

Comparison of an Experimental vs. Commercial Dry Period Barrier Teat Sealant Dip on Teat Coverage Persistency and Teat Health (Trial 1)

A.S. Leaflet R3081

Aislinn Pomfret, Undergraduate in Animal Science; Leo Timms, Morrill Professor of Animal Science

Summary and Implications

Mastitis research has shown 40-50% of intramammary infections (IMI) are contracted during the dry or non-lactating period with greatest percentages occurring during first and last two weeks of dry period. The ability to develop and apply external persistent barrier teat dip products (like a liquid bandage) that can persist for these 1 week periods could decrease IMI, thus improving animal health and performance, and product quality and safety. Objective of this study was to evaluate an experimental vs. commercial persistent barrier dry cow teat sealant dip with particular interest and comparisons of dip persistency in providing teat end protection, and overall teat end and skin health.

Two external teat sealants were applied to 30 animals in a half udder designed trial for assessment of adherence to teat skin/teat end over a period of 5 days. On average, the control product had 62% teat ends protected 3d after application, while it was 25% for the experimental product 549-60-1. It is concluded that the experimental product did not meet the expected efficacy results.

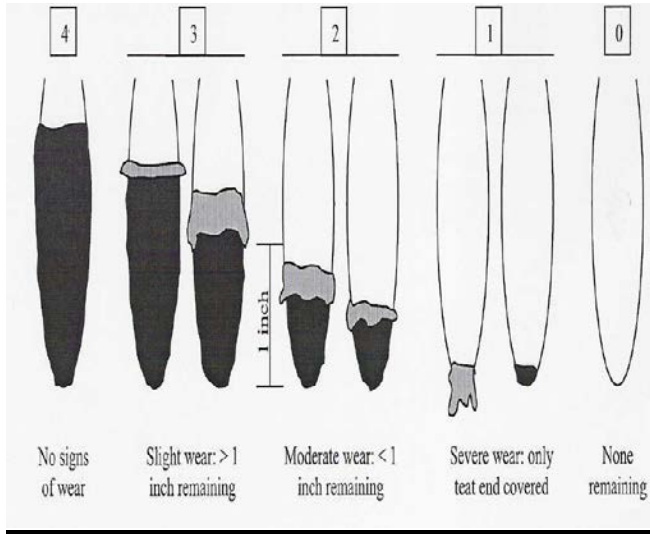
Introduction

Mastitis research has shown that 40-50% of intramammary infections (IMI) are contracted during the dry or non-lactating period with the greatest percentages of these occurring during the first and last two weeks of the dry period. At these times, the mammary gland is in a transitional state. Immunological factors are preoccupied or suppressed, milk is not being flushed from the gland, and increased mammary pressure distends the teat, thus allowing for easier bacterial penetration through the streak canal. Both external persistent sealant (2-5 day adherence) dips and internal teat sealants have been developed and shown to decrease IMI rates, especially environmental mastitis, in dry cows/ springing heifers during the early dry and late parturition periods when used properly. The ability to develop and apply external persistent barrier teat dip products (like a liquid bandage) that can persist for these 1 week periods could decrease IMI, thus improving animal health and performance, and product quality and safety. The objective of this study was to evaluate an experimental vs. commercial persistent barrier dry cow teat sealant dip with particular interest of dip persistency in providing teat end protection, and overall teat end and skin health.

Materials and Methods

1. **Dips used:** 2 dips were used in this trial. One dip was an experimental polymer dip (549-60-1, DeLaval) while the control dip was a commercial dry cow sealant product (Dry Off, GEA).
2. **Cows:** All protocols were approved by the ISU Committee on Animal Care. 30 dry cows and pregnant heifers (~ 2-4 weeks pre-calving) were used for the study. Cows were housed in a free stall barn with sand bedding and headlocks on the south side of the ISU dry cow barn. Cows were fed and locked up at 6:30 am Sunday, December 14, 2014 and dipping commenced.
3. **Animal ID and teat health evaluation** (initial and final): 30 animals in lockups were visually identified by eartag. All teats of all animals were cleaned and dried with terry cloth towels. If teats were visibly dirty, teats were pre-dipped first with a 350 ppm chlorine predip and then dried with the towel. Individual teat ends and teat skin for every animal were evaluated by one scorer using the system below at this time (initiation of trial) and again once the dip had completely been removed from the teat following dipping (final evaluation). Comparisons between dips as well as between evaluation periods were conducted.
4. **Teat dipping and dripping / drying evaluations:** Dip was dispensed into dixie cups for dipping and refilled as needed. 30 total animals (20 Holstein cows, four Holstein heifers, and six Jersey heifers) were dipped in a half udder design alternating right and left udder half teats between dips. A total of 60 quarters were assigned to each treatment, and each treatment had an equal number of quarters (n=15) assigned to a quarter location (LF, RF, LR, RR). Film or dip thickness, color, dip dripping and/or stringing of dip, and dip wastage via animal leg movement, etc. were noted. Some cows were photographed on day 0 (dip day) and day 2 post dipping (see end of report).
5. **Teat dip persistency evaluation:** Teat dip persistency or coverage of teats (especially teat ends) was conducted every 24 hours. Teat dip coverage was scored using a 0-4 scale: (4= complete teat adherence similar to originally dipped; 3 = dip starting to peel but on $\frac{3}{4}$ of teat; 2 = 50% of teat covered; 1 = teat end only covered; and 0 = dip completely off. Observations on dip shearing, flaking, or tearing were also recorded. Each teat was given a score (day when dip last seen) and means and medians for each dip were calculated.

6. **Statistical analysis:** Logistic regression was used to test differences in proportion of cow teat ends that were protected (adherence score of 4, 3, 2 or 1) after 1 to 5 days, using statistical package MedCalc (v12.7.0.0). Treatments were compared relative to control product Dry-Off[®]. Statistical significance was set at 0.05.



2. **Teat dip film coverage:** All products could be applied to teats in a uniform manner. Shredding and slippage from teats was observed after the first day, and persistence of products on teats varied from cow to cow.

3. **Teat dip persistency and coverage:** Number of teats and score values on different days after application of product are shown in Table 1. Products on teats are shown in Figure 1. Statistical outputs of logistic regression calculations when comparing 549-60-1 to the control product Dry-Off[®] at different hours relative to initial application on teats is shown in Table 2. Results showed that the experimental product 549-60-1 had similar number of protected teats after 24 h compared to Dry-Off[®] both above 90%. In the following days (2, 3 and 4), the control product had a higher number of protected teats (P<0.001). There were no differences observed between both treatments in the fifth day after dipping teats. Previously (trial 2011-019 Round 7), Dry-Off[®] protected 21% teats after three days, but a higher number (62%) of protected teats was observed in this trial. Possible differences may be due to changes in ambient temperature. In the previous trial the temperature was higher compared to this one, as that trial was conducted in May 2012 and this one in December 2014.

Results and Discussion

1. **Teat end and teat skin health**

➤ There were no differences among dips with regards to teat skin and end health. All teats had excellent teat skin and end health before dipping and after dip removal.

Overall Summary

Two external teat sealants were applied to 30 animals for assessment of adherence to teat skin/teat end over a 5 day period. Control product had 62% teat ends protected 3d after application, while it was 25% for the experimental product 549-60-1. It is concluded that the experimental product did not meet the expected efficacy results.

Table 1. Adherence of external teats sealants on quarters of dry cows over a period of five days after initial application.

Treatment	Hours	Quarters (n)					Coverage*
		Score 4	Score 3	Score 2	Score 1	Score 0	
Dry-Off [®]	24	46	7	1	2	4	56 (93%)
	48	18	12	13	3	14	46 (77%)
	72	4	11	14	8	23	37 (62%)
	96	2	4	0	17	37	23 (38%)
	120	0	0	2	5	53	7 (12%)
549-60-1	24	45	5	1	7	2	58 (97%)
	48	10	4	9	8	29	31 (52%)
	72	5	3	3	4	45	15 (25%)
	96	1	1	1	3	54	6 (10%)
	120	0	1	1	0	58	2 (3%)

* Includes quarters with any score, from 1-4

Iowa State University Animal Industry Report 2016

Table 2. Statistical outputs of logistic regression calculations when comparing 549-60-1 to the control product Dry-Off[®] at different hours relative to initial application on teats.

Time after application	<i>P</i> value	Odds ratio*	95% Confidence Interval
24 hours	0.4111	2.0714	0.3648 to 11.7624
48 hours	0.0050	0.3253	0.1486 to 0.7124
72 hours	0.0001	0.2072	0.0947 to 0.4532
96 hours	0.0007	0.1787	0.0663 to 0.4816
120 hours	0.1032	0.2611	0.0519 to 1.3127

* Odds ratio is the coverage odds in the treatment group divided by the coverage odds in the control group

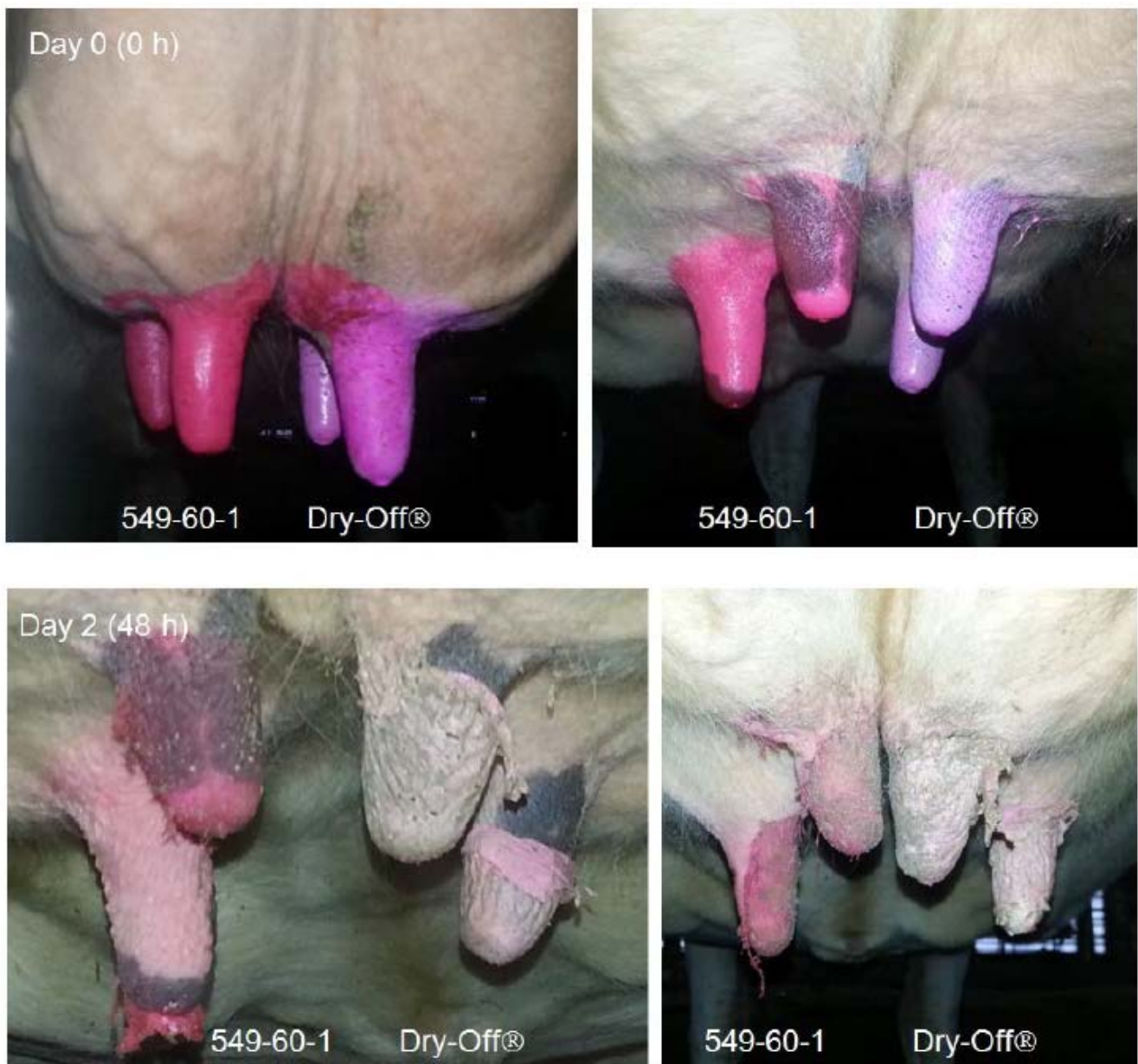


Figure 1. Products on teats after dipping (0 h) and after 48 h.