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Review Article

EFFECT OF PREMILKING AND POSTMILKING TEAT DIPPING IN CONTROL OF SUBCLINICAL MASTITIS IN DAIRY CATTLE

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Introduction:

Mastitis, in either of its two forms; clinical (CM) and subclinical (SCM), represents a prominent hazard to dairy producers (Oliver *et al.*, 2003). This hazard may exceed the limit of economical losses due to dropped milk production and culling out of lactating dairy cows (Waage *et al.*, 2001), as it may represent a food safety issue due to contamination of milk with different mastitis pathogens that may represent an imminent human pathogenic burden. Thus, proper control of mastitis in dairy herd is considered an indispensable process to ensure both animal health and food (milk) safety. For this, numerous control programs have been developed over the last few decades (Fetrow *et al*., 1991), and despite the massive development in mastitis control techniques, mastitis still constitutes the main problem of dairy production (Bhutto *et al.*, 2012). Among these controlling regimes, teat dipping has acquired great importance as an essential mastitis preventive tool (Hassan *et al*., 2009). Teat dipping has been demonstrated to be highly effective at preventing new intramammary infections with different mastitis pathogens (Hogan *et al.*, 1987). While premilking teat dipping is necessary to reduce the microbial population and minimize new intra mammary infections, postmilking teat dipping has been used mainly in highly infected herds (Contreras *et al.*, 2003), and it has been revealed also as a very effective tool to prevent mastitis incidence. However, recent researches have revealed that not all types of mastitis causing pathogens are responding the same to teat dipping (Osteras *et al.*, 2008).

This study was conducted to evaluate the effect of potassium permanganate ($KMnO_4$) or LactiFence (DeLaval) solution as either premilking or postmilking or both pre and post milking teat dipping solution for protection of dairy cow from subclinical mastitis and to determine the effects of teat dipping on milk composition, milk production and health of teats.

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Materials and Methods

Twenty different small dairy farms of Erode District were selected. Training given to the twenty selected dairy farmers about the clean milk production and the managemental practices to prevent the occurrence of mastitis – the causes, clinical signs, effect on udder tissues and milk production, other ill effects.

Field level demonstration (FLD) and hands on training on clean milk production *viz*., cleaning of dairy cattle, disinfection and sanitation of shed, milking methods, cleaning of udder, wiping of udder, California mastitis test-mastitis detection and teat dipping were conducted.

Demonstration of pre and post milking teat dip carried out and farmers advised to wash the udder with KMnO4 solution or use the Post Milking Teat Dip solution immediately after milking and it prevent the entry of pathogen into the teat and prevent mastitis. Inputs like pre and post milking teat dip container, pre milking teat dip, post milking teat dip ($KMnO_4$ or LactiFence, DeLaval), were distributed to selected dairy farmers.

A total of 100 crossbred dairy cows of different age groups (3 to 8 years), parities (1 to 5), stage of lactation (early, mid and late), milking (both hand and machine) were selected for the study of effect of pre milking, post milking and both pre and post milking teat dipping with $KMnO_4$ or LactiFence (DeLaval). Before selection of animal the CMT (Schalm *et al*., 1971) were performed, all the selected animals were Negative for CMT.

One hundred clinically-healthy and negative for CMT dairy cows were used. Cows under this study were hand-milked two times daily following standard hygienic milking procedures. Experimental cows were divided into four groups (25 cows in each). The first serve as control, the second was designed to serve as pre milking teat dipping group ($KMnO_4$), the third as post milking teat dipping group (LactiFence, DeLaval) and the fourth as both pre and post milking teat dipping group ($KMnO_4$). Cows' udders in all groups have similar preparatory manipulations, which included premilking washing of the udder with clean water and drying with clean clothes. Just before milking in pre milking teat dipping group, nearly the whole external surface of the teat was dipped into dipping solution ($KMnO_4$) which was left for about 30 seconds and teat was then dried by another clean clothes. While in the case of post milking teat dipping group (LactiFence, DeLaval), similar teat dipping manipulation was applied after cow has ended milking and dipped teats were not dried off. In fourth group both pre and post milking teat dipping procedure was carried out ($KMnO_4$). The animals of

the control group were given teat wash with water before the start of milking as per the practices followed in the farm.

Milk samples were collected from control and treated animals on days of teat dipping (day 0) and thereafter on day and 30, respectively. Milk production, milk composition details were collected and tested for mastitis using California Mastitis Test (CMT).

Result and Discussion:

Nowadays, the primary concern of dairy producers is to implement and maintain a good mastitis control program. Despite the widespread of such control programs among dairy herds (teat dipping, dry cow therapy and machine milking maintenance), mastitis cases still to constitute a repetitive problem (Milne *et al.*, 2003). Teat dipping is among the highly recommended mastitis controlling programs (Oliver *et al.*, 2001), and it is widely used as a simple and cost-effective procedure.

Table 1: Effect of pre and post milking teat dipping on milk quality and quantity of dairy cows on 0 day

Parameters	Control	Pre milking teat dipping group	Post milking teat dipping group	Both pre and post milking teat dipping group
Milk production/day	14.3 ± 1.2	13.6 ± 0.8	15.2 ± 1.7	14.8 ± 0.8
Fat %	3.9 ± 0.4	4.1 ± 0.3	3.9 ± 0.6	4.2 ± 0.6
CMT positive	Nil	Nil	Nil	Nil

(N=25)

Table 2: Effect of pre and post milking teat dipping on milk quality and quantity of dairy cows on 30th day

Parameters	Control	Pre milking teat dipping group	Post milking teat dipping group	Both pre and post milking teat dipping group
Milk production/ day	14.5 ± 0.6	14.2 ± 0.8	15.5 ± 1.2	15.2 ± 0.7
Fat %	4.0 ± 0.5	4.1 ± 0.5	4.0 ± 0.6	4.2 ± 0.6
CMT positive	11	7	Nil	Nil

(N=25)

The effect of teat dipping on milk production/day, fat% and California mastitis test positive in 0 and 30th day in cows has been presented in Tables 1 and 2, respectively. In the present study teat dipping effectively control somatic cell counts of milk in cows. The mean milk production and fat% was not affected by the teat dipping procedure.

A number of routine hygienic practices at milking including washing of udder with disinfectant, use of separate towel for washing, rinsing milking machine, teat cups disinfectant and teat dipping effectively reduces udder infection and mastitis (Erskine and Eberhardt, 1990) however, when teat dipping was discontinued the incidence of bacterial infection increases (Harmon and Langlois, 1986). In cows teat dipping after milking reduces SCC and had no adverse reaction or teat irritation (Winter, 1999) as also observed in this study.

In the present study there was no effect of dipping on teat, the injury to teat, irritation of teat or redness over teats in cows. Results obtained from CMT were in the favor of post and pre and post milking teat dipping as in comparison to the control and pre milking teat dipping group. Post milking teat dipping has achieved prioritized results against pre milking teat dipping. Both LactiFence (DeLaval) and KMnO4 have equally important role in lowering SCC and control of subclinical mastitis.

Conclusion

From the results of the study revealed that post milking teat dipping looks promising in controlling of major mastitis pathogens in dairy farms. In this aspect, a more rigorous program should be applied with routine follow up to limit the problem of mastitis and in turn to avoid its implications on human health.

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