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EVALUATION OF SOME DISINFECTANTS ON TOTAL MICROBIAL LOAD IN TEATS CUPS

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ABSTRACT

This study was conducted at the farm of Animal Production ,College of Agriculture and Forestry- University of Mosul, to study the effect of using a number of disinfectants on Total Viable Bacterial Count (TBC) and Total Fungi (TF) on teat cups which they are a part of the automatic milking machine.The following disinfectants were used with two concentration (5 and 10%) of Dettol; Chloroxylenol and Hydrogen Peroxide. Water was also used at temperature at (700C).Teat cups were immersed in a bowl containing each of the above mentioned disinfectants for one minute. The results revealed that in control treatment(without using any disinfectants) the (TBC) was 8X105 (CFU) and there was a reduction in the (TBC) after the use of the above mentioned disinfectants at 5%, and water (700C) they were 33X103 ; 35 X 103; 25X103; 37 X103 (CFU) respectively. One log reduction in the (TBC) was reported after increasing the concentration of these disinfectants to 10% and they were 15X102; 30X102, 15X102 and 37 X102 (CFU) respectively. For the (TF) in teat cups there was a reduction (TF) from 4.3X105 in the control treatment to 5X102; 7X102 and 6X102 (CFU) after using the above disinfectants at aconcentration 5% respectively, but when disinfectant concentration were increased to10%, there was one log reduction in (TF) to 4X101; 6X101; and 3X101 (CFU) respectively.

It could be concluded, from this study, that the best disinfectant was hydrogen peroxide in both concentration.

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INTRODUCTION

Good husbandry is essential to produce good milk quality in dairy farms and at the same time to prevent udder diseases and that needs a great care to all farm processes especially the hygiene of the automatic milking machines, i.e., their cleanliness and disinfection (Fraise et al 2004). As the cross contamination of udders between cows could occur through milking teat cups, an intense focusing was applied to the sanitary condition during milking through the pretreatment of udders before milking with suitable disinfectants. The application of different disinfectants in farms of milk production had been started since 1926 to provide a dairy equipment cleaner which also efficiency cleans and flushes all part of equipment which come in contact with milk lid..

At that time, little knowledge about using chemicals in sterilization of rubber inside cups used in milking machines, although ingenuity invention of Automatic Milking Machine (AMM) was at 1863. The real need for AMM began in the mid-forties of the last century after World War II due to the lack of manpower, prompting workers in this field for the development of industrial and sophisticated

milk machines (Ronger and peter, 2010).The sterilization procedure to the milking machine is to reduce the level of milk contamination and the likelihood of disease transmission to humans .The right decision in producing good quality milk depends mainly on employees and consultants in the field of dairy production in all stages of production including the right use of chemicals in udder cleaning and disinfection (Richard and Trevor, 2008). Before using milk machine, it must be tested entirely in terms of suitability for use and cleanliness from an experienced employees and know how to install and work of milking machine. Cleaning and sterilization of milking machine instruments, including cups, nipples, beginning with dirt removing and followed by chemical disinfectants that help to remove and kill the contaminated microorganisms. Cleansing and disinfection of milking machines is affected by several factors such as ambient temperature, time of cleaning, the concentration of the chemical disinfectant and the machine used in cleaning and disinfection

The aim of this experiment was to know the effect of using a number of disinfectants on the total number of bacteria and fungi in teats cup of the AMM used in milking cows at the farm animals, Department Animal Production , Faculty of Agriculture and Forestry / Mosul University .

MATERIALS AND METHODS

This experiment was conducted at the farm animals, Department Animal Production, Faculty of Agriculture and Forestry / Mosul University / Mosul.

The disinfectants used in this study were the following:

1. Dettol at a concentration 5 and 10%
2. Chlorozalynol at concentration 5 and 10%
3- Hydrogen Peroxide at concentration of 5 and 10%

Teat cups were immersed in a bowl containing the above mentioned types of disinfectants for 1 minute.

Sampling:

samples were collected in test tubes and transferred to the laboratory in a cool container and tested within 3 hours at the same day .

Titration of the samples: Samples were treated according to (Alfred, 2005), by taking 0.1 ml of the sample was titrated by decimal dilution mixing with 0.9 ml of peptone water to perform serial dilution 102 -106 .

Agars for total bacterial and fungal counting:

Total Bacterial Count (CFU) was carried out by using plate count agar and potato dextrose agar (LAB UK) for fungal count, according to company instructions.

Bacterial and Fungal culture methods:

After performing the required dilutions, 0.1 ml of each dilution was spread out on the two agars in duplicates and incubated at 37c for 24h for total bacterial count, and 25c for fungal growth (3-5 days) (Jone.1997). Plates show colonies between 25-250 CFU were counted and the total counts were calculated according to the equation (Jone.1970):

$$= \frac{\text{count} \times 1/\text{dilution}}{\text{Inoculum}} \text{CFU}$$

RESULTS

Table (1) shows the total number of bacteria (CFU), which was in control samples more than 300 (CFU), and reduced when using disinfectants at a concentration of 5% for Dettol, Chlorozalynol , and Hydrogen peroxide as follows 33 ×10 2, 35× 10 2, 25× 10 2 respectively and more reduced occurs when we increased the concentration of these disinfectants to 10% and the results were 15×101, 30×101, 15× 101respectively.

Table (1) Total bacterial count CFU/ml

Disinfectant type	CFU/ml Total Bacteria Count	
	5%	10%
Dettol	33X102	15X101
Chlorozalynol	35X102	30X101
Hydrogen peroxide	25X102	15X101
Without disinfectant	> 300	

Table (2) shows the total number of fungi (CFU), which were in cases of non-use of any of disinfectants 43X102 (CFU), and became (5×101, 7× 101and 6×101) at 5% of Dettol, Chlorozalynol and Hydrogen Peroxide disinfectants, and more reduced to (4×101, 6 ×101and 3×101) (CFU) at 10% concentration of these disinfectants respectively.

Table (2) Total fungal count CFU/ml

Disinfectant type	Total fungal count CFU/ml	
	5%	10%
Dettol	5X101	4 X101
Chlorozalynol	7X101	6 X101
Hydrogen peroxide	6X101	3 X101
Without disinfectant	43X102	

DISCUSSION

Under the terms of good milking and get good milk quality to fit for human consumption is to prepare automatic milk machine through washing and disinfection because it is the first part that contact milk after his release from the udder .

In our study we used three different disinfectants: Dettol, Chlorozylenol and hydrogen peroxide at 5 and 10%, for disinfection of the teat cups. These results in reduction total bacterial and fungal counts were compared with the control non treated teat cups. There was a dose dependant reduction in the number of these microorganisms, being hydrogen peroxide the best one among those disinfectants. It is not surprising that hydrogen peroxide gave these results, since it couldbe dissociated to O2 and water and so it is effective against wide range of microorganisms (bacteria, fungi, spores and viruses) and works under low temperatures. Finally, many studies are required with other disinfectants in order to choose the best one in disinfection of the automatic milk machine cups (Richard and Trevor, 2008,Geoffrey, 2009).

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تقييم كفاءة بعض المطهرات على الحمل الجرثومي في كؤوس الحلمات

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الخلاصة

أجريت هذه الدراسة في حقل كلية الزراعة والغابات /جامعة الموصل لدراسة تأثير استخدام عدد من المعقمات على العدد الكلي للبكتريا والفطريات الموجودة في كؤوس الحلمات التي هي جزء من وحدة الحليب الأوتوماتيكي المستخدم لحلب الأبقار الموجودة في حقل الكلية، حيث تم استخدام المعقمات التالية: ديتول بتركيز 5 و10 %ا، كلوروزالينول بتركيز 5 و10%، فوق اوكسيد الهيدروجين بتركيز 5 و10% والماء الحار بدرجة 70 درجة مئوية. وتم مقارنة نتائج المعاملات السابقة الذكر مع معاملة السيطرة أي بدون استخدام أي من المعقمات حيث غمر كل كاس من كؤوس الحلمات في وعاء يحوي واحد من المعقمات أعلاه ولمدة دقيقة واحدة وقد تبين ان أعداد البكتريا الكلية (وحدة مكونة للمستعمرات) في حالة عدم استخدام المطهرات كان أكثر من 80 × 510 (وحدة مكونة للمستعمرات) في حين أصبحت هذه الأعداد عند استخدام المطهرات السابقة الذكر بتركيز 5% والماء درجة حرارته 80 (درجة مئوية) وكما يلي: (33 ×10 3، 35 ×10 3 ،25 × 10 3 و 37 ×10 3) (وحدة مكونة للمستعمرات) على التوالي. في حين أصبحت أعداد البكتريا الكلية عند زيادة تركيز المطهرات السابقة الذكر إلى 10% كما يلي :(15×10 2 ، 30×10 2 و 15×10 2) (وحدة مكونة للمستعمرات) على التوالي، كذلك وجد أن أعداد الفطريات الكلية في حالات عدم استخدام المطهرات هو 43× 410 (وحدة مكونة للمستعمرات) وانخفضت هذه الأعداد عند استخدام المطهرات السابقة الذكر بتركيز 5% والماء درجة حرارته 80 (درجة مئوية) وكما يلي: (5 × 10 2 ، 7 ×10 2، 6 × 210و 9 ×210) (وحدة مكونة للمستعمرات) على التوالي في حين أصبحت أعداد الفطريات الكلية عند زيادة تركيز المطهرات السابقة الذكر إلى 10% كما يلي : (4 × 110، 6 × 110 و 3 ×110) (وحدة مكونة للمستعمرات) على التوالي. تبين من هذه الدراسة ان اكفا المطهرات المستخدمة في هذه الدراسة هو فوق اوكسيد الهيدروجين بكلا التركيزين.

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