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# EFFECTIVENESS OF TEAT DIPPING IN CONTROL OF BOVINE MASTITIS*

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## Süt ineklerinin mastitisten korunmasında "Teat Dipping"in etkisi üzerinde çalışmalar

**Summary:** *The purpose of this study was to investigate the effectiveness of teat dipping alone in control of bovine mastitis.*

*A sum of* 20 *hand-milking and* 20 *machinery-milking (total is* 40*) cows were used. The right side teats were dipped into a solution that contained one percent of active chlorine (Preparation*: 1 *ORBITABS*[R] *tablet was dissolved in* 200 *ml of warm water, active chemical is sodium salt of dichloroisocyanurate) as the antiseptic principle and the left side teats were reserved for controls and not treated wtih any medicine. Teat dippings were performed twice a day after morning and evening milking for a complete lactation period (Average* 300 *days.)*

*To evaluate the effectiveness of teat dipping application, monthly CMT's and polimorph leucocyt counts were made for milk samples obtained from cows with* 40 *days intervals.*

*The results showed that, teat dipping was actively effective in the prevention of mastitis (*$P < .01$*) and the type of milking was not important (*$P > .05$*) The Percentage of occurence of mastitis with clinical manifestations was very low in treatea quarters.*

*As a conclusion the post milking teat dipping appeared as an active and economical method in the prevention of bovine mastitis.*

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**Özet:** *Bu çalışmada, mastitislerden korunmak amacı ile sağım sonrasında uygulanan bir dezenfeksiyon metodu olan "teat dipping" in etkinliği ve bu etkinin sağım şekline bağlı olarak farklılıkları araştırıldı.*

*Bu amaçla elle sağım yapılan Lalahan Zootekni ve Araştırma Enstitüsü'nden 20 ve makineli sağım yapılan Çayır, Mer'a ve Yem Bitkileri ve Zootekni Araştırma Enstitüsü'nden 20 olmak üzere toplam 40 baş sağılır inek seçilerek, sağ taraftaki meme bölümlerine "teat dipping" uygulandı, sol taraftakiler ise ise kontrol için bırakıldı. "Teat dipping" için % 1 aktif klor içeren ORBITABS$^R$ (Beecham) (Sodyum dikloroisosyanurat) tabletlerinin 200 ml ılık suda erit lmiş solusyonları kullanıldı. "Teat dipping" 300 günlük bir laktasyon dönemi süresince, sabah ve akşam sağımlarından hemen sonra günde iki defa uygulandı.*

*"Teat dipping"in etkisi ayda bir kere uygulanan CMT sonuçlarına bakılarak, 40 gün ara ile alınan süt örneklerinde 1 ml deki polimorph löykositler sayılarak ve klinik mastitis çıkışları göz önüne alınarak değerlendirildi.*

*Gerek CMT ve gerekse hücre sayımı sonuçlarına göre her iki yetlştirmede de "teat dipping" uygulananlarla, kontrol için bırakılanlar arasında istatistik olarak önemli farklılıklar ortaya çıktı ($P<.01$). Sağım şekline bağlı olarak ilacın etkisinde önemli bir farklılık görülmedi ($P>.05$). Yine klinik belirtileri ile seyreden akut mastitisler "teat dipping" uygulananlarda, kontrollara kıyasla daha az görüldü.*

*Kanımıza göre "teat dipping" ucuz kolay ve etkili bir dezenfeksiyon memetodu olarak, sağımın hemen arkasından uygulanmak üzere sütçü yetiştirmelere salık verilebilir*

**Zusammenfassung:** *Der Zweck dieser Arbeit war die Untersuchung des Einflusses des Zitzendips auf die Mastitiserkrankung beim Rind.*

*Als Untersuchungsmaterial dienten 20 hand und 20 maschinengemolkene Kühe. Das Zitzenbad wurde nur an den rechts gelegenen Zitzen vorgenommen. Die linken blieben unbehandelt und dienten als Kontrollen. Die Diplösung enthielt 1% aktives Chlor (1 ORBITABS$^R$ Tablette wurde in 200 ml warmen Wasser gelöst, aktive Substanz ist das Sodiumsalz des Dichloroisocyanurats). Das Zitzenbad wurde zwemial täglich, morgens und abends nach dem Melken durchgeführt üben über eine Laktationsperiode (300 tage).*

*Um die Wirksam keit des Zitzenbades beurteilen zu können, wurde der Schalm- Test monatlich und die mikroskopische Zellzählung der polymorphen Leukozyten 40 tägig durchgeführt.*

*Das ergebnis zeigte, daß das Zitzenbad zur Mastitisvorbeugung geeignet ist ($P<.01$), und daß die Art des Milchentzuges keine Bedeutung hat ($P>.05$).*

*Das Auftreten von klinischer Mastitis war bei den gedippeten Vierteln viel geringer.*

*Das Zitzenbad im Anschlu ß an das Melken ist als eine geignete und ökonomische Methode zur Verhinderung von Mastitis beim Rind anzusehen.*

## Introduction

Various procedures have been recommended for reducing the incidence of mastitis in dairy herds. Many investigators thought that cleaning the teats after milking is an more important factor from the point of view of mastitis control than cleaning the teats prior to milking (18,19).

The practice of dipping teats into antiseptic solution after milking to prevent intramammary infections has been investigated extensively and widely recommended.

Teat dipping can be defined as dipping of the teat ends into antiseptic solution, for preventing against to mastitis, immediately after the milking procedure.

This method was formerly suggested by MOAK (15) in 1916 for preventing new infections. Recently there was increased attention on this procedure.

The claimed purpose of post milking teat disinfectionis to destroy microorganisms located on the teat surface and protect the udder by preventing the bacterial colonisation of nearly all teat canals (1,5,11). Regular use of the teat dip reduces hardening and inflammation of teats, softens the teat skin, stops the healing, improves milking performances and reduces cell counts in milk. Also dipping of the teats in a mild antiseptic solution removes residual milk from the teats and destroys some of bacteria (2, 3, 8, 28).

According to Hansen (9), teats should be dipped immediately after milking, before the contraction of teat-end sphincter and drying of the milk films on the teat surface.

Among those studies to detect the effect of teat dipping in control bovine mastitis few are given in the following tables.

| Names of the investigators | The period of the study | Reduction rate in mastitis |
|---|---|---|
| Farnsworth, R.J., et al (4) 1976 | – | 95–99 % total bacterial flora. |
| Glawisnich, E., et al (6) 1971 | 1 year | 81–85 % total number of Hermolitic staphylococ. |
| Langlois, B.E. and Pyles, W. M. (13), 1975 | 19 months | 31.4 % in new infections. |
| Natzke, R.P. and Bray, D.R. (16), 1973 | 1 year | From 22 % to 16 % infection rate in herd. |
| Natzke, R.P. et al (17) 1974 | 3 years | From 28 % to 7 % in new infections. |
| Roberts, S.J. et al (25) 1971 | 18 months | % 71.5 in new infections No effect |
| Grootenhuis, G., et al (7) 1974 | 8 months | No difference between dipped and controlled. |
| Hickman, C.G. and Logan, V.S. (10), 1962 | 3 months | " " " |
| Orr, D.A. and Taylor, M.M. (20) 1968 | 15 weeks | On total numbers of staphylococcus. |
| Tripathy, S.B. (27), 1961 | 4 weeks | Teat dipping hasn't effect alone against mastitis. |
| Vob, K.D. (29), 1973 | – | No effect on mastitis status of the herd. |

Wilson (30), reported that dipping of the teats alone, without any hygienic precautions had caused more infection than before his study.

There are various clinical and laboratory methods to investigate the effectiveness of teat dipping in control of mastitis. Cell count is one of the original mastitis tests and is the basis for most presumptive tests presently being used to evaluate the incidence of mastitis. The neutrophil leucocyte (polymorphonuclear) count has been accepted as the best index of the presence and degree of inflammation in the bovine mammary gland (14, 23, 24, 26, 31).

Counts of five hundered thousand or greater are usually considered positive mastitis quarters or samples (12, 26).

The purpose of this study was to investigate the effectiveness of teat dipping alone in control of bovine mastitis.

## Materials and Methods

A sum of 20 hand-milking (Lalahan Zootekni Araştırma Enstitüsü) and 20 machinery-milking (Çayır, Mer'a ve Yem Bitkileri ve Zootekni Araştırma Enstitüsü) (total 40) cows were used during the study.

Husbandry, feeding and hygienic precautions which are taken during the milking procedure were nearly equal in all two farms.

All the cows were formerly controlled by CMT (California Mastitis Test) and direct microscopiccell counts were performed. The cows which had counts less than 500.000 cells/ml in milk were chosen for the study.

As a treatment procedure; The right side teats were dipped into a solution that contained one percent of active chlorine (Preparation: 1 ORBITABS[R] tablet was dissolved in 200 ml of warm water, active chemical is sodium salt of dichloroisocyanurate) as the antiseptic principle, and the left teats were reserved for control and not treated with any medicine. Teat dippings performed twice a day, after morning- and evening-milking for a complete lactation period of average 300 days.

To evaluate the effectiveness of teat dipping application, monthly CMT's and polimorph leucocyt counts were made for milk samples oblatined from cows with 40 days intervals. Acut mastitis cases also recorded during the trial.

All the results were tested and classified statitically.

## Results

The results are summarized in table 1, 2, and 3.

The cell count status of the dipped and control quarters in both machinery and hand milking herds are in table 1.

Table: 1 Comperable statistical analysis of the leucocyt counts.

| | | Teat Dipping | | Control | Statistical Control (1) |
|---|---|---|---|---|---|
| | n | × ∓ Sx | n | × ∓ Sx | |
| Hand Milking | 20 | 345155∓18578 | 20 | 513745∓22666 | t: 5,752** |
| Machinery Milking | 20 | 316590∓17793 | 20 | 457665∓21393 | t: 5,070** |
| Statistical Control (1) | | t: 1,110 (—) | | | |

(1) (—) : P>.05
(**) : P<.01

Results showed that differences between dipped and control quarters are statistically important in both herds (P< .01). But there is no effective difference relating to the milking techique (P>.05).

In the second table CMT scores can be observed.

Table: 2 Classification of the CMT scores by Chi-square method.

| CMT SCORES | Hand Milking | | | | Machinery Milking | | | |
|---|---|---|---|---|---|---|---|---|
| | T.Dip. | % | Cont. | % | T.Dip. | % | Cont. | % |
| — | 329 | 76,33 | 245 | 57,78 | 331 | 79,56 | 238 | 54,71 |
| + 1 | 91 | 21,12 | 147 | 34,66 | 80 | 19,23 | 174 | 40,00 |
| + 2 | 6 | 1,39 | 14 | 3,30 | 5 | 1,20 | 17 | 3,91 |
| + 3 | 5 | 1,16 | 18 | 4,24 | 0 | – | 6 | 1,38 |
| N | 431 | | 424 | | 416 | | 435 | |

The same means results are obtained by the analysis of CMT scores as direct cell counts.

The percentage of occurence of mastitis with clinical manifestations was very low in treated quarters.

Table: 3 Clinical mastitis cases which are observed during the trial.

| | Teat Dipping | Control |
|---|---|---|
| Hand Milking | 5 cases | 13 cases |
| Machinery Milking | 2 cases | 7 cases |

All the results showed that, teat dipping was actively effective in the prevention of mastitis ($P<.01$) and the type of milking was not important ($P>.05$).

## Conclusion

Infection agents mostly enter to the mammary gland by the way of teat orifice. During the post milking period, when the natural defence mechanism of the mammary glands are weakened by the milking procedure, invasions can be prevented by the hygienic precautions.

The application of teat dipping to prevent intramammary infections wideley recommended. Various disinfectants can be used for teat dip but chlorine and iodine products specially advised by investigators (4, 11, 17, 21, 22, 30).

Sodium salt of dichloroisocyanurate is used as a solution of one percent of active chlorine for teat dipping in this study. This solution

has no harmfull effect on teats and are highly effective according to the results of study.

According to many investigators, teat dipping along or together with the some hygienic precautions significatly reduces mastitis incidence and new infections under experimental conditions (4, 6, 13, 16, 17, 25). Some investigators reported that teat dipping hasn't effect alone against mastitis (7, 10, 20, 27, 29). In addition of these, Wilson (31) reported that teat dipping of the teats alone without hygienic precautions had caused more infection before his study.

In our study, without changing any hygienic procedure, teat dipping was used alone. CMT scores and direct cell count showed that differences between dipped and controlled quarters are statistically important for both herds ($P<.01$). But there is no effective difference relating to the milking technique ($P>.05$). And also the percentage of occurence of mastitis with clinical manifestations was much lower in treated quarters. Thus, the post milking teat dipping appeared as an active and economical method in the prevention of bovine mastitis.

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