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"SENSITIVITY OF SOME FOOD-POISONING  
MICROORGANISMS ISOLATED FROM MILK  
TO SANITIZERS"

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SUMMARY

Three commercial sanitizers, Antigerm-50, Prophyl, and Crown were tested against three food-poisoning microorganisms isolated from milk. The organisms were, *E.Coli* K58: B<sub>4</sub>, *Staphylococcus aureus* and *Clostridium perfringens*.

The time needed for killing the different microorganisms by various sanitizers either in the presence or in absence of milk varied from 5 minutes to more than 24 hours.

Cleansing, is essential before the application of the various sanitizers used.

INTRODUCTION

The aim of milk hygienene is to produce safe milk free from causes of animal and human diseases, of low bacterial count and of good keeping quality.

For obtaining such milk, some kind of sanitizers should be used in the process of production either for killing undersirable microorganisms or minimizing their presence to negligible counts.

Among the dangerous diseases transmitted to man through milk is food poisoning caused by *E.Coli* 0111 K58, B<sub>4</sub>, *Staphylococcus aureus*, and *Clostridium perfringens* which have been reported by many authors, (Singh and Ranganthan, 1974; Mol and Vincentle, 1975; and ICMSF 1978).

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As there are many sanitizers in the Egyptian market used in milk production plants, this work was done to test three available sanitizers against three food-poisoning microorganisms isolated from milk.

## MATERIAL AND METHODS

### A) Culture media :

Nutrient agar (Baker, 1967), nutrient broth, cooked meat media (ICMSF 1978) and fresh horse blood agar were used.

Fluid-thioglycolate media was used for iodophorous compounds, while Lecithin broth was used for Quaternary ammonium compounds, (as neutralizing agent).

### B) Test organisms :

24 hours broth culture of well identified microorganisms; *Staphylococcus aureus*, *E.Coli* (0111:K58:B<sub>4</sub>) and *Clostridium perfringens*. The microorganisms were isolated from milk (Dept. of Hygiene and Prev. Med., Zagazig Univ.) and were subjected to specific biochemical and serological tests.

### C) Test Sanitizers

1. Antigerm-50 (Pfizer), Quaternary ammonium compound, used in concentrations of 0.2, 0.4 and 0.6% in sterile dist. water.
2. Prophyl (Meriel), A Synthetic compound having a phenolic ring, used in concentrations of 0.2, 0.4 and 0.6% in sterile dist. water.
3. Crown (Crown), An iodophorous compound, used in concentrations of 0.2, 0.4 and 0.6% in sterile dist. water.

### Technique :

Six sterile stainless steel cups were used for each test organism.

Each sterile cup was contaminated with 0.5 ml of 24 hours broth culture of the test organisms.

Three contaminated cups were further soiled with 2 ml of sterile milk.

The contaminated cups were then heavily saturated with (0.2, 0.4 and 0.6%) of each sanitizer.

A loopfull from the treated surface of each cup was taken at intervals of 5, 10, 15, 20 and 30 minutes, then after 1, 2, 3, 6, 12 and 24 hours and spread over the specific media.

The inoculated media were incubated at 37°C for 48 hours. The time at which the microorganisms died was recorded from the first subculture media which showed no specific growth. Results were recorded in Tables (1&2).

### RESULTS

Table (1): Time taken for killing microorganisms by sanitizers in absence of milk

Sanitizers	Concentration								
	Antigerm-50			Prophyl			Crown		
Organism	0.2	0.4	0.6%	0.2	0.4	0.6%	0.2	0.4	0.6%
E.Coli 0111 K58 : B <sub>4</sub>	12 hr	12 hr	12 hr	12 hr	12 hr	12 hr	12 hr	12 hr	12 hr
Staphylococcus aureus	10 m.	5 m.	5 m.	15 m.	10 m.	5 m.	15 m.	10 m.	5 m.
Clostridium perfringens	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs

< 24 hrs = more than 24 hours.

Table (2): Time taken for killing microorganisms by sanitizers in presence of milk

Sanitizers Organism	Concentration								
	Antigerm-50			Prophyl			Crown		
	0.2	0.4	0.6%	0.2	0.4	0.6%	0.2	0.4	0.6%
E.Coli 0111 K58 : B4	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs
Staphyloco- ccus aureus	6hr	30m.	5m.	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs
Clostridium perfringens	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs	<24 hrs

<24 hrs = more than 24 hours.

#### DISCUSSION.

This work was done to determine the efficiency of different dilutions of some sanitizers on three food-poisoning organisms isolated from milk.

Table (1) presents the time required for destroying different food-poisoning organisms by various sanitizers used in the absence of milk. The time needed for 0.2 Antigerm-50 varied from 10 min. for *staphylococcus aureus* to 12 hrs for *E. coli* (0111 : K58 (B4) and more than 24 hrs for *Clostridium perfringens*.

The bactericidal power of 0.4 and 0.6% Antigerm-50 ranged from 5 minutes to 12 hrs and more than 24 hrs for killing *Staphylococcus aureus*, *E. coli* and *Clostridium perfringens*, respectively.

Concerning Crown, the above mentioned dilutions of this compound were found to require 12 hrs and more than 24 hrs for killing *E.coli* and *Clostridium perfringens* respectively. However, 15, 10 and 5 min., respectively were elapsed before destroying *Staphylococcus aureus*.

Table (2) illustrates the time needed by various sanitizers for destroying the different food-poisoning microorganisms in the presence of milk.

The time needed for killing *E.coli* 0111: K58:B<sub>4</sub> and *Clostridium perfringens* by 0.2, 0.4 and 0.5% of Antigerms-50, was found to be more than 24 hrs, while it was 6 hrs, 30 min. and 5 min. respectively for destroying *Staphylococcus aureus*.

Regarding Prophyl, the above mentioned concentrations required more than 24 hrs of exposure for killing the test organisms.

On the other hand, 0.2, 0.4 and 0.6% of Crown needed more than 24 hrs for killing *Staphylococcus aureus* and *Clostridium perfringens*. However, *E.coli* 0111: K58:B<sub>4</sub> was only killed within 12 hrs by 0.4 and 0.6% of this compound.

It can be concluded that commercially used sanitizers killed *E.Coli* and *Staphylococcus aureus* within 12 hrs while *Clostridium perfringens* need more than 24 hrs.

It is clear therefore that the presence of milk, decreases the bactericidal activity of the used sanitizers. These findings were confirmed by Sykes (1958) Barr et al (1966). Bean (1967) and Ismail (1967) who indicated the rapid inactivation of these sanitizers in the presence of milk as an organic matter. This fact makes them unsuitable for treating heavily contaminated surfaces in the presence of milk.



It is advisable therefore to use these commercial sanitizers, taken into consideration that the milk equipments should be scrupulously cleaned by hot water and detergents for removal of any organic material before the application of sanitizers in the least effective dilutions.

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