

Evaluation of Two Experimental Organic Acid Post Milking Teat Dips on Teat Health and Condition

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Heather Tauke, Undergraduate in Animal Science;
Leo Timms, Morrill Professor of Animal Science,
Iowa State University

Summary and Implications

A 4 week trial was conducted at the ISU dairy to evaluate the teat conditioning efficacy of two experimental organic acid teat dip formulas. Teat skin and teat end thickness and roughness were scored on each teat 2X/week. Results showed that teat skin was maintained at the optimum level (score 1) on all teats of all cows for both experimental products over the full trial period. Teat end condition remained stable (and excellent) during the test period and no significant differences were observed between treatments, scoring dates or the interaction treatment*score date. It is concluded that both experimental products have similar teat condition efficacy properties.

Introduction

Teat dipping with effective products is a critical control point for mastitis prevention, from a germicidal standpoint as well as excellent teat health and conditioning. This trial was designed to compare the teat conditioning properties of 2 experimental organic acid post milking teat dip formulas over a 4 week period.

Materials and Methods

Test site and farm management: The Iowa State Dairy farm was the trial site. One pen was used for this 4 week trial. Cows were milked three times a day in a double 12 parallel parlor. Cows were pre-dipped (6 cow sequence), then forestripped (3 strips/teat), then dried with terry cloth towels prior to milker unit attachment. Automatic detachers were set at 2.0 lb. flow rate and 0 second delay.

Trial and dips: All protocols were approved by ISU Committee on Animal Care (IACUC # 10-06-6228-B). On average, there were 33 cows in the pen. The trial was a half udder design with left teats post dipped with one product, and right teats with the other experimental product. Milkers were blinded as to the origin of the product. Two experimental post milking teat dip products were used in the trial. Opti Blue (DeLaval) was used as a premilking disinfectant, and was applied using a non-return dip cup. All postmilking disinfectants were applied using a non-return dip cup. The main features of the formulas tested are shown in Table 1 and dippers in parlor are shown in Figure 1.

Teat skin and teat end health evaluations: Data collection was initiated on May 11, 2015 and continued until June 22, 2015. Baseline data on teat end and teat skin

health was observed for 2 weeks prior to trial dips.

Experimental organic acid post dips were applied) at every milking (3X/ day) milking starting May 25 through June 22 (28 days). Teat skin and teat end scoring were performed using a variation of the Goldberg and Timms methods, respectively, by trained graders (Tables 2 and 3). Scoring was performed two times per week. Data was entered into an Excel database. Results were compiled and analyzed using SAS.

Product consumption data: Product consumption was monitored at every milking and records of prepared solution and usage were recorded. Consumption was calculated and values are expressed as ml/cow/milking.

Statistical analysis: Trial data was analyzed using descriptive statistics and an ordinal model for multinomial data (GENMOD procedure). A cow's quarter was the unit of study. The response variable was teat condition (teat end condition) and the covariates included treatment and scoring date. Post hoc comparisons were also made using least square means and odds ratio. Level of statistical significance was set at 0.05. All statistics were analyzed using SAS 9.3, Inc. (Cary, New York).

Results and Discussion

- a) **Teat skin condition:** All quarters scored 1 at each scoring date, and therefore no statistical analysis could be conducted. All quarters maintained optimal teat skin health for the duration of the study.
- b) **Teat end condition:** Teat end thickness and roughness of both groups is summarized in Figure 2-3 and Table 4. Data showed that overall there were no differences in teat end roughness between both groups ($P = 0.619$), between scoring dates ($P = 0.424$) or between treatments at different scoring dates ($P = 0.998$). Slight changes were seen in teat end condition profiles after 1 week of usage, but these did not differ compared to initial values observed.

When teat end scores were grouped, no overall differences were observed between both groups. For the scorer there are small differences between a teat end score of 1 and 1.5. In practical terms and when evaluating a herd, both are desired in a well-managed operation compared to higher teat end scores. The proportion of teats falling into this desired category were at 90% for both groups at the start of the study. Compared to initial values, both groups suffered a short term change in the first week (May 29 and June 1; $P < 0.05$) but recovered and slightly improved after that. Final proportions were 97.5% and 95% for teat end score ≤ 1.5 for Product B and Product A, respectively.

- c) **Weather:** The teat condition study was conducted under moderate temperatures (50-60°F) but a cold snap in late May (31°F) was incurred and this rapid change was the probable reason for increased teat roughness or cracking during that week (Figure 4).
- d) **Product consumption:** Product consumption was measured for all teat disinfectants used in the study. Means were obtained from 9 different milkers corresponding to 68 milking sessions. Usage was as follows: 9.6 ± 2.6 ml/cow/milking (Opti Blue), 6.7 ± 2.7 ml/cow/milking (Product A), and 7.4 ± 3.0 ml/cow/milking (Product B). On average, there was 10% more teat disinfectant usage when Product B was used compared to Product A.

Overall Summary and Conclusion

A trial was conducted at the ISU dairy to evaluate the teat conditioning efficacy of two experimental teat dip formulas when used post-milking. Teat skin condition was maintained at optimum levels for the whole duration of study in both experimental and control solutions. Teat end condition efficacy was also not different between the test and experimental solutions. After a minor short term negative change in teat end condition in the first week, teat end condition improved and surpassed initial values. Consumption records showed that the usage of the control solution (Product B) was 10% higher than the experimental solution (Product A). It is concluded that the 2 teat disinfectant solutions tested are equally able to maintain good teat skin and teat end condition and health.

Table 1. Products used in the study

| | | | |
|---------------------|------------------|------------------|---------------------------------|
| Premilking | Opti Blue | | |
| Internal ID | F-2426-4 | | |
| Side | Left and Right | | |
| Mixing instructions | RTU | | |
| Color | Blue | | |
| Active ingredient | 1.6% DDBSA | | |
| Emollient | 2% glycerin | | |
| Postmilking | Inducer A | Inducer B | Conditioner Package (CP) |
| Label ID | Green | Blue | Orange |
| Internal ID | CHD Conc | F-9343 | 592-001-1 |
| Color | Colorless | Colorless | Brown |
| Active ingredient | 13% OAD | 5% OAD | N/A |
| Emollient | N/A | N/A | 5% glycerin |



Figure 1: Mixed Teat Disinfectant Solutions and color coded dippers

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Table 2. 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 3. 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

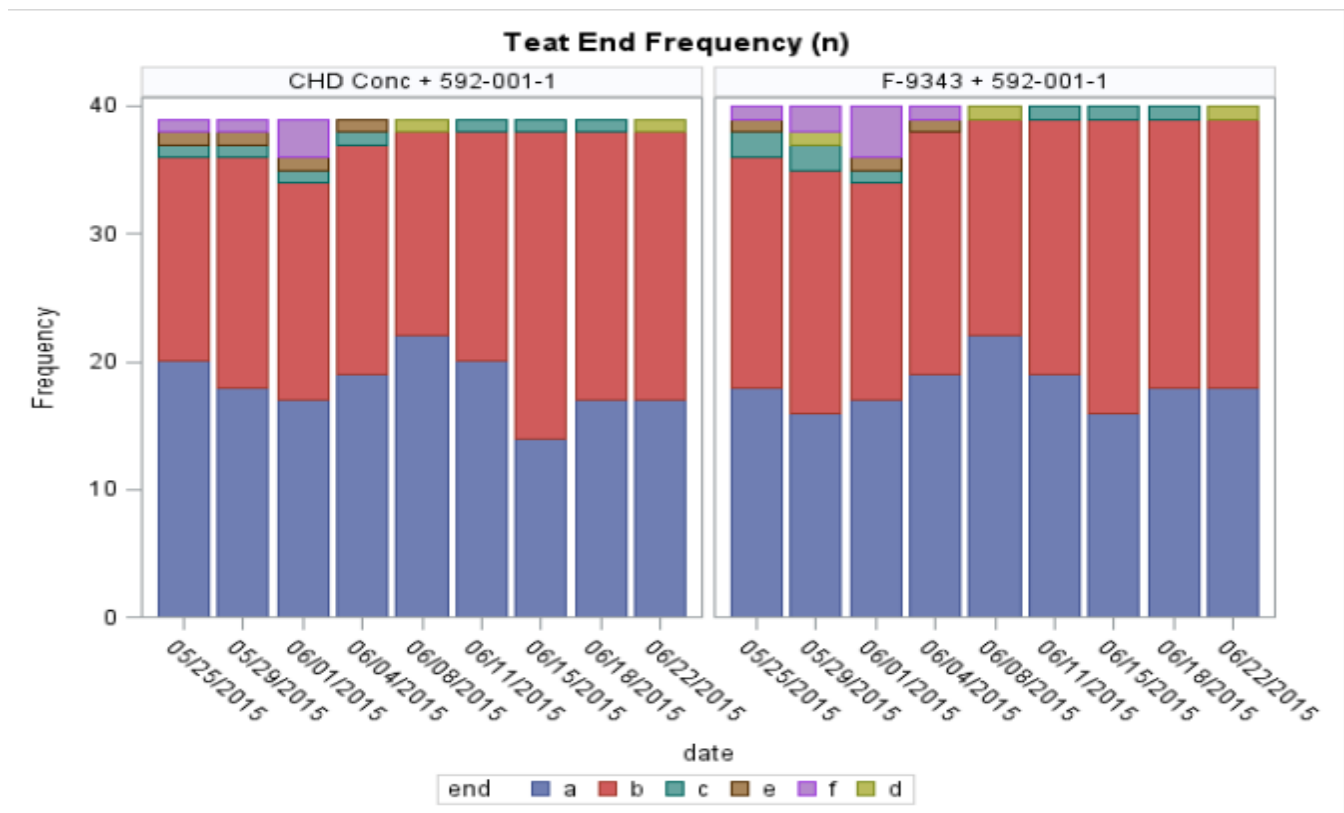


Figure 2. Teat end condition frequencies for 2 experimental organic acid dips for the 4 week trial period. (a = score 1, b = score 1.5, c = score 2, d = score 2.5, e = score 3, f = score 3.5)

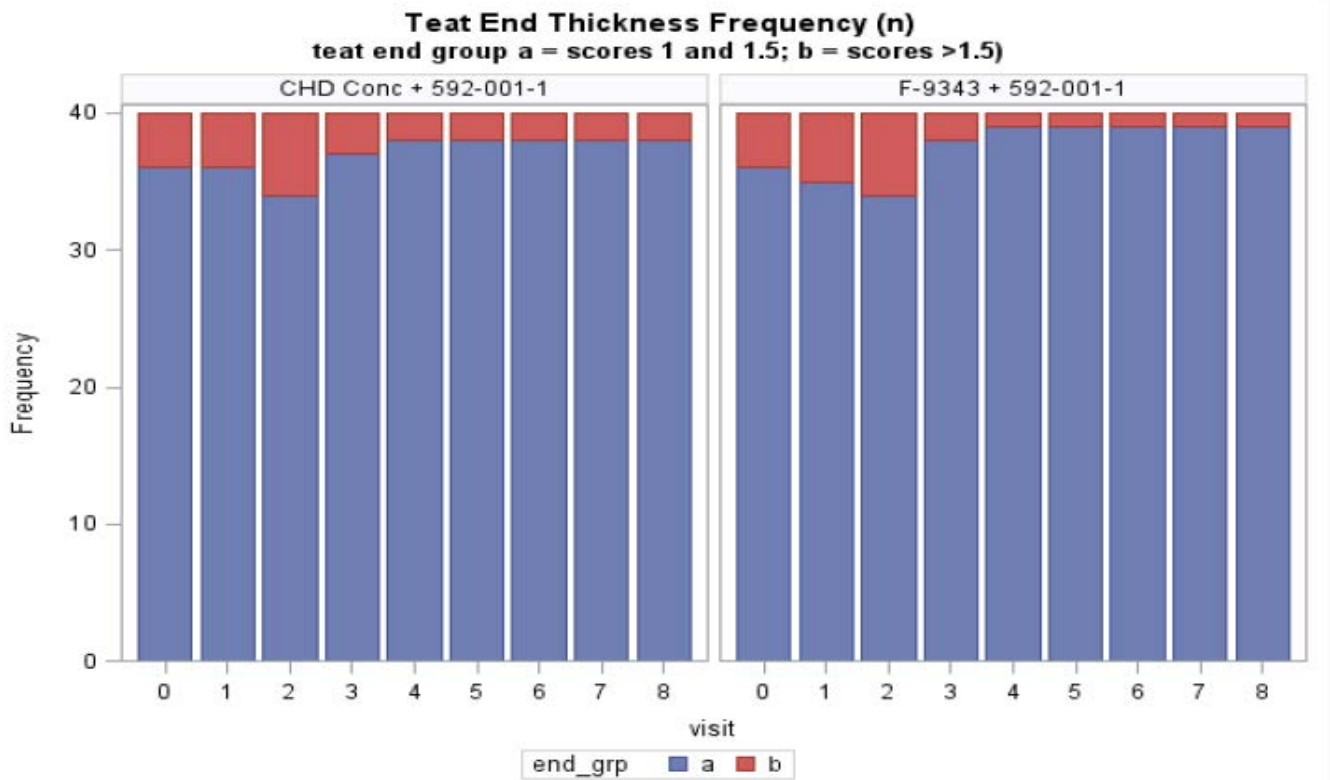


Figure 3. Teat end condition frequencies (≤ 1.5 and > 1.5) for 2 experimental organic acid dips for 4 week trial period.

Table 4. Proportion of teats (%) with teat end score of 1 or 1.5

| Product | 5/25 | 5/29 | 6/01 | 6/04 | 6/08 | 6/11 | 6/15 | 6/18 | 6/22 |
|---------|------|------|------|------|------|------|------|------|------|
| A | 90.0 | 90.0 | 85.0 | 92.5 | 95.0 | 95.0 | 95.0 | 95.0 | 95.0 |
| B | 90.0 | 87.5 | 85.0 | 95.0 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 |

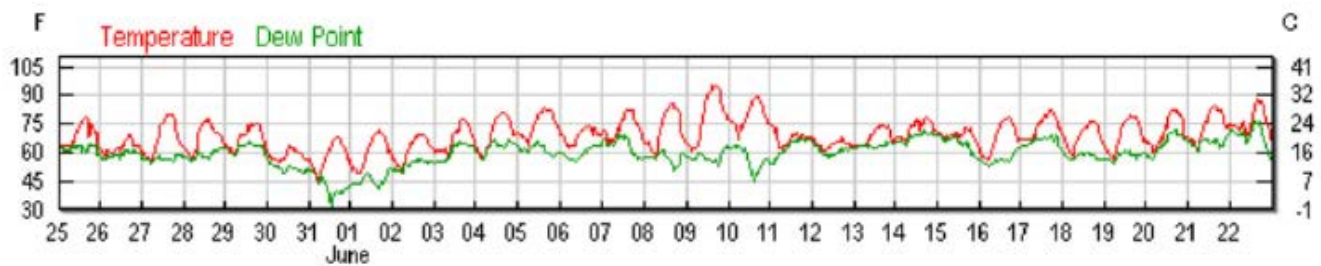


Figure 4. Temperature observed during the experimental period (Source: WeatherUnderground (www.wunderground.com))