Teat skin scores from July 10 – Aug 2<sup>nd</sup> reflect trial dips. Other dates represent where normal herd dips were used (2 scorings prior and following trial dips).



**Figure 2.** Average teat end scores for control teats (left side teats – 0729 Dip) and treated teats (right side teats – 2383 dip). Teat end scores from July 10 – Aug 2<sup>nd</sup> reflect trial dips. Other dates represent where normal herd dips were used (2 scorings prior and following trial dips).



\*\* No significant differences between control and treatment dips.

**Figure 3.** Percentages of cracked / rough teats for control teats (left side teats – 0729 Dip) and treated teats (right side teats – 2383 dip). Teat end scores from July 10 – Aug 2<sup>nd</sup> reflect trial dips. Other dates represent where normal herd dips were used (2 scorings prior and following trial dips).