

Evaluation of Experimental Iodine vs. Commercial Iodine Post Milking Teat Dips on Teat Health and Condition

A.S. Leaflet R3159

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Summary and Implications

An eight week trial was conducted to evaluate the teat conditioning efficacy of one experimental iodine post milking teat dip formula compared to a commercial iodine product. Teat skin and teat end roughness were scored for each teat 2X/week. A total of 48 cows were scored during the study period, but only 36 cows had full records for analyses. Results showed no concerning teat skin condition irritation events. There were no differences between products in teat end condition. However it was observed that teat end condition worsened over time for both products, most likely as a result of changes in temperature during winter.

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 commercial iodine post milking teat dip over an 8 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 8 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 43 cows in the pen. The trial was a half udder design with left teats post dipped with commercial product, and right teats with the experimental product. Milkers were blinded as to the origin of the product. The commercial iodine post dip (DeLaval) was used as a pre-milking disinfectant on all teats, 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.

Teat skin and teat end health evaluations: Data collection was initiated on Nov. 7, 2015 and continued until Jan. 11, 2016. Baseline data on teat end and teat skin health

was observed for 1 week prior to trial dips. Post dips were applied) at every milking (3X/ day) milking starting Nov. 14, 2015 through January 11, 2016 (56 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 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:** Teat skin remained unchanged for quarters on the control group during the trial. For the experimental group >99% quarters scored 1; therefore no statistical analyses could be conducted to evaluate differences between products. (Figure 1).
- b) **Teat end condition:** Teat end roughness of both groups is summarized in Figure 2. Data showed that overall there were no differences in teat end condition between both groups ($P = 0.62$) or treatment x date ($p = 1.00$). However, there were differences between scoring dates ($p < 0.0001$), where worse teat end condition was observed on score dates 11/21, 12/21, 12/28, 12/31, 01/05, 01/09, 1/12 compared to initial values. The number of quarters with a teat condition score of 1 (a) or 1.5 (b) decreased from 77.5% (F-2187) and 73.6% (X-2504) at the start of the trial to 66.2% (F2187) and 59.7% (X-2504) ($P < 0.05$). In addition, the proportion of quarters scoring > 2.5 increased from 11.3% (F-2187) and 18.4% (X2504) at the start of the trial to 25.4% (F-2187) and 32.3% (X-2504) ($P < 0.05$).
- c) **Weather:** Trial temperatures are shown in Figure 3. Temperatures were below freezing 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 2. There were 14 different milkers during the study period which accounted for a great variation per milker on product consumption.

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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 iodine post milking teat dip vs. a commercial iodine post-milking dip.. Teat skin condition was maintained at optimum levels for the whole duration of study in both products. Teat end condition efficacy was not

different between the control and experimental solutions. However, teat end condition worsened from initial values in both groups, most likely because of changes in temperature. 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. Products used in the study

Description	Control	Experimental
Trial ID	Yellow	Blue
Commercial name	Della Care Enhanced Concentrate 0.25%	NA
Internal ID	F-2187	EXP0117 (X- 2504-1)
Color	Brown	Brown
Active ingredient	0.25% iodine in RTU	0.5% iodine
Emollient	2% glycerin in RTU	10% glycerin
Dilution	1 part + 3 parts of water	RTU

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

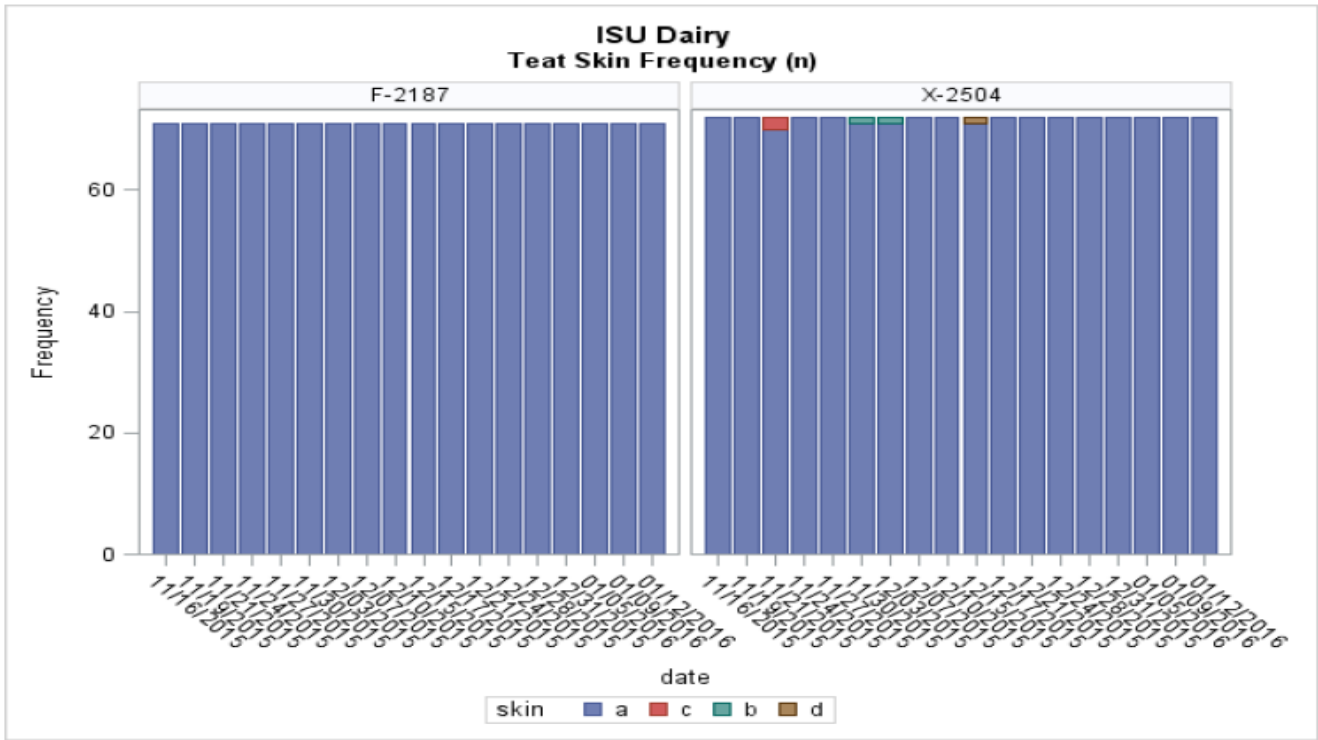


Figure 1. Frequency of teat skin condition in teats dipped with F-2187 or X-2504-1 during the 8 week trial period. (a = score 1, b = score 1.5, c = score 2, d = score 2.5)

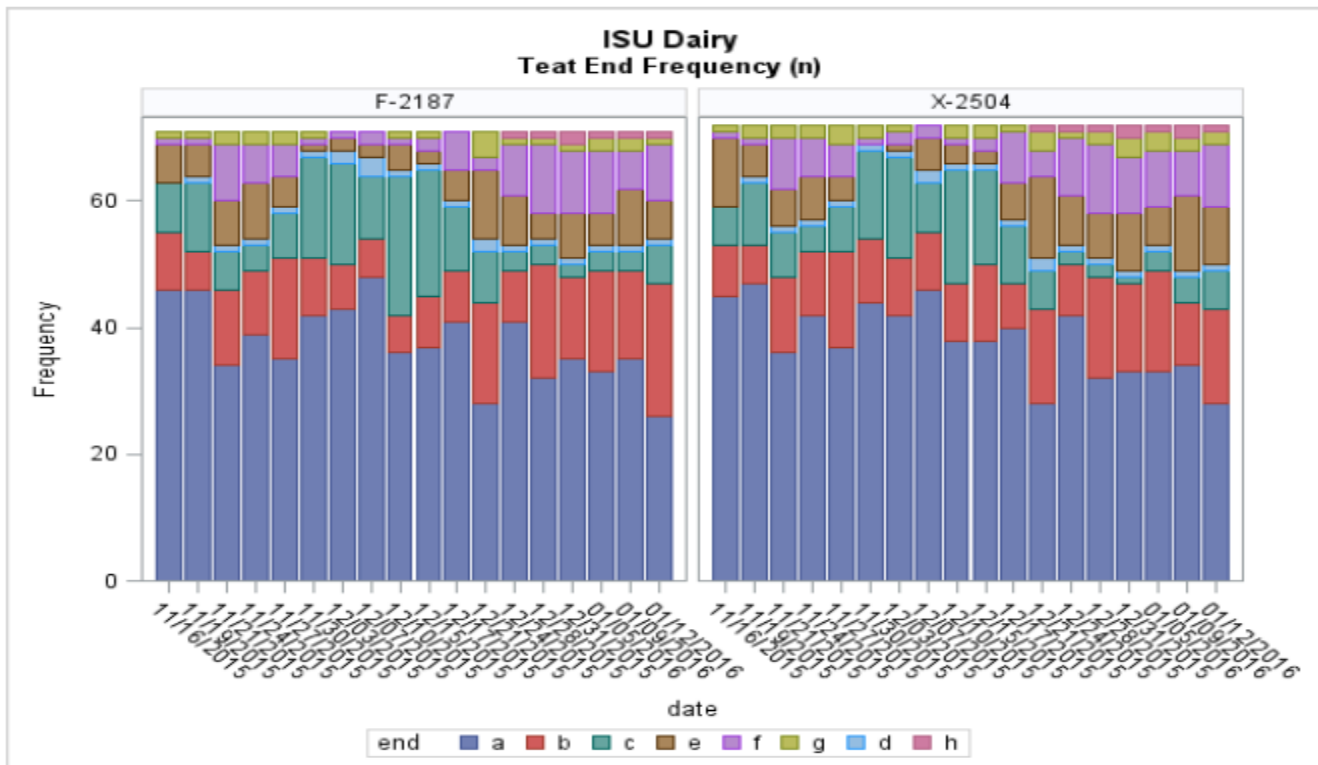


Figure 2. Frequency of teat end condition in teats dipped with F-2187 or X-2504-1 during the 8 week trial period. (a = score 1, b = score 1.5, c = score 2, d = score 2.5, e = score 3, f = score 3.5, g = 4, h = 4.5)

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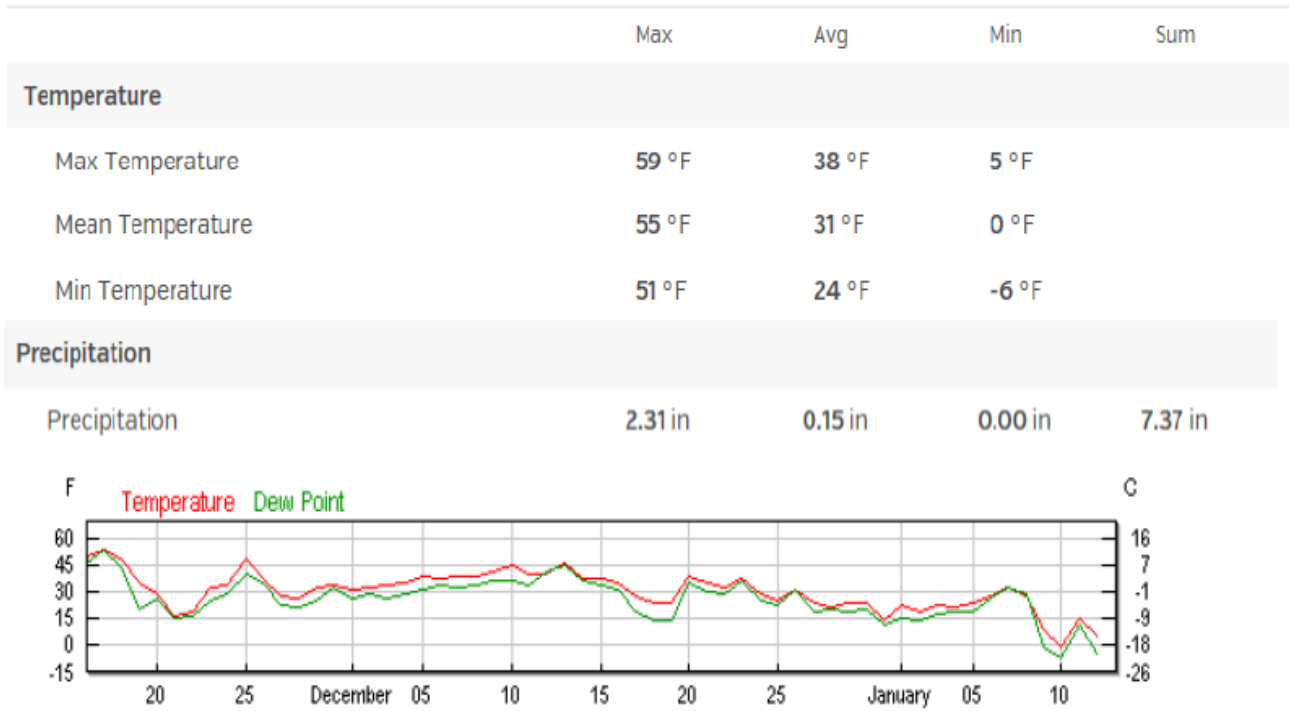


Figure 3. Temperature observed during the experimental period (Source: WeatherUnderground (www.wunderground.com))

Table 2: 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 Care Enhanced (F-2187)- post	8.6	3.6
X-2504-1	5.2	2.5