

Evaluation of Teat Coverage Persistency and Teat Health for 2 New Prototype & 1 Commercial Dry Period Persistent Barrier Teat Dips

A.S. Leaflet R2881

Melanie Matti, Undergraduate 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 2 new prototype persistent barrier dry cow teat dips compared to a commercially available dry cow barrier teat dip, with particular interest and comparisons of dip persistency in providing teat end protection, and overall teat end and skin health.

Cows dipped with commercial T-Hexx dip had significantly greater persistency and protection compared to experimental dips A (2323-124-01) and B (2323-125-01). Experimental dips were easy to apply (as was control dip). Problems with experimental dips are they crack, shed, and rip more easily and thus come off. It seems to rub and shred on the teat end also even though dip may remain on the side or barrel of the teat. Believe this has to do with the consistency or thickness of the film and its tensile strength.

Introduction

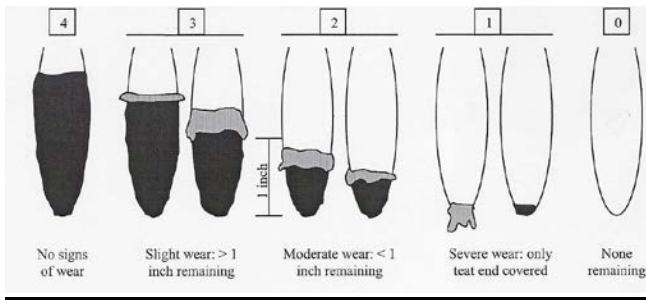
Mastitis research has shown that 40-50% of intramammary infections (IMI) are contracted during the dry or non-lactating period with the greatest percentages of these occurring during the first and last two weeks of the dry period. At these times, the mammary gland is in a transitional state. Immunological 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 prepartum 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 2 new prototype persistent barrier dry cow teat dips compared to a commercially available dry cow barrier teat dip, 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. Two new prototype experimental dry cow barrier dips ((2323-124-01 Dip A (A) and 2323-125-01 Dip B (B)) were compared to a commercially available blue dry cow barrier dip (T- Hexx Dry, Hydromer, Inc.) (C).
2. **Cows:** All protocols were approved by the ISU Committee on Animal Care. 32 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 6:00 am Friday August 16, 2013.
3. **Animal ID and teat health evaluation** (initial and final): 32 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 .5% iodine 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. 32 total cows were dipped. 8 cows were dipped in a half udder design with right teats dipped in T-Hexx dip (C – control: C1) and left teats with Dip A (A) and a 2nd set of 8 dipped with right teats dipped with A and left teats dipped with C (C1). The next 8 cows were dipped with right teats getting C (C2) and left teats dipped in B, with the last 8 cows dipped with right teats in B and left teats with T-Hexx (C2). 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) and day 3.
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 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). Cows with 2 digit scores (teat ends not covered but dip on sided) are designated with an asterisk (4*) in the master database (T-Hexx Dry Study August 2013 excel database)



Results and Discussion

1. **Teat end and teat skin health:** Teat skin and teat end scores can be found in the Excel worksheet (T Hexx Dry Study 2013). Prior to dipping, all teats had excellent teat skin and ends (a few hyperkeratotic ends) since these were mid dry cows and heifers (no milking machine pressures). All teat skins and teat ends of both groups scored the same after dip was removed and gone.
 - **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 Day 2-3:** Both experimental dips (A & B) tore easier, especially rubbing off the end of some cows.
 - 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. Experimental dips tended to tear and shred more and faster.
3. **Teat dip persistency and coverage:** Results can be found in Figures 1 and 2 below. Figure 1 represents % of teat ends protected relative to dips used and days post dipping. Figure 2 represents days post dipping that an individual cow (both teats) were still completely protected. **Only compare C1 to Dip A and C2 to Dip B!!!!**

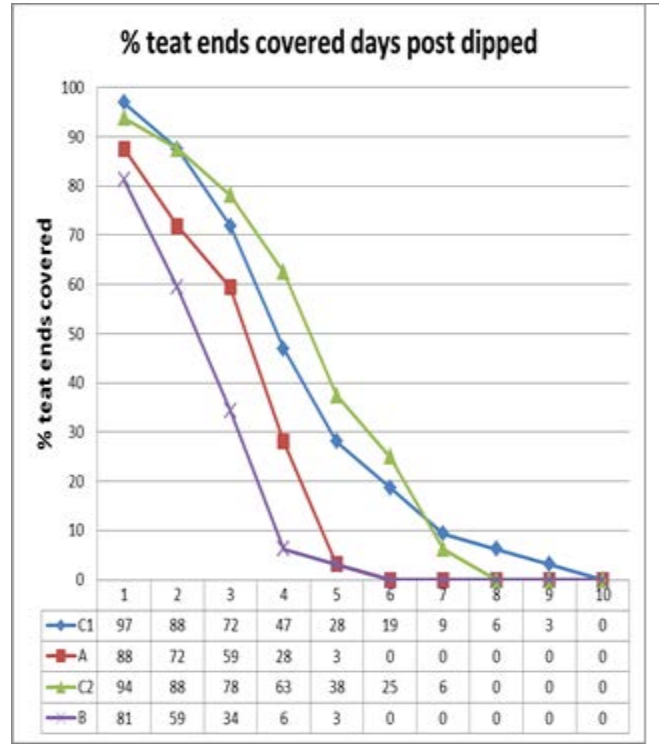


Figure 1. % teat ends protected (≥ 1) in relation to dip used and days post dipping (C1 v A; C2 v B).

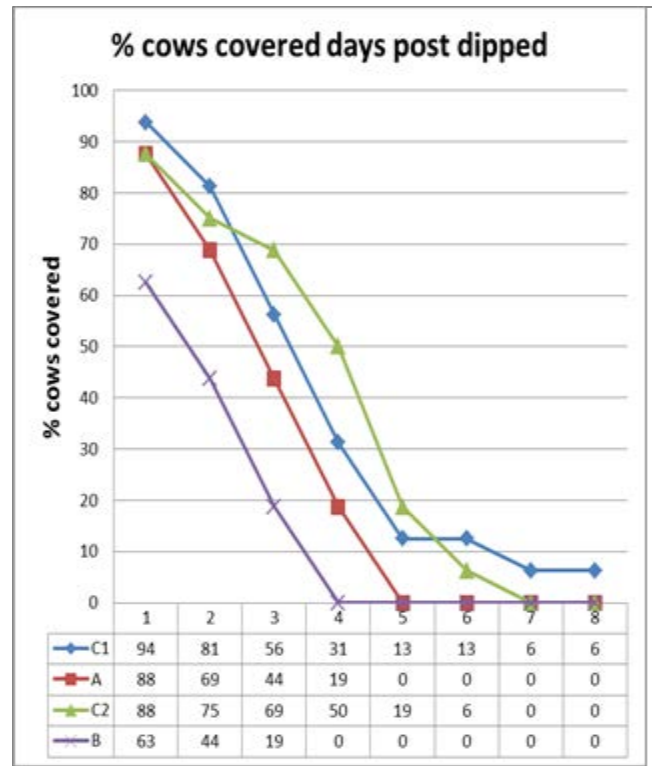


Figure 2. % cows protected (both teats ≥ 1) in relation to dip used and days post dipping. (C1 v A; C2 v B).

- a) **T-Hexx (C1) vs. Dip A:** T- Hexx showed significantly better persistency on teats and cows in this trial compared to Dip A (average .8 and 1.4 days greater minimum retention time in front and rear quarters, respectfully; 0 – 1.5 day greater median days protected).
 - Average minimum retention times and median days retention times for T-Hexx (C1) and Dip A on front and rear teats were: T-Hexx: 3.56 and 3.81 days, median 3 and 3.5 days; Dip A: 2.88 and 2.19 days, median 3 and 2 days protection.
- b) **T-Hexx (C2) vs. Dip B:** T- Hexx showed significantly better persistency on teats and cows in this trial compared to Dip A (average 2+ days greater minimum retention time; 2 day greater median days protected)
 - Average minimum retention times and median days retention times for T-Hexx (C2) and Dip B on front and rear teats were: T-Hexx: 4 and 3.81 days, median 4 and 4 days; Dip B: 1.75 and 1.94 days, median 2 and 2 days protection.
- c) **T-Hexx 1 and A cows vs T-Hexx 2 and B cows:** All cows had dipped dried before being released to lie down in stalls. C1 and C2 dips are same dips on 2 different sets of cows. Although they show slightly different overall persistency, they were fairly similar between groups.
- d) **Overall T-Hexx vs experimental dips:** Overall, commercial T-Hexx dipped teats showed greater persistency and protection over time compared to the both experimental dips. It looked like Experimental A dip was better than B, but both were inferior to T-Hexx control.

Overall Summary

Cows dipped with commercial T-Hexx dip had significantly greater persistency and protection compared to experimental dips A (2323-124-01) and B (2323-125-01). Experimental dips were easy to apply (as was control dip). Problems with experimental dips are they crack, shed, and rip more easily and thus come off. It seems to rub and shred on the teat end also even though dip may remain on the side or barrel of the teat. Believe this has to do with the consistency or thickness of the film and it’s tensile strength.

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

Some post dipping pictures – days 2-3 after dipping



Day 2 post dip: C2 (T-Hexx) on LF intact, A on RF shredded, off end Day 3: LR (T-Hexx) intact; B dip on RR ripped/ torn