EVALUATION OF A POSTMILKING TEAT DISINFECTANT CONTAINING A PHENOLIC COMBINATION FOR THE PREVENTION OF MASTITIS IN LACTATING DAIRY COWS

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Postmilking teat disinfection is an effective procedure for reducing the rate of subclinical and clinical mastitis during lactation. However, there are limitations associated with many teat disinfectants currently available. While postmilking teat disinfection with an effective germicide reduces intramammary infections (IMI) caused by contagious mastitis pathogens such as *Streptococcus agalactiae* and *Staphylococcus aureus*, it has not proven effective in controlling mastitis due to environmental pathogens such as coliforms and streptococci other than *S. agalactiae* (2). The objective of the present study was to determine the efficacy of a postmilking teat disinfectant containing a phenolic combination for the prevention of bovine mastitis during lactation. Phenol and phenolic compounds have been studied extensively as disinfectants and have been shown to have a wide spectrum of antibacterial activity against both Gram-positive and Gram-negative pathogens, including *Mycobacterium bovis*, as well as viruses (1).

Materials and Methods

This study was conducted in The University of Tennessee Middle Tennessee Experiment Station research herd at Spring Hill, TN. On average, 120 Holstein cows were lactating at each herd survey and 194 cows were included in the 12-month study. The herd was *S. agalactiae*-negative but experienced mastitis caused by *S. aureus* and environmental pathogens, particularly *Streptococcus uberis*. Cows were milked twice daily in a double-five herringbone parlor equipped with a DeLaval milking machine system (De Laval, Kansas City, MO) with automatic milking machine take-offs.

The experimental teat disinfectant was evaluated following procedures recommended by the National Mastitis Council (2). Postmilking teat disinfection was compared to a negative control using a split-udder experimental design. Milking procedures for cows in the postmilking teat disinfectant and negative control groups were identical except for application of the experimental teat disinfectant that contained a phenolic combination (MASTICIDE™, Sporicidin International, Rockville, MD) after milking machine removal. Teats on the left side of udders were not dipped.

Duplicate samples of foremilk were collected aseptically from all quarters of all lactating cows at the onset of the study and from cows with clinical mastitis. Single samples of foremilk were collected monthly thereafter for the duration of the study. In addition, quarter foremilk samples were collected aseptically from cows within 7 days after calving, from cows at drying off, and when animals left the herd. Milk samples were examined following procedures recommended by the National Mastitis Council and essentially as described by Oliver et al. (3). A quarter was considered infected at the onset of the study when the same pathogen was isolated from duplicate samples. Diagnosis of IMI in mammary glands of cows after parturition was based on isolation of

the same organism in samples obtained within the first 7 days of lactation. A quarter was considered newly infected when the same bacterial species was isolated from two consecutive monthly samples, or in samples from mammary glands of cows with clinical mastitis. A quarter was eligible for only one infection per bacterial species during a lactation (i.e. only one *S. aureus* infection per quarter per lactation). Teats were examined visually for irritation, chapping, or other abnormalities regularly throughout the study. Mean percentage reduction in the rate of new IMI achieved among mammary glands with teats dipped in the experimental teat disinfectant after milking compared to the rate among undipped controls and the statistical reliability of the mean percentage reduction were determined. Differences between treatment groups were assessed by Student's *t*-test.

Results and Discussion

One hundred and four new *S. aureus* infections were observed, 63 in undipped controls and 41 in mammary glands with teats dipped in the experimental teat disinfectant after milking. Efficacy of the experimental teat disinfectant in the prevention of new *S. aureus* IMI was 33.2% ($P < 0.05$). Seventy-five new *S. uberis* IMI were detected, 52 in undipped controls and 23 in mammary glands with teats dipped in the experimental teat disinfectant after milking. Efficacy of the experimental teat disinfectant in the prevention of new *S. uberis* IMI was 54.6% ($P < 0.001$). Efficacy of the experimental teat disinfectant in the prevention of new coagulase-negative *Staphylococcus* species IMI and *Corynebacterium bovis* was 62.0% ($P < 0.005$) and 53.2% ($P < 0.005$), respectively. Overall efficacy of the experimental postmilking teat disinfectant for the prevention of new IMI against all mastitis pathogens was 45% ($P < 0.001$). Sixty-two cases of clinical mastitis were observed, 38 in undipped controls and 24 in mammary glands with teats dipped in the experimental teat disinfectant after milking; however, statistical differences between treatment groups in the incidence of clinical mastitis were not observed.

38 undipped
24 dipped exp.

Results of the present study indicate that the experimental teat disinfectant containing a phenolic combination was effective in preventing new IMI by *S. uberis*, *S. aureus*, coagulase-negative *Staphylococcus* species and *C. bovis*. Under conditions of this trial, no chapping or irritation of teats was observed. The phenol combination-based teat disinfectant would be of value as a postmilking teat disinfectant especially in herds experiencing *S. uberis* mastitis.

References

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