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EVALUATION OF TWIN OXIDE USED AS SANITIZER IN AN ORDERING EQUIPMENT

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INTRODUCTION

Milk production in Mexico has fluctuated in recent years, the overall performance of this productive sector shows an increase in production volumes (1994-2006, 37.8%). This increase in productivity is reflected in the increase of herd, from 1994 to 2006 this was 34.6% (INEGI, 2007). The increase in the number of dairy animals and dairy production directly affects the technological level of the producers; The greater the number of milking animals per unit of production, the greater the requirements of machinery and equipment for the extraction of milk and, therefore, all the inputs for its maintenance and hygiene.

In Mexico there are 154,045 economic units dedicated to the dairy farm and only 12.53% of them have a milking parlor (19,300); In Aguascalientes the percentage of economic units with milking parlor is higher (22.45%, 666 EU) (INEGI, 2009).

Washing of milking equipment is necessary to:

- A) Preserving the quality of the product (milk) as residues are left over by bacteria that break down and contaminate the milk, altering the taste, nutritional value, quality and sales potential for the products elaborated.
- B) Also to preserve the maintenance of the milking equipment, since the fat covered tires lose their favorable characteristics and stainless steel elements lose their condition when coated with any residue.

Most of the waste that can leave the milk in the pipes and milking equipment is imperceptible, some of it is removed by rinsing; It is necessary to alternate chemicals to eliminate the different types of waste. Alkaline detergents have the ability to dissolve the fats, in addition to having a bactericidal effect. Acid detergents help in the elimination of bacteria and the entrainment of protein residues. Sanitizers have the function of inhibiting bacteria that may be present in the milk conduction lines after washing. Chlorinated, iodinated or quaternary ammonium compounds may be used as sanitizers; Each of them have characteristics that can be valued by manufacturers and users in order to see which one has the best results.

For some milk producers, improvements in milk quality represent an "extra" or "premium" income, because milk processing companies obtain greater benefits from the purchase of better quality milk, so they can reward their Customers with a premium per liter of milk.

The objective of this study was to evaluate the presence of colony forming units (CFUs) in a milk pipeline after milking, washing and sanitizing using two different types of sanitizers (chlorine and TwinOxide).

MATERIALS AND METHODS

The present study was carried out in the facilities of the Livestock Area and in the Laboratory of Quality Control in Food of the Center of Agricultural Sciences of the Autonomous University of Aguascalientes during the months of May, June, July and August of the year 2011.

The study was carried out in two stages:

1. Take your samples of the laboratory analysis.
2. Analysis of data.

After finishing with milking, the routine of washing the milking parlor was performed as follows:

1. Rinse with water 35 ° C.
2. Alkaline at 75 ° C for 10 minutes.
3. Rinse the water.
4. Acid for 10 minutes.
5. Water rinse.
6. Sanitized.

Two treatments (control and alternative) were performed. An 8% commercial sanitizer at a concentration of 500 ppm (supplier's recommended) was used as control; And Twin Oxide as an alternative to sanitize milking equipment at a concentration of 250 ppm.

Samples were taken once the milking and washing routines of the equipment had been completed. Sampling was performed in different areas of the milking equipment (at the outlet of the filter and at the elbow of exit to the cooling tank (Figure 1).



Figure 1. Sample collection locations. Left, filter output; Right, outlet elbow to the cooling tank.

Sampling was performed six times for each of the sanitizers; For each sampling site, a sample and a control were taken. The sampling was performed with sterile iso-pos, alcohol lamp, gloves, coping and covers. The iso-forms were placed in sterile test tubes with 10 ml of buffer solution. When sampling was afternoon, the iso-pos were stored at 4 oC until the next day they were used for sowing.

The test methods used were based on the following Mexican Official Standards: Dilutions (NOM-110-SSA1-1994), Mesophiles (NOM-092- SSA1-1994), Total Plate Coliform's (NOM-113-SSA1-1994) And Fungi and Yeasts (NOM-111-SSA1-1994).

A t-student test was used to compare the two treatments with the assumption of different variances.

RESULTS

72 iso-pates were made in the milk conduction lines. For each isotope used in the sampling, 15 petri dishes were used for direct sowing and dilutions. There were 1,080 plantings in total.

It was found that there was a greater presence of microorganisms in the filter area than in the elbow area (Figure 2), using the control sanitizer at the end of the washing routine.

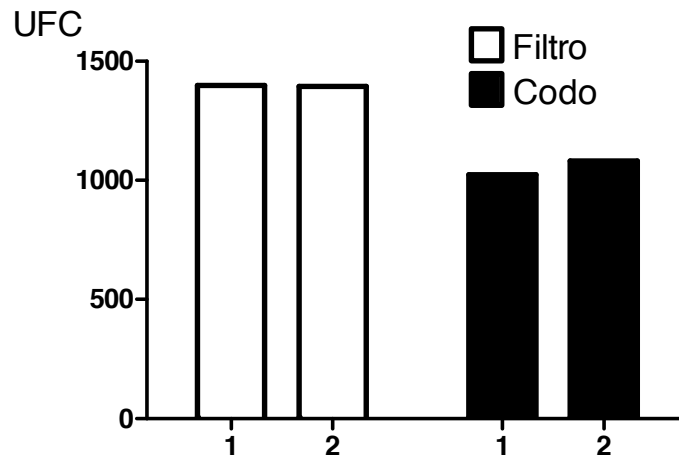


Figure 2. UFC found by sampling zone; Standard count (1) and Total coliform's (2). Control Sanitizer (Chlorine).

It was observed that as with the control sanitizer, there was a greater presence of microorganisms in the filter area than in the elbow area (Figure 3), using the alternative sanitizer at the end of the washing routine.

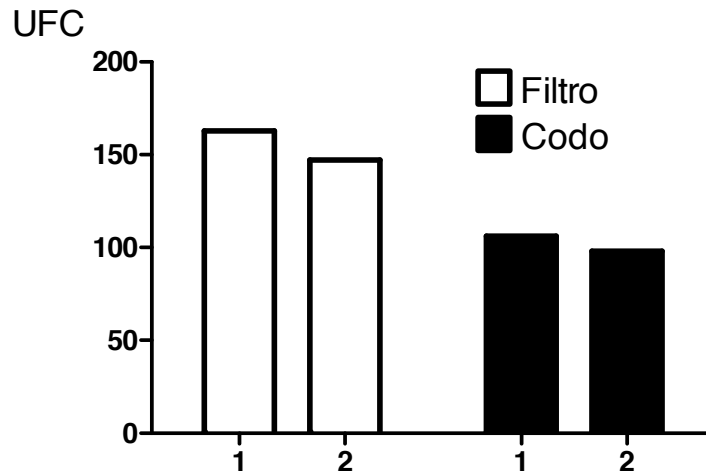


Figure 3.

UFC found by sampling zone; Standard count (1) and Total coliform's (2). Alternative sanitizer (Twin Oxide).

The results for fungi and yeasts show higher CFUs in the filter area than in the elbow area.

A difference was observed in the CFUs grown in the culture media when the control sanitizer (Chlorine) and the alternative sanitizer (Twin Oxide) were used.

Figure 4 shows the number of CFUs found in the filter area after the use of the different sanitizers used.



Figure 4.

CFUs found in the filter; Standard count (1), total coliform's (2) and, fungi and yeasts (3).

Figure 5 shows the number of CFUs found in the elbow area after the use of the different sanitizers used.

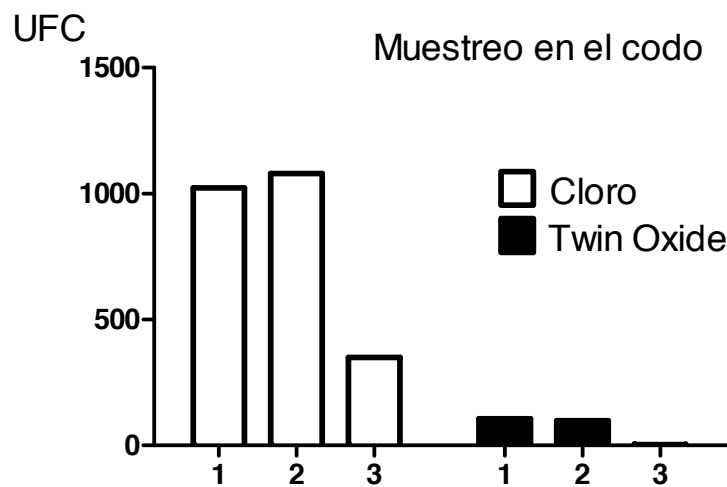


Figure 5. CFUs found in the elbow; Standard count (1), total coliform's (2) and, fungi and yeasts (3).

The results found in the filter and in the elbow of the milk line were averaged in order to find significant differences in the two treatments and it was found that for Total Coliform's and Standard Count, if there is a significant difference ($P < 0.05$) In the UFC number found using the control sanitizer (Chlorine) and the alternative sanitizer (Twin Oxide) (Figure 6).

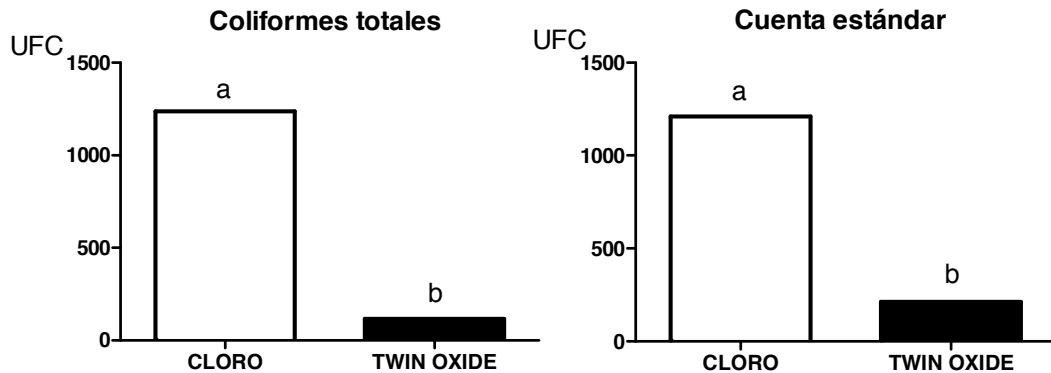


Figure 6. CFU of Total Coliform's and Standard Counts evaluated with the two types of sanitizers.

The results found in the filter and at the elbow of the milk conduction line were averaged in order to find significant differences in the two treatments and it was found that for Mushrooms and Yeasts, there is no significant difference ($P > 0.05$) in the Number of CFUs found using the control sanitizer (Chlorine) and the alternative sanitizer (Twin Oxide) (Figure 7).

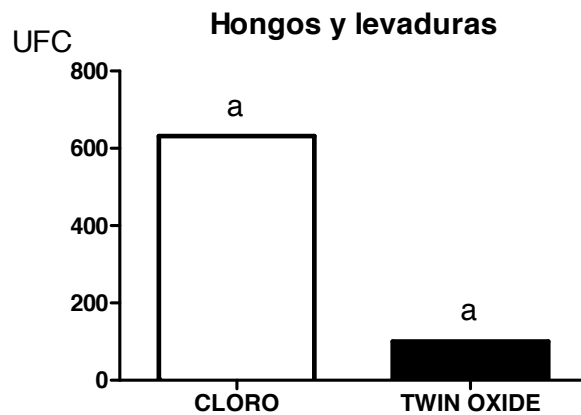


Figure 7. CFU of fungi and yeasts evaluated with the two types of sanitizers.

Figure 8 shows the CFUs found for Standard Count, Total Coliform's, and Fungi and Yeast according to the sanitizer used after washing the milking line.

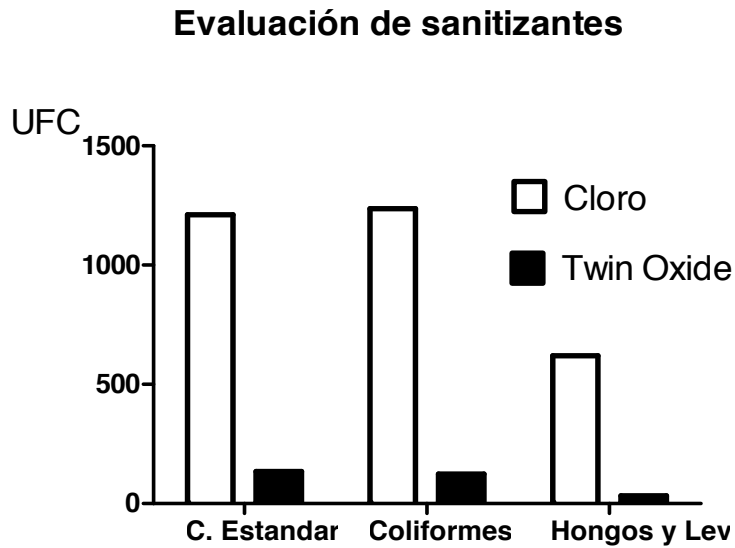


Figure 8.

CFU of Total Coliform's, Standard Count, and Fungi and Yeasts evaluated with the two types of sanitizers.

There is a difference between UFC counts after the use of the two types of sanitizers in the milk conduction line for this study; These results reflect a particular case where the conditions of the equipment, materials, operators, etc. Are specific.

CONCLUSIONS

The alternative sanitizer showed greater effectiveness than the control sanitizer for Total Coliform's and Standard Accounts ($P < 0.05$). For fungi and yeasts, no differences ($P > 0.05$) were found between the two types of sanitizers used. Concentration, exposure time, temperature and other factors may influence the effectiveness of the sanitizers used in milking lines.

REFERENCES

- INEGI (National Institute of Statistics and Geography) 2007. Agri-food information system for consultation. Edition 2007. Mexico
- INEGI (National Institute of Statistics and Geography) 2009. Census of Agriculture 2007. Edition 2009. Mexico.
- Official Mexican Standard. NOM-092-SSA1-1994. Goods and services. Method for aerobic bacteria count in plate.
- Official Mexican Standard. NOM-110-SSA1-1994. Goods and services. Preparation and dilution of food samples for microbiological analysis.
- Official Mexican Standard. NOM-111-SSA1-1994. Goods and services. Methods for the account of molds and yeasts in foods.
- Official Mexican Standard. NOM-113-SSA1-1994. Goods and services. Methods for counting coliform microorganisms in plaque.