

# Evaluation of Teat Coverage Persistency and Teat Health for Four New Prototype Dry Period Persistent Barrier Teat Dips

## A.S. Leaflet R2795

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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 4 new prototype faster drying persistent barrier dry cow teat dips, 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 dip (A, B, C, D) resulted in similar excellent teat end and skin health. Overall persistency was lower (only 5-35% teats protected for 3 days), especially compared to commercial T-Hexx Dry. The stranding and stringing of these dips upon drying created problems with the dip sticking to legs and/ or being pulled off easier. Dip C did not show this and had higher persistency @ day 2, but all dips showed inferior persistency @ day 3 (similar to other fast dry dip trials) compared to commercially available T-Hexx Dry teat dip product. Overall, the new experimental dips were inferior to the commercial T-Hexx Dry product! Also, every future trial should have commercial T-Hexx Dry incorporated into it so direct comparisons within cow and trial can be made.

### 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 4 new prototype faster drying persistent barrier dry cow teat dips, 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:** 4 prototype dips were used in this trial. Four faster drying prototype experimental dry cow barrier dips were compared. These were Dip A:2318-205A (blue); Dip B: 2318-205B (blue); Dip C: 2318-205C (blue); and Dip D: 2318-204A (yellow) (Hydromer, Inc.).

**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 Friday March 9, 2012.

**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. 20 cows were dipped in a randomized design where all 4 dips were used within each cow and dips were rotated among quarters across cows. This allowed 5 teats of each of the 4 quarters to be dipped with each dip and also allowed each animal to serve as her own control. Observations of film or dip thickness, stringing of dip, and dip wastage via animal leg movement, etc. were recorded.

**Teat dip persistency evaluation:** Teat dip persistency or coverage of teats (especially teat ends) was conducted every 24 hrs for 7 days. 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 (Figure 1). 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 and teat ends of both groups scored 1 before and after dips were removed.

- 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.

**Teat dip film coverage:** Experimental fast drying blue dips A and B dried as the dip was initially running off or dripping leaving often a large thick strand of dip hanging from the teat. Dip C dried with a thicker, darker coverage with minimal stringing or stranding. Dip D dried somewhat thicker but showed fine wispy strands (like spider silk) especially when tacky.

**Teat dip persistency and coverage:**

- **All groups persistency over time:** Figure 2 shows the percentage of teat ends protected over time for all 4 dips individually. 85-100% of teats were protected @ 24 hrs. By 48 hrs. (2 days) only 50-55% were protected by Dips A, B, and D with 75% protected by dip C (probably relates to the limited stringing or stranding of the dip upon application). Only 5-35% of teats were protected @ 3 days with Dip D showing

5%. This is far lower compared to commercial T-Hexx Dry data in other studies.

- **Front vs rear teat persistency:** Similar mean / median data was seen across teat position (front vs. rear, left vs. right) supporting no differences in persistency in relation to teat position. This is different compared to trial 1 where front teats showed lower persistency compared to rear teats.

## Summary

Dipping with the new fast drying dip (A, B, C, D) resulted in similar excellent teat end and skin health. Overall persistency was lower (only 5-35% teats protected for 3 days), especially compared to commercial T-Hexx Dry. The stranding and stringing of these dips upon drying created problems with the dip sticking to legs and/ or being pulled off easier. Dip C did not show this and had higher persistency @ day 2, but all dips showed inferior persistency @ day 3 (similar to other fast dry dip trials) compared to commercially available T-Hexx Dry teat dip product. Overall, the new experimental dips were inferior to the commercial T-Hexx Dry product! Also, every future trial should have commercial T-Hexx Dry incorporated into it so direct comparisons within cow and trial can be made.

**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

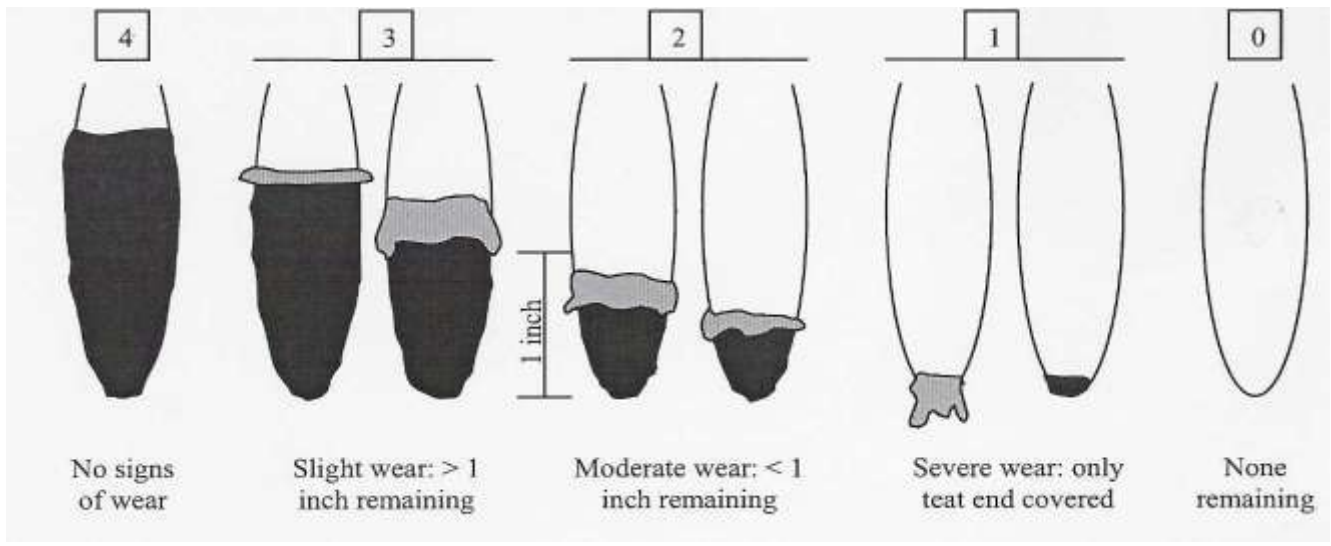


Figure 1. Teat dip persistency and protection scoring system (4-0).

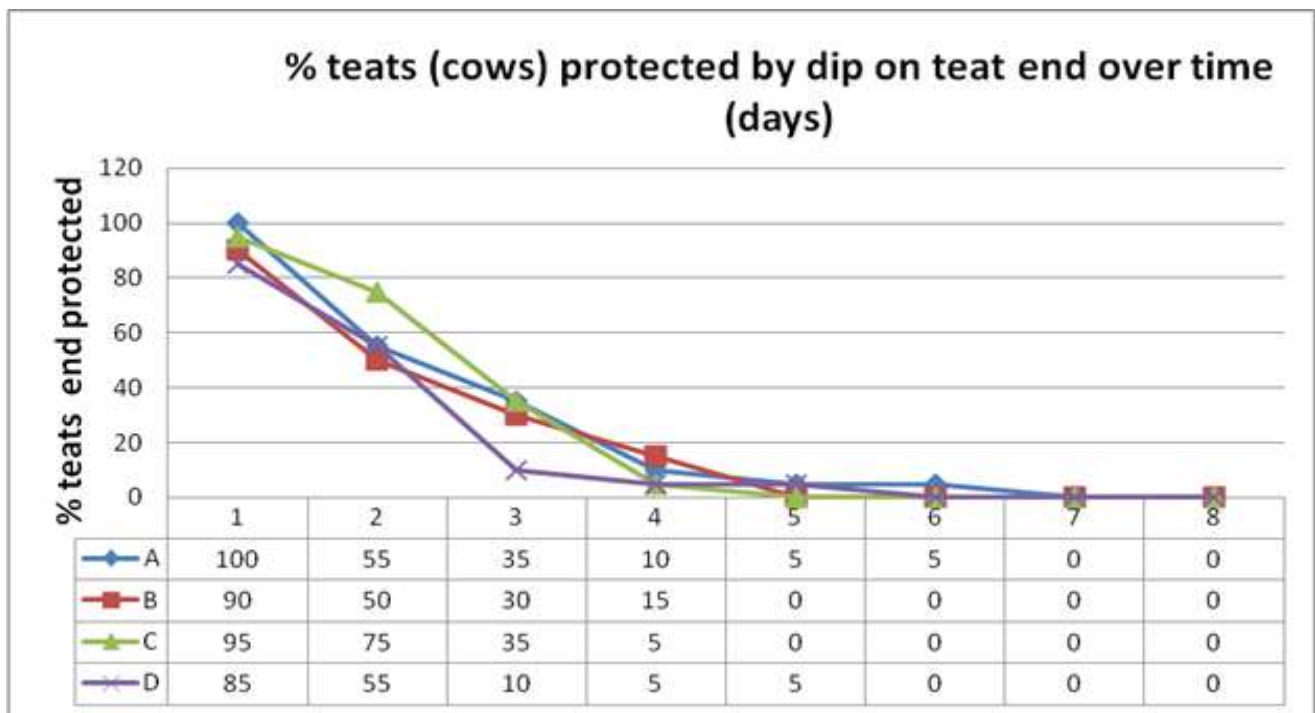


Figure 2. Percentage of teat ends protected over time for four new prototype dry cow persistent barrier teat dips.