Evaluation of Experimental vs. Two Commercial Post Milking Teat Dips (Separate Pens) on Teat Health and Condition

A.S. Leaflet R3158

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Summary and Implications

A trial was conducted to evaluate the teat conditioning efficacy of one experimental formula when used post-milking. The trial consisted of two pens, where the same pre-milking teat disinfectant was used. The same experimental post milking teat disinfectant was used on the left quarters for both pens. However, two different control products were used on the right quarters, one for each pen. The study lasted 4 weeks for one pen and 8 weeks for the second pen. Teat skin and teat end roughness were scored for each teat 2X/week. A total of 75 cows from one pen and 67 cows from the second pen were scored during the study period, but only 19 cows from one pen and 30 cows from the second pen had full records for analyses. Results showed no concerning teat skin condition irritation events. There were no differences between products in teat end condition.

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 an experimental iodine post milking teat dip formula compared to a 2 different commercial iodine post milking teat dips (2 different pens) over 4 (pen 1) and 8 (pen 2) weeks.

Materials and Methods

Test site and farm management: The Iowa State Dairy farm was the trial site. Two pens was used for this 8 week trial (Pen 11 8 weeks but Pen 12 only 4 weeks). 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). The trials were a half udder design with right teats post dipped with commercial products, and left teats with the experimental product. Milkers were blinded as to the origin of the product. A commercial iodine dip (DeLaval) was used as a premilking disinfectant on all teats, and was applied using a non-return dip cup. All postmilking disinfectants were applied using a non-return dip cup.

Teat skin and teat end health evaluations: Data collection was initiated on Nov. 7, 2015 and continued until Jan. 12, 2016. Baseline data on teat end and teat skin health was observed for 1 week prior to trial dips. Dipping with the test solutions Exp 605-041-2 and F-1712-8 (pen 11) started on November 14 2015 and ended January 12 2016. Dipping with the test solutions Exp 605-041-2 and GMP-56 (pen 12) also started on November 14 2015 but ended earlier, on December 14 2015. For the analyses, only those cows with complete teat condition records were used (Pen 11 = 19; Pen 12 = 30). Teat skin and teat end scoring were performed using a variation of the Goldberg and Timms methods, respectively, by trained graders (Tables 1 and 2). 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 and the covariates included treatment and scoring date. Post hoc comparisons were also made using least squares. 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: Exp 605-041-2 vs. F-1712-8**: There was very little change on teat skin, with most of quarters (>94%) for both groups (Exp 605-041-2 and F-1712-8) scoring 1 or 1.5 throughout the trial period, therefore there were no statistical differences between products ($p = 0.95$) (Figure 1). Also there was no difference on dates ($P= 0.052$) or treatment date ($p=1.00$). **Exp 605-041-2 vs. GMP 56:** There were no differences on teat skin condition between products (Exp 605-041-2 and GMP-56) ($P=0.81$) or the interaction product date ($P = =0.99$). However, there were differences on dates ($P< 0.0001$), with skin condition improving from start to end. The differences could actually be noticed on the second scoring and remaining good until the end of the trial (figure 2).

b) **Teat end condition: Exp 605-041-2 vs. F-1712-8**: Teat end roughness of both groups, Exp 605-041-2 and F-1712-8, is summarized in Figure 3. Data showed that overall there were no differences in teat end condition between both groups ($P=0.51$), scoring dates ($P=0.49$) or the interaction treatment date ($P= 1.00$). The number

of quarters with a teat condition score of 1 (a) or 1.5 (b) on the Exp 605.041-2 slightly improved from 63.2% (F-2187) at the start of the trial to 68.4% at the end of the trial. However, the F- 1712-8 slightly worsened from 63.9% at the start of the trial to 61.1% at the end of the trial, but these changes were not significant. **Exp 605-041-2 vs. GMP 56:** Teat end roughness of both groups, Exp 605-041-2 and GMP 56, is summarized in Figure 4. Data showed that overall there were no differences in teat end condition between both groups (P=0.56), scoring dates (P=0.37) or the interaction treatment date (P= 0.99). The number of quarters with a teat condition score of 1 (a) or 1.5 (b) for both groups improved from 58.3% (Exp 605-041.2) and 55% (GMP 56) at the start of the trial to 66.7% (X- 605-041.2) and 63% (GMP 56) at the end of the trial. However, these changes (improvement) were not significant (P= 0.99).

c) **Weather:** Trial temperatures are shown in Figure 5. Temperatures were below freezing in Nov. and during the last half of trial with extremely low temperatures the last 2 weeks.

d) **Product consumption:** Before dipping each pen, products were weighed to calculate the amount of teat dip used per cow. Consumption of teat dip per product is summarized in table 1. There were 14 different milkers during the study period which accounted for a great variation per milker on product consumption.

Overall summary and conclusion:

An 8 week half udder designed trial was conducted at the ISU dairy to evaluate the teat conditioning efficacy of an experimental post milking teat dip vs. 2 different commercial post-milking dip in separate pens. Teat skin condition was maintained at optimum levels for the whole duration of study in all products. Teat end condition efficacy was not different between the control and experimental solutions. However, teat end condition on Exp 605-041-2 group and GMP 56 slightly improved while teats on the F-1712-8 group slightly worsened from beginning to end of the trial, but these changes were not statistically significant. It is concluded that the teat disinfectant solutions tested were similar in maintaining teat skin and teat end condition during the winter period.

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**				
Cracking	none	minor	mild	moderate	severe
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

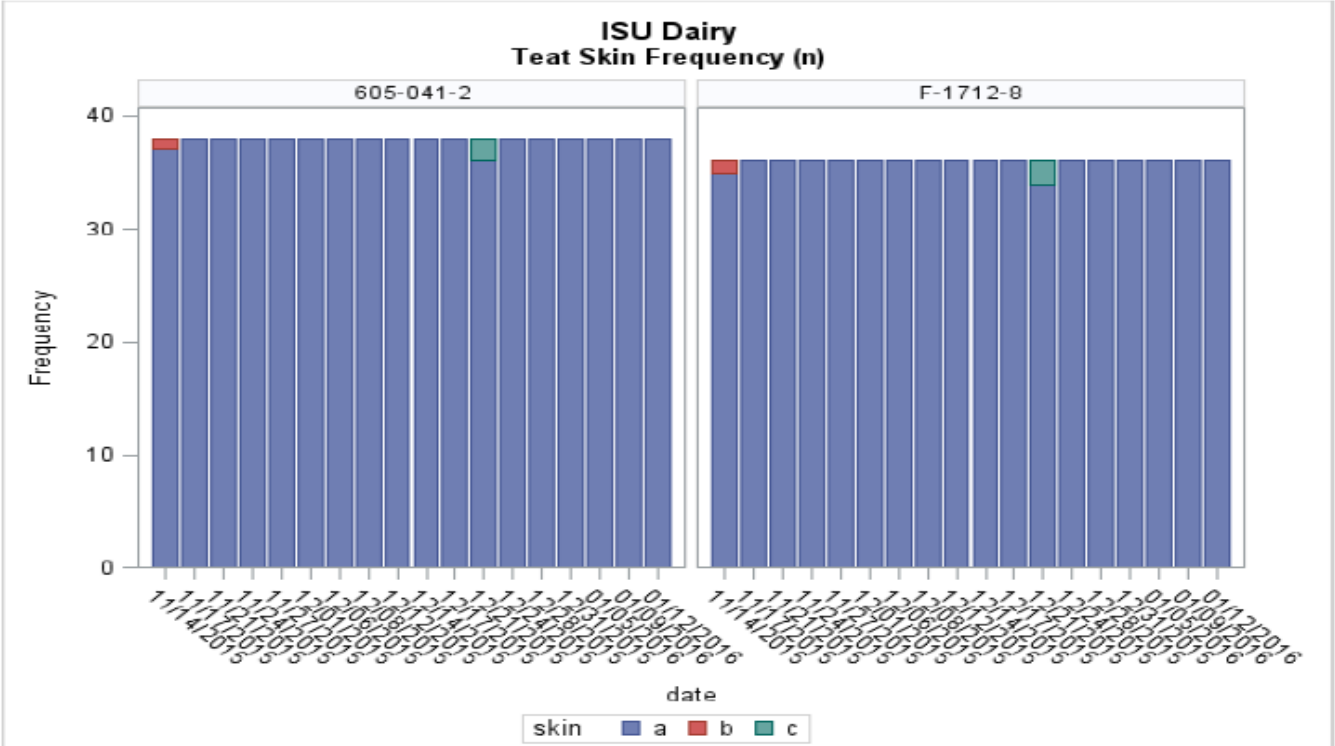

Figure 1. Frequency of teat skin condition in teats dipped with Exp 605-041-2 or F-1712-8 during the 8 week trial period. (a = score 1, b = score 2, c = score 3)

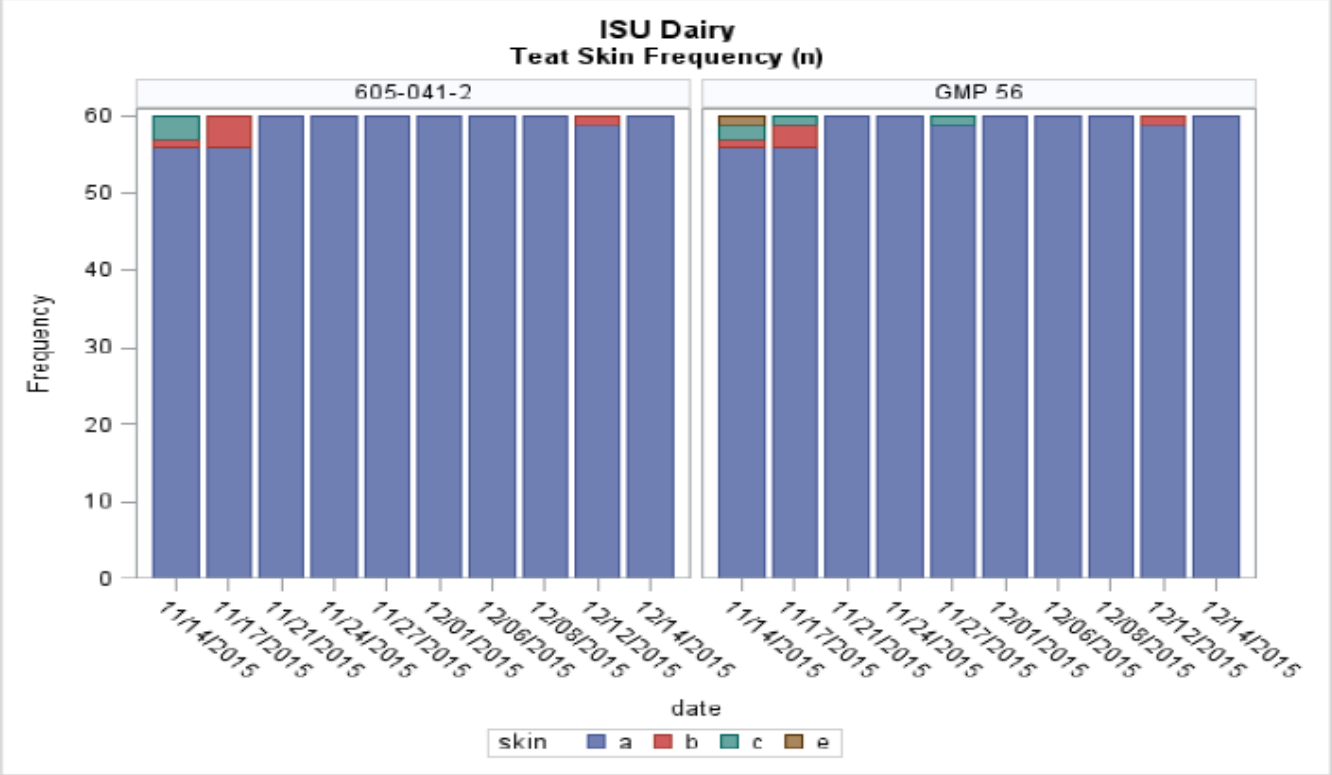

Figure 2. Frequency of teat skin condition in teats dipped with Exp 605-041-2 or GMP 56 during the 4 week trial period. (a = score 1, b = score 2, c = score 3, d= score 4, e= score 5))

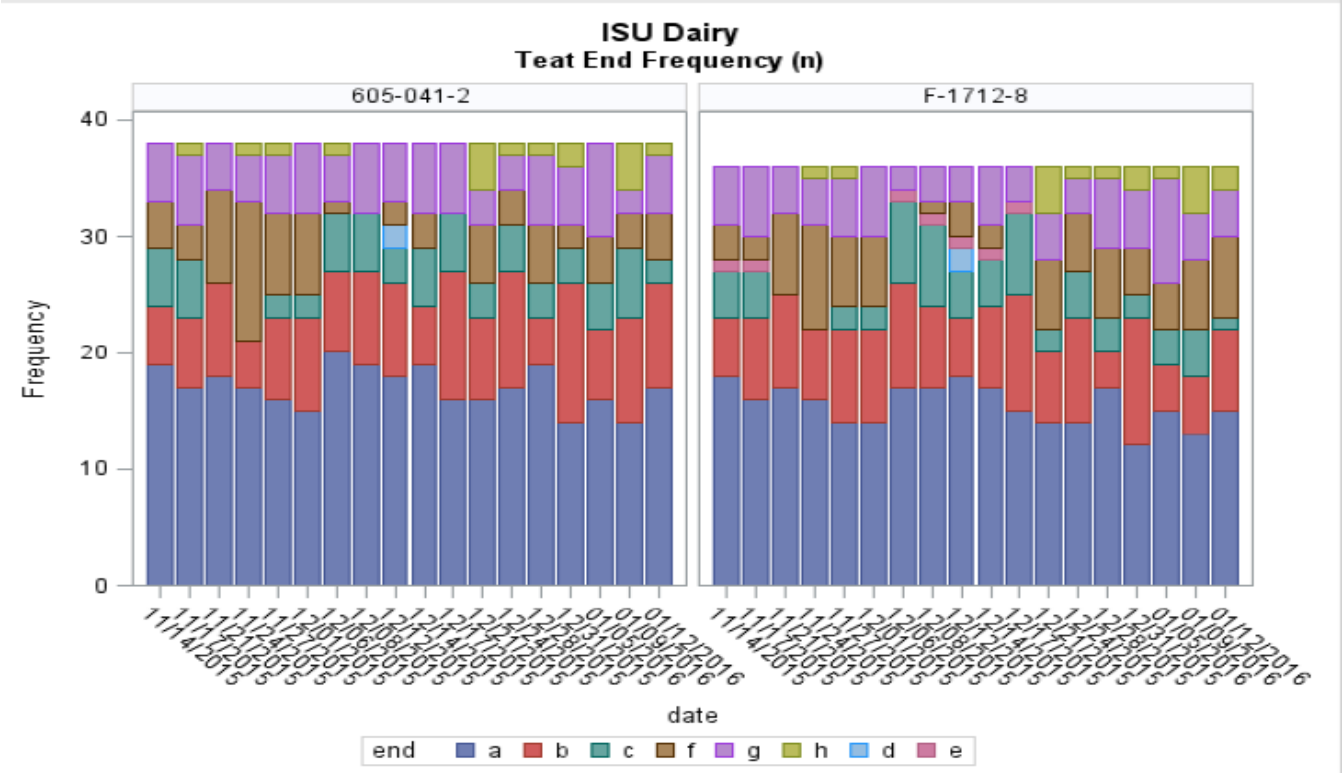

Figure 3. Frequency of teat end condition in teats dipped with Exp 605-041-2 (T) or F-1712-8 (C) during the 8 week trial period. (a = score 1, b = score 1.5, c = score 2, d = score 2.5, e = score 3, f = score 3.5, g= 4, h= 4.5).

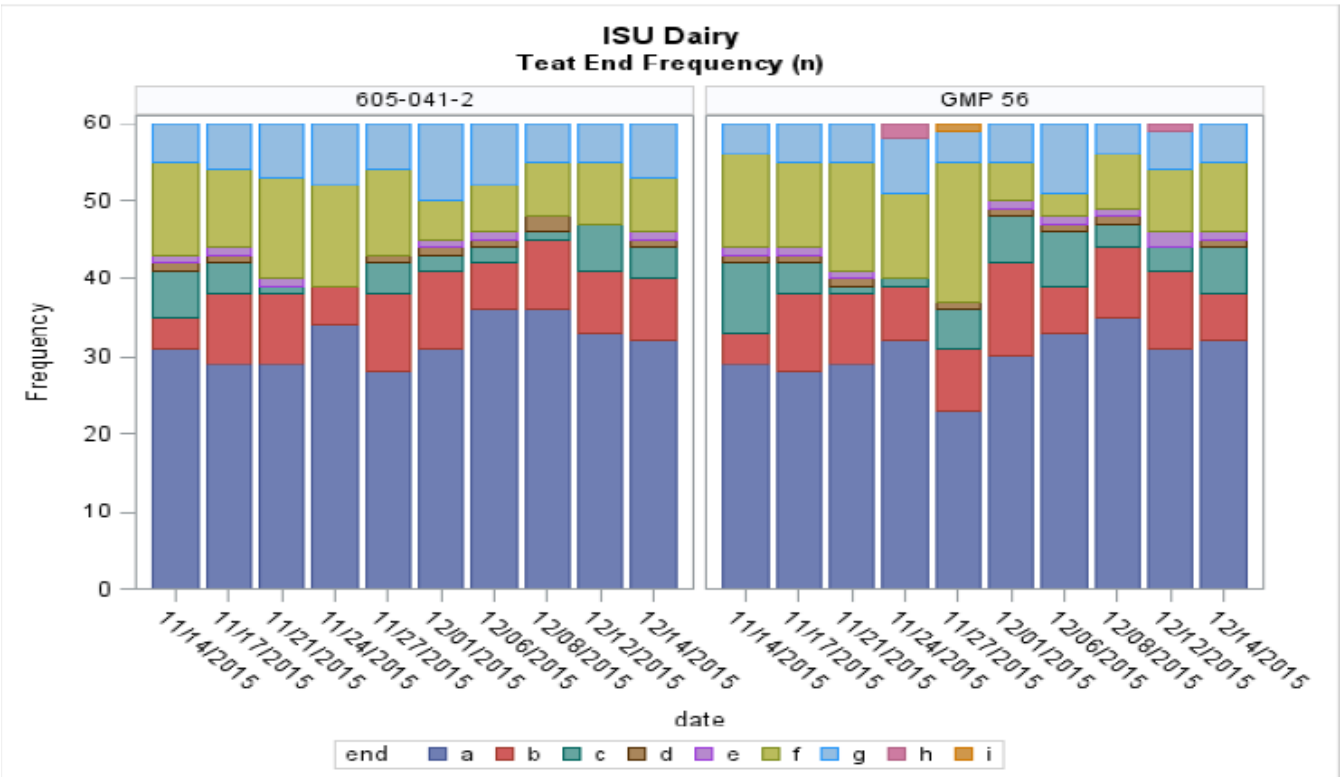

Figure 4. Frequency of teat end condition in teats dipped with Exp 605-041-2 (T) or GMP 56 (C) during the 4 week trial period. (a = score 1, b = score 1.5, c = score 2, d = score 2.5, e = score 3, f = score 3.5, g= 4, h= 4.5, i=5)

	Max	Avg	Min	Sum
Temperature				
Max Temperature	59 °F	38 °F	5 °F	
Mean Temperature	55 °F	31 °F	0 °F	
Min Temperature	51 °F	24 °F	-6 °F	
Precipitation				
Precipitation	2.31 in	0.15 in	0.00 in	7.37 in

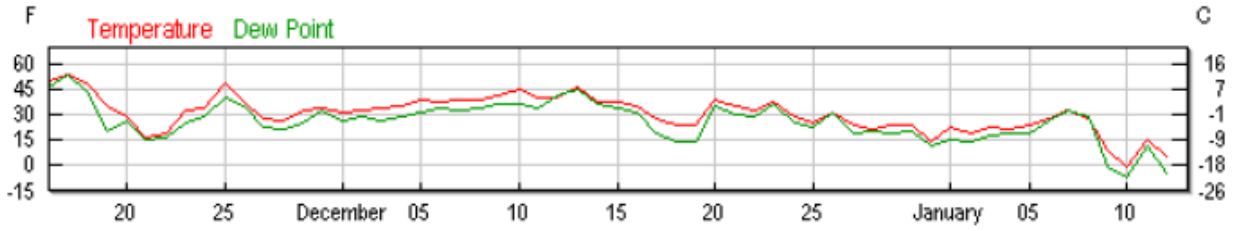

Figure 5. Temperatures observed during the experimental period (Source: WeatherUnderground (www.wunderground.com))

Table 1: Summary of average consumption of product per cow (ml/cow).

Product	Usage (g/cow)	StdDev
Della Care Enhanced (F-2187) - pre	7.4	2.4
Della Soft Enhanced (F-1712-8) - post	6.1	3.3
X-605-041-2 - post	6.3	2.3
Fortex (GMP 56) - post	5.1	2.5