قسم : الرقابة الصحية على الأغذيـــة •

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تأثير المطهرات بعد عملية الحليب
كوسيلة للوقاية من التهاب الضرع

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تم دراسة تأثير المطهرات مثل محلول اليود بتركيز ٥٠٠٠ مجم/لتر ومركبـــات الأمونيوم الرباعية بتركيز ١:٣٢٠ كوسيلة للوقاية من التهاب الضرع، ولقد ثبت مـــن الفحص أن قوة تأثير محلول اليود ضد الميكروبات المكوره السبحية والميكروبـــات المكورة العنقودية الذهبية وميكروبات القولون المعوية العصوية كان أفضـــل مـــن تأثير مركبات الأمونيوم الرباعية حيث أن نسبة اختزال الأرباع المصابة بعدالتطهير بمحلول اليود ومركبات الأمونيوم الرباعية كانت ٥ر٤٢، ٥ر٢٢٪ على التوالـــــي • ونوصي نحن الباحثين باستخدام محلول اليود كمطهر بعد عملية الحليب كوســـيلة للوقاية من التهاب الضرع حيث أن التطهير باليود بعد عملية الحليب له أهميـــة اقتصـــادية •

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EFFECT OF POST MILKING DISINFECTANTS AS PROPHYLACTIVE MEASURE IN CONTROL OF MASTITIS

(With 3 Tables)

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SUMMARY

The effect of post-milking disinfectants (Iodophor at concentration of 5000 mg available Iodine/liter and Quaternary ammonium compound (Q.A.C.) at concentration of 1:320 as a prophylactive measure in control of mastitis was studied. Our investigation proved that the bactericidal efficacy of Iodophor aganist Strepcocci. Staph. aureus and Coliforms was better than Q.A.C. On the basis of bacteriological data the reduction in infected quarters by Iodophor was 42.5% while for Q.A.C. was 22.5%. Finally results concluded that mastitis control system must be including the teat dipping especially with Iodophor which lead to economical benefit.

INTRODUCTION

Bovine mastitis is one of the most important disease that effect dairy cattle. It causes a termendous losses in milk yield and shortens in the production life of affected dairy animals. In the pathogenesis of mastitis, primary the penetration of the teat streak canal by a pathogen has to occur and the infection of the mammary gland via teat take place during the lactation, mostly after milking.

Mastitis control programmes based on post-milking teat disinfection has been found to be effective in reducing the level of infection (NEAVE et al., 1966 and WILSON and KING-WILL, 1975). Iodine teat skin disinfectant tested in lactating cows has a bactericidal effect aganist Staph. aureus and Strept. dysagalactia (SHELDRAKE et al., 1980 and BRAMLEY and HOGBEN, 1983). Q.A.C. and Iodophor when used as post-milking teat disinfectants, reduced the infected quarters at percentage of 42 and 15 before teat dipping to 30 and 8 after teat dipping respectively (TERPLAN and GROVE, 1976). This work was undertaken to investigate the effect of post-milking disinfection by using 2 disinfectants Iodophor and Q.A.C., in control of mastitis.

MATERIAL and METHODS

Collection os samples :

A total of 125 milk samples were collected from Friezian herd at Kafr El-Shikh Governorate. The teat orifice of each quarter was distinfected with 70% ethyl alcohol before the milk samples were obtained. Each samples were collected in sterile screw capped bottles for cytobacteriological examination. Milk samples were collected before and after teat dipping every 2 weeks for 3 months.

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Detection of subclinical mastitis :

100 quarters milk samples proved to be infected with subclinical mastitis by using Schalm test (SCHALM et al., 1971), somatic cell count (International Dairy Federation, 1984) and Bacteriological examination were recovered. The infected quarters were divided into two groups including control ones, according to type of disinfectant used.

Application of disinfectants :

Iodophor (Crown chemical company limited Lamberhurst, kent. M.P.H. Egypt) was repored to give a cocentration of 5000 mg available iodine per liter.

Quaternary ammonium compound (Chemical and Drug company, Egypt permited by Antec. A.H. international company England) solutions were prepared by dilution of stock Q.A.C. 1:320 for cytobacteriological studies.

Bacteriological examination :

I- Total viable count of the causative organisms. Each milk sample was divided into two parts, one was used to prepare 10- fold serial dilution for enumeration of strept., Staph. aureus and Coliforms, using Edward's (EFTHYMIOU et al., 1975), Baird - Parker's (THATCHER and CLARK, 1975), agar plats and most propable number (M.P.N.) (ICMSF, 1978) respectively.

II- Isolation and identification of pathogenic and potentially pathogenic bacteria.

The other part of the milk sample was incubated at 37°C overnight, after which it was streaked on cow blood agar and incubated at 37°C for 48 hrs. The inoculated plates were examined for growth and haemolysis. The different bacterial isolates were confirmed morphologically by staining film with Gram stain. Suspected culture was streaked on specific agar media including Edward, Baird Parker and Violet Red Bile Agar (V.R.B.). The suspected colonies of Streptococci were performed by using sodium hippurate test (AYERS and RUPP. 1922) and CAMP (CHRISTIE et al., 1944). While Staph. aureus was identified by coagulase, thermonuclease and thermonuclease - seroinhition tests according to RAYMAN et al. (1978), LACHICA et al. (1971) and BECKER et al. (1984) respectively. E.coli was identiffed according to report of the coli aerogenes (1956) sub committee of the society for Applied Bacteriology.

RESULTS

Incidence of pathogenic microorganisms recovered from subclinical mastitic cows is recorded in table (1).

The effect of bactericidal efficacy of teat disinfectants tested against naturally infected quarters with Strept., S. aureus and Coliforms is recorded in table (2).

The effect of post milking teat dipping on the infected quarters is recorded in table (3).

DISCUSSION

From the stated data of the investigation, it was found that the incidence of subclinically mastitic quarters among examined dairy herd was found to be 80% (table 1). Nearly similar findings have been reported by BAGADI (1970); STEPANYK (1973); FILS et al. (1974) and AMIRA (1979) who isolated pathogenic microorganisms in a percentage of 66.7, 72, 76 and 80 respectively. On contrary low incidence have been recorded by NASR (1956), BUTOZAN

et al. (1963) ZAKARYA (1969), MARINSEK (1976) and BRAMLEY et al. (1984). The disagreement of these results from the present data may be referred to the difference in the techniques used for the bacteriological investigation and for the difference in sources from which milk samples were collected.

The pathogenic and potentially pathagenic bacteria recovered from milk samples were Strept. agalactiae (71%). Strept. dysagalactiae (4%) Strept. uberis (3%), Staph aureus (10%) and E.coli (12%). Streptococci appeared to be the most prominant and etiological significants agents in subclinical mastitis (Table 1). These findings substantiate what have been reported by FRANKE (1969) ZURITA et al. (1972) STADLTFELD et al. (1980) and HUSSIAN et al. (1984). It clearly evident from table 2 that lodophor disinfectant containing 5000 mg/available lodine per liter was the most effective in reducing the numbers of Staph. aureus, Streptococci and Coliforms in naturally subclinically mastitic quarters. Such findings is in accord with what have been reported by PHILPOT and PANKEY (1978), and SHELDRAKE (1980). On the other hand Q.A.C. in a conc. of 1:320 was bacteriocidally effective aganist the previously mentioned microorganisms but with lesser extent if compared with lodophor. These findings are supported by TERPLAN and GROVE (1976). Howver the post milking teat disinfection could control mastitis as it reduced the number of pathogenic microorganisms remaining on the teat, eliminate subsequent colonization and infection as well as the new intramammary infection (NEAVE et al., 1969, O'SHEA et al., 1975, Philpot and Pankey, 1978 and SHELDRAKE and HOARVE, 1980). They are also effective aganist pathogenic microorganisms in the teat lesions or at least the lower parts of streak canal (TERPLAN and ROVE, 1976).

According to cytobacteriological data tabulated in table 3, it is clearly evident that, teat disinfection can reduce the number of infected quarters in a short period. The percentage of reduction of infected quarters by using lodophor & Q.A.C. was found to be 42.5% and 22.5% respectively. These findings supported the results of HOARE and DENSON (1975), who observed during field experiments in 35 herds with a mastitis control programme including dipping of teats after milking that clinical mastitis was reduced for 108 cases in the first year to 64 and 47 case in the second and third year respectively.

Any how we can conclude that mastitis control systems including the teat dipping lead to economical benefit for farmers either by increasing the milk yield or lowering the rate of mastitis and subsequently cost of treatment of diseased udders.

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Table (1): Incidence of pathogenic microorganisms recovered from subclinical mastitic cows.

No. of examined samples	No. of infected samples	%	Types of infection	
			No. samples	percentage
125	100	80	Str. ag*. 71	71
			Str. dys. 4	4
			Str. ube. 3	3
			S. aureus 10	12
			E. coli 12	12

* Str. age. = Strept. agalagtiae

Str. dy. = Strept. dysagalactiae

Str. ube = Strept. uberis

S. aureus = Staph. aureus

Table (2): The effect of bactericidal efficacy of teat disinfectants tested against naturally infected quarters with Strept., S. aureus and Coliforms.

Type of disinfectant	Streptococci CFU/ml dis. Teats	n.	Cont. teats	n.	S. aureus CFU/ml dis. teats	n.	cont. teats	n.	Coliforms CFU/ml dis. teats	n.	cont. teats	n.
I- Iodophor												
before TD	$3.3.4 X10^7$	34	$2.8X10^7$	5	$1.7X10^7$	3	1 X107	2	7 X 10^8	3	5 $X10^8$	3
after TD												
2 weeks	7 $X10^6$	34	$1.5X10^7$	5	1 $X10^7$	3	$2.9X10^7$	2	5 $X10^8$	3	4 $X10^8$	3
4 weeks	$1.2X10^5$	34	$3.5X10^7$	5	8 $X10^6$	3	4 $X10^7$	2	4 $X10^7$	3	9 $X10^8$	3
6 weeks	1 $X10^5$	34	$5.3X10^7$	5	5 $X10^6$	3	$3.8X10^8$	2	$1.5X10^6$	3	2 $X10^9$	3
8 weeks	$1.8X10^4$	34	1 $X10^8$	5	$1.9X10^5$	3	$5.5X10^8$	2	1 $X10^4$	3	$1.5X10^9$	3
10 weeks	$1.5X10^4$	34	$3.5X10^8$	5	$7.1X10^4$	3	8 $X10^8$	2	$2.1X10^3$	3	1 $X10^9$	3
12 weeks	$1.2X10^3$	34	5 $X10^9$	5	$2.3X10^2$	3	$9.9X10^8$	2	$2.1X10^3$	3	1 $X10^9$	3
II- QAC												
before TD	9 $X10^6$	34	$1.1X10^5$	5	$1.5X10^6$	3	$1.6X10^6$	2	$2.3X10^7$	3	4 $X10^7$	3
after TD												
2 weeks	7 $X10^6$	34	$1.1X10^7$	5	$9.4X10^5$	3	$1.4X10^6$	2	$2.1X10^7$	3	3 $X10^7$	3
4 weeks	6 $X10^6$	34	$3.5X10^8$	5	$8.2X10^5$	3	$8.2X10^7$	2	$2.1X10^7$	3	4 $X10^7$	3
6 weeks	6 $X10^6$	34	4 $X10^8$	5	7 $X10^5$	3	$9.9X10^6$	2	$1.1X10^7$	3	5 $X10^7$	3
8 weeks	9 $X10^5$	34	$7.5X10^8$	5	$6.5X10^5$	3	$9.5X10^6$	2	7 $X10^8$	3	$2.1X10^8$	3
10 weeks	$3.5X10^5$	34	$4.5X10^9$	5	$4.5X10^4$	3	$1.5X10^9$	2	$1.5X10^6$	3	5 $X10^8$	3
12 weeks	$1.2X10^5$	34	6 $X10^9$	5	3 $X10^4$	3	$5.5X10^9$	2	1 $X10^5$	3	1 $X10^9$	3

QUA = Quternary ammanium compounds **TD** = teat dipping **dis** = disinfectant **cont** = control **N** = No. of teats **CFU** = colony forming unit.

POST MILKING DISINFECTANTS

Table (3): Effect of post milking teat dippin on the infected quarters.

Type of disinfectants	No of infected quarters		Percentage of reduction
	before teat dipping	after teat dipping	
Iodophor	40	23	42.5 %
Q.A.C.	40	31	22.5 %