

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

A.S. Leaflet R2794

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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 1 new prototype faster drying persistent barrier dry cow teat dip 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.

Dipping with the new fast drying blue dip (E) compared to T-Hexx Blue (commercial dip - B) resulted in similar excellent teat end and skin health. Although a small % of cows had similar short (48 hours or 2 days protection) and long protection (> 5 days with both teats protected) across both dips, the majority of cows showed ~ 1 day longer persistency with T-Hexx compared to the fast drying blue experimental dip with this difference being greater in front compared to rear quarters but both front and rear quarters were higher with the T-Hexx group. Front teats averaged .5 days greater persistency than rear teats. Overall, the new experimental dip was slightly inferior to the commercial T-Hexx product.

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 1 new prototype faster drying persistent barrier dry cow teat dip 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

Dips used: 2 dips were used in this trial. One faster drying prototype experimental dry cow barrier dips (fast drying blue) (E) was compared to a commercially available blue dry cow barrier dip (T- Hexx Dry, Hydromer, Inc.) (T).

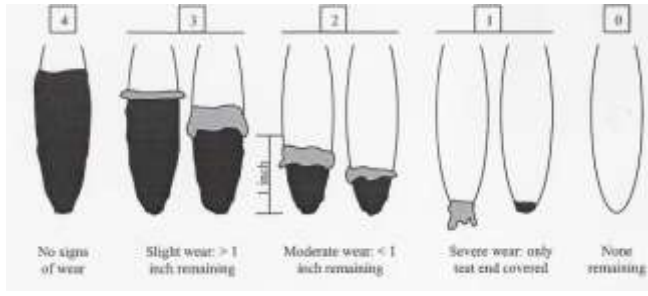
Cows: All protocols were approved by the ISU Committee on Animal Care. 20 dry cows and pregnant heifers (~ 2-4 weeks pre-calving) were used for the study. Cows were housed in a free stall barn with sand bedding and headlocks on the south side of the ISU dry cow barn. Cows were fed and locked up at 10:30 am Wednesday December 21, 2011.

Animal ID and teat health evaluation (initial and final): 20 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 .25% 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

Teat dipping and dripping / drying evaluations: Dip was dispensed into dixie cups for dipping and refilled as needed. 10 cows were dipped in a half udder design with right teats dipped in T-Hexx dip (T - control) and left teats with Fast Blue (E). The second 10 cows were dipped with right teats dipped in Fast Blue dip (E) and left teats with T-Hexx (T). Observations of film or dip thickness, stringing of dip, and dip wastage via animal leg movement, etc. were recorded. Also, 5 cows' teats were photographed with short video clips of 2 cows on initial dipping day, and 3 cows at 3 days post dipping.

Teat dip persistency evaluation: Teat dip persistency or coverage of teats (especially teat ends) was conducted every 12 hrs for 2 days, then every 24 hours thereafter. 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.



Results and Discussion

Teat end and teat skin health: Prior to dipping, all teats had excellent teat skin and ends since these were mid dry cows and heifers (no milking machine pressures). All teat skins of both groups scored 1 before and after dips were removed, and all teat ends scored 1 pre and post dipping except for 1 cows who had all 4 teat ends score 1.5 before and after dipping.

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

Teat dip film coverage: (pictures at end). Experimental fast drying blue dip (E) initially looked like a more consistent film due to its faster drying. Visually, the teat looked better covered (more consistent blue across the whole teat film) than commercial T-Hexx for 24-48 hrs.

Teat dip persistency and coverage: Results were calculated on 2 sets of cows independently. The first 10 cows had right teats dipped with T-Hexx; the 2nd had left teats dipped with T-Hexx. This allowed us to see if there were any differences in cows/ groups.

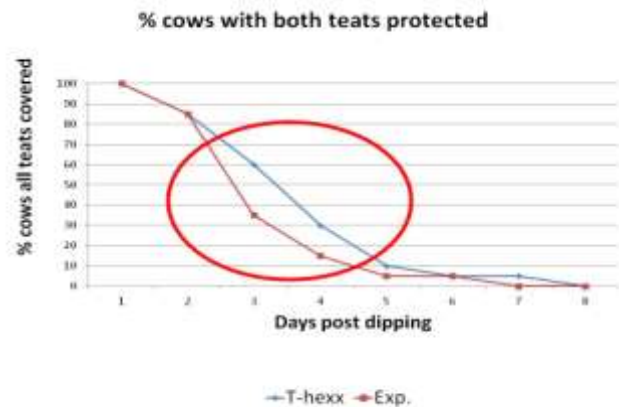
➤ **Group 1: T-Hexx on right teats; Exp. On left:** Mean and median days persistency (dip last seen on teat end) for RF, RR (both T-Hexx) and LF, LR (Exp) were: 4, 3.5, 3.1, and 3.2 (mean); and 3.5, 3, 3, and 2.5 (median) respectfully. Experimental dips showed 1 and .5 less days average persistency on front and rear teats, respectively.

➤ **Group 2: Exp. on right teats; T-Hexx On left:** Mean and median days persistency (dip last seen on teat end) for RF, RR (both Exp.) and LF, LR (T-Hexx) were: 3.1, 2.5, 3.8, and 2.9 (mean); and 3, 2.5, 4, and 3 (median) respectfully. Experimental dips showed 1 and .5 less days average persistency on front and rear teats, respectively.

➤ **Both groups:** Similar data was seen across both groups with T-Hexx dipped front and rear teats having 1 and .5 days more coverage than teats dipped with fast drying blue dip (E). Of the 40 teat pairs comparisons (RF to LF, RR to LR) within individual cows, T-Hexx had longer persistency on 21 teat pairs (52.5%), 14

pairs were equal (35%), and fast dry had longer persistency on 5 teat pairs (12.5%).

➤ **Persistency over time:** The following graph shows the percentage of cows having both teat ends protected over time. All teats of all cows were protected (100%) for 24 hours. At 2 days post dipping, both groups had 80% of cows with both teats protected. At 3 days post dipping, 60% of cows dipped with T-Hexx still had both teats protected while only 35% of cows dipped with Fast Drying Blue experimental dip had both teats protected. This trend persisted until day 5. Less than 10% of cows had both teats protected with either dip by day 6 post dipping. The graph points out that there are a few cows that have either short or long persistency (persistency similar for both groups up until 2 days post dipping and after 6 days post dipping). However, the bulk of cows that probably portray dip persistency the best (3-5 day persistency) showed T-Hexx having a much greater retention on these cows and teats (1 day or more).



➤ **Front vs rear teat persistency:** Front teats (FT) showed about .5 days higher persistency compared to rear teats (RT), with 50% of FT showing longer persistence than RT, 25% of RT showed greater persistence in RT, and 25% were equivalent.

Overall Summary

Dipping with the new fast drying blue dip (E) compared to T-Hexx Blue (commercial dip - B) resulted in similar excellent teat end and skin health. Although a small % of cows had similar short (48 hours or 2 days protection) and long protection (> 5 days with both teats protected) across both dips, the majority of cows showed ~ 1 day longer persistency with T-Hexx compared to the fast drying blue experimental dip with this difference being greater in front compared to rear quarters but both front and rear quarters were higher with the T-Hexx group. Front teats averaged .5 days greater persistency than rear teats. Overall, the new experimental dip was slightly inferior to the commercial T-Hexx product.

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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: 12/22/2011 24 hours post dipping



Cow 7894 T-Hexx right side

Cow 7583 T-Hexx right side

Cow 7895 T-hexx right side



Cow NTB T-Hexx Left side

Cow 3040 J T- Hex left side

Cow pictures: 12/24/2011 72 hours (3 days) post dipping

