

Field trial evaluations of a novel persistent barrier teat dip for preventing mastitis during the dry period and as a potential substitute for dry cow antibiotic therapy

A.S. Leaflet R1914

Leo Timms, Associate Professor of Animal Science

Summary and Implications

Dipping of cows at dry off and cows and heifers 10 day prepartum until calving with a persistent barrier teat dip product (developed and patented at ISU) in 2 natural exposure field trials resulted in a significantly lower IMI (particularly major environmental pathogens) at calving compared to controls. Dipping and/or dry therapy resulted in significantly lower new IMI in the early dry period compared to controls, with no difference in new IMI between treatments. Dipping of cows with a new persistent barrier teat dip provides the first cost effective, novel dry cow mastitis prevention tool focused at high susceptibility times and all causative organisms, and also can be a potential substitute for dry cow antibiotic therapy for prevention of new early dry period IMI. This also results in lowering the potential risks of antibiotic contamination of milk.

Materials and Methods

A 13 month natural exposure trial (trial 1) was conducted using an persistent barrier teat dip. All dry cows and freshening heifers at the ISU Dairy Farm were used. The trial was a half udder randomized design with either right or left quarters dipped while the others served as controls. All cows were dry treated with an approved intramammary antibiotic tube. Cows were only dipped once at dry off following dry cow treatment administration. Cows and heifers were dipped starting approximately 10 days prepartum and were redipped as needed until parturition. Dip persistency was evaluated daily on all animals. Duplicate aseptic quarter milk samples were taken at 3 days pre-dry off, dry off, calving, and 3 days

postpartum and frozen until subsequent bacteriological analysis. A second 14 month trial was conducted (trial 2). Dipping and sampling were similar to trial 1 but only half the quarters were dry treated to evaluate the potential role of the dip as an alternative / adjunct to dry cow therapy for prevention of early dry period IMI. Duplicate quarter milk samples were also taken at 14 days post dry off in this trial.

Results and Discussion

New IMI at calving for trial 1 (190 animals; 756 quarters) are shown in Table 1. Dipped quarters of heifers showed a 19, 40, and 50% reduction in all, major pathogen(MP), and environmental streptococcal (ES) IMI, with no significant reduction in coagulase-negative staphylococcal(CNS) or gram negative(G-) IMI. Dipped quarters of cows showed a 47, 52, 68, and 43% reduction in all, MP, ES, and CNS IMI with no reduction in G- IMI. Combining data from both groups shows an overall reduction of 37, 48, 63, and 28% of all, MP, ES, and CNS IMI in dipped quarters as compared to controls. New IMI at calving for trial 2 (221 animals; 884 quarters) are shown in Table 2. Dipped quarters of heifers showed a 26, 75, 75, and 80% reduction in all, MP, G-, and ES IMI. Dipped quarters of cows showed 34, 47, 75, and 30% reduction in all, MP, *S. aureus*, and CNS IMI. Combined data from both groups shows a 31, 60, 57, 54, 71, and 22% reduction in all, MP, G-, ES, *S. aureus*, and CNS infections. New early dry period IMI for control, dry treated only(DCT), dipped only(DIP), and DCT/DIP quarters are shown in Table 3. Although infection levels for all groups were low, all treatment groups showed significant reductions in CNS and total IMI compared to controls, with the DCT and DIP groups showing significant reductions ($p < .1$) in major pathogens, also. No significant differences were seen across treatment groups for all new IMI categories. All persistent infections from dry off were CNS.

Table 1. New intramammary infections at calving in quarters dipped with a novel persistent barrier teat dip and undipped control quarters for trial 1.

		<u>NG</u>	<u>CNS</u>	<u>SA</u>	<u>ES</u>	<u>G-</u>	<u>Major</u>	<u>All</u>
HEIFERS n=66;	Dipped	102	21	1	5 ^a	3	9	30
264 quarters;	No Dip	95	22	2	10	3	15	37
COWS n=124;	Dipped	213	20 ^c	1	7 ^c	5	13 ^c	33 ^c
492 quarters;	No Dip	184	35	0	22	5	27	62
TOTALS n=190;	Dipped	315	41 ^a	2	12 ^c	8	22 ^c	63 ^c
756 quarters;	No Dip	279	57	2	32	8	42	99

Table 2. New intramammary infections at calving in quarters dipped with a novel persistent barrier teat dip and undipped control quarters for trial 2.

		<u>NG</u>	<u>CNS</u>	<u>SA</u>	<u>ES</u>	<u>G-</u>	<u>Major</u>	<u>All</u>
HEIFERS n= 78;	Dipped	122	31	1	1 ^b	1 ^a	3 ^d	34 ^a
312 quarters	No Dip	110	34	3	5	4	12	46
COWS n =143;	Dipped	240	35 ^a	1 ^a	5	2	8 ^a	43 ^c
572 quarters;	No Dip	219	50	4	8	3	15	65
TOTALS n=221;	Dipped	362	66 ^a	2 ^b	6 ^a	3	11 ^d	77 ^d
884 quarters	No Dip	329	84	7	13	7	27	111

<u>Group</u>	<u>NG</u>	<u>CNS</u>	<u>SA</u>	<u>ES</u>	<u>G-</u>	<u>major</u>	<u>all</u>	<u>PI</u>
Control	94	10	1	2	1	4	14	4
DCT	105	5 ^a	0	1	0	1 ^a	6 ^b	1
DIP	104	4 ^a	0	1	0	1 ^a	5 ^c	3
DCT/DIP	108	2 ^c	0	2	0	2	4 ^c	0

NG = uninfected; CNS = coagulase negative staphylococci ; SA = Staphylococcus. aureus;

ES = Environmental streptococci; G- = gram negatives; major = major pathogen IMI;

All = all intramammary infections; PI = persistent infection from dry off .

^{a,b,c,d} Significant lower IMI compared to controls: ^a(p< .1); ^b(p< .05); ^c(p< .025); ^d(p < .01).