

Evaluation of Teat Coverage Persistency and Teat Health for Three Dry Period Persistent Barrier Teat Sealant Dips

A.S. Leaflet R2976

Melanie Matti and Aislinn Pomfret, Undergraduates in Animal Science; Leo Timms, Morrill Professor of Animal Science

Summary and Implications

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. 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 and compare 3 persistent barrier dry cow teat sealant dips with particular interest and comparisons of dip persistency in providing teat end protection, and overall teat end and skin health.

Cows dipped with all dips had significantly greater persistency and protection compared to previous 4 trials (last 2 years). All dips were easy to apply and showed excellent teat health. Films were very consistent and very flexible over time (limited ripping, shredding or flaking). Overall, Dips C and A showed the greatest persistency in the first 5 days post dipping which is a very critical time period, but dip C persisting longer after this.

Introduction

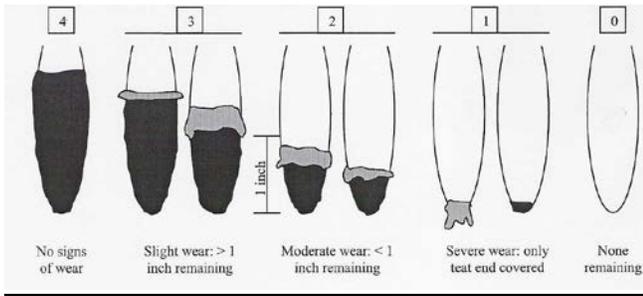
Mastitis research has shown that 40-50% of intramammary infections (IMI) are contracted during the dry or non-lactating period with the greatest percentages of these occurring during the first and last two weeks of the dry period. At these times, the mammary gland is in a transitional state. Immunological 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 and compare 3 persistent barrier dry cow teat sealant dips with particular

interest and comparisons of dip persistency in providing teat end protection, and overall teat end and skin health.

Materials and Methods

1. **Dips used:** 3 dips were used in this trial. The three dips were named T-Hexx Dry A (Dip A), T-Hexx Dry – B (Dip B) and T-Hexx Dry C (Dip C).
2. **Cows:** All protocols were approved by the ISU Committee on Animal Care. 24 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 Saturday March 8, 2014.
3. **Animal ID and teat health evaluation** 24 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 .400 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. 24 total cows were dipped. 8 animals were dipped in a half udder design with 4 cows' right teats dipped in Dip A (designated A1) and left teats with Dip B (B1); and the 2nd 4 reversed (A1 on left; B1 on right). The 2nd set of 8 animals were dipped with 4 cows' right teats dipped with Dip A (A2) and left teats dipped with Dip C (C2), and the 2nd 4 cows reversed (A2 on left, C2 on right). The final 8 cows were dipped with right teats of 4 cows getting Dip B (B3) and left teats dipped in Dip C (C3), with the last 4 cows dipped with left teats in B3 and right teats with C3. Observations of film or dip thickness, color, dip dripping and/or stringing of dip, and dip wastage via animal leg movement, etc. were recorded. Some cows were photographed on day 0 (dip day- 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 score using a 0-4 scale: (4= complete teat adherence similar to originally dipped; 3 = dip starting to peel but on ¾ 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. A 2

digit system (x-0) was used when dip was off the end but still on the side of teat (x= side coverage number, 0 = dip not covering teat end). Each teat was given a score (day when dip was last seen) and means and medians for each dip and set of cows are in the database spreadsheet. Summary data on each dip (A, B, and C) but on different cow sets (A1 and A2; B1 and B3; C2 and C3) were evaluated and compared. **Persistency characteristics within each dip across sets of cows were similar so then all teats receiving A, B, or C dips were combined (16 cows, 32 quarters with each dip) and summarized and graphed.**



Results and Discussion

1. Teat end and teat skin health

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

2. Teat dip film coverage:

- Dip films on Day 0: All dips went on very fluently with some dripping but all gave very uniform films.
- Dip films on Days 2 and later: All dips were reasonably flexible with good films. There was limited or no ripping, shearing, or flaking. These are the best films we have seen in terms of both thickness and flexibility (limited drying out or flaking)
- Dip thickness, stickiness, and reasonable drying times are very important. We dip not dip any different than we have in previous experiments and all cows had dip dried before being released to lie down. All dips looked and did very well from a film standpoint!

3. **Teat dip persistency and coverage:** Results can be found in Figures 1 and 2. Figures 1 and 2 represent data on dips combined across animals. This was done since similar patterns were seen within each animal group dipped for each dip. Figure 1 represents % of teat ends protected relative to dips used and days post dipping for each dip combined across all combinations and blocks. Figure 2 represents days post dipping that an individual cow (both teats) were still completely protected for each dip combined across all combinations and blocks.

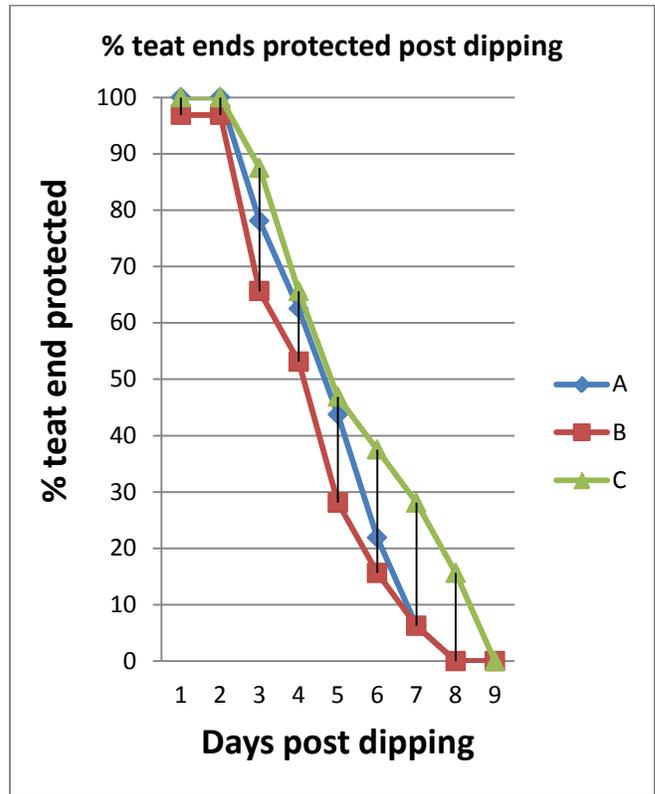


Figure 1. % of teat ends protected by dip (data combined on dips across all teats and animals).

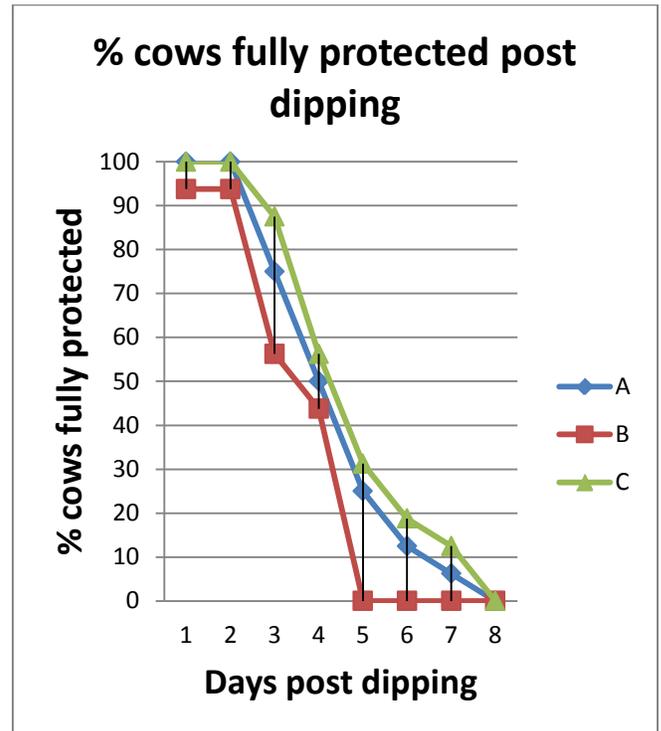


Figure 2. % of cows fully protected by dip (data combined on dips across all teats and animals).

Iowa State University Animal Industry Report 2015

- **Dips A vs. B vs. C when data combined over teats and times:** Figures 3 and 4 represent data on dips combined across animals. This was done since similar patterns were seen within each animal group dipped for each dip. These figures really highlight the differences among the dips (more numbers of teats and animals/ dip).
- Dip C was better than Dips A and B. Dip's C and A were similar through the 1st 4-5 days but C was much more persistent after that. Dip C and B were similar for 2 days. Then clearly, Dip C was superior to B.
- Dip A was better than Dip B. Dips were similar the first 2 days, but A was more persistent after this
- Over 50% of cows and teats were protected at least 3 days for all dips.
- Adherence of dips in this study were better than previous 2 years of studies with other prototypes.

Overall Summary

- **Ranking the Dips:** C > A > B. C and A similar for 1st 4-5 days but then C more persistent. A and B similar 1st 2 days but then A more persistent.
- All dips were easy to apply and showed excellent teat health. Films were very consistent and very flexible over time (limited ripping, shredding or flaking).
- Adherence of dips in this study were better than previous 2 years of studies with other prototypes.

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

Cow pictures: 3/8/ 2014 10 minutes post dipping

