

## HYGIENIC QUALITY OF CONCENTRATED AND RAW MILKS SOLD IN DAMIETTA GOVERNORATE

By

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### ABSTRACT

One hundred random samples of market and bulk raw milk (50 of each) and 50 concentrated (25 each of condensed and evaporated) milk, collected from different localities in Damietta Governorate. A survey was conducted to determine the hygienic quality of concentrated and raw milk samples. The obtained results revealed that the mean values of acidity in examined market and bulk raw milk were  $0.20 \pm 0.0007$  and  $0.21 \pm 0.0007$  respectively. The methylene blue reduction time showed that 64% of examined raw milk samples had a reduction time 5 hours or more while 36% had a reduction time less than 5 hours. The mean total colony counts/ml of examined market and bulk raw milks were  $3.7 \times 10^7$  and  $2.7 \times 10^7$  respectively.

Prevalence of coliforms contamination were 84% and 74%, while the mean coliform counts (MPN/ml) were  $5 \times 10^2 \pm 0.85$  and  $77.8 \pm 0.30$  for market and bulk raw milk samples respectively. Prevalence of *E. coli* in the examined market and bulk raw milk samples were 66% and 86% with mean value of  $39.6 \pm 0.99$  and  $6.2 \pm 0.63$ /ml of milk respectively. Out of the tested *E. coli* isolates (10) *E. coli* serotypes (O152 poly 8), (O26 poly 1), (O63 poly 5), (O164 poly 8) and (O86a poly 1) represented 3, 3, 2, 1, and 1 of the total isolates respectively.

*Staphylococcus aureus* was isolated from 40% and 64% with mean value/ml  $3.7 \times 10^5 \pm 1.8 \times 10^5$  and  $6.1 \times 10^5 \pm 3.5 \times 10^5$  of market and bulk raw milk samples respectively, while *Bacillus cereus* was isolated from 4% and 16% with mean count/ml  $2 \times 10^5$  and  $1.7 \times 10^5$  of market and bulk raw milk samples respectively, and *Yersinia enterocolitica* was isolated from 48% and 38% of market and bulk raw milk samples respectively. None of examined market and bulk raw milk samples was positive for *Salmonellae*.

Grading of examined raw milk samples with **Egyptian standards (2001)** showed that 8%, 53% and 26% exceeded the standard limits for *Bacillus cereus*, *Staphylococcus aureus* and MBRT respectively. Grading of examined raw milk samples with **Robinson Standards (1990b)** declared that 98%, 3%, 8%, 53% and 61% exceeded the standard limits for total colony count, coliforms, *Bacillus cereus*, *Staphylococcus aureus* and MBRT respectively. The result obtained in our investigation showed that all examined raw milk samples were in agreement with Egyptian Standards for *Salmonellae*.

Out of 25 examined condensed milk samples 6(24%) were found to contain bacteria and the mean count was  $2.2 \times 10^4$  /ml, while out of 25 examined evaporated milk

samples 8(32%) had a total colony counts ranged from 30 to  $6.0 \times 10^5$ /ml. Prevalence of *Bacillus stearothermophilus* in examined concentrated milk samples were 4(16%) and 2(8%) with mean count  $2.7 \times 10^3 \pm 1.04 \times 10^3$  and  $4 \times 10^3 \pm 3.5 \times 10^3$  for condensed and evaporated milk samples respectively, while prevalence of pathogenic bacteria in examined concentrated milk samples showed that none of examined condensed and evaporated milk samples contained *Clostridium* spp., *Bacillus cereus*, *E. coli* or *Staphylococcus aureus*.

Prevalence of mould and yeast of examined condensed milk samples revealed that out of the examined samples 16% and 20% were found to be contaminated with mould and yeast with mean counts  $5.6 \times 10^2$  and 66/ml respectively. Mould and yeast were isolated from 40% and 32% with mean value/ml  $43.3 \pm 0.18$  and  $1.2 \times 10^2 \pm 0.37$  of evaporated milk samples respectively.

*Asperigillus* spp. or *Rhizopus* spp. could not be detected in examined sweetened condensed milk, while *Cladosporium* spp. and *Penicillium* spp. could be detected in 8% each of the examined samples. Moreover, *Cladosporium* spp. could not be detected in any of examined evaporated milk samples, while *Asperigillus* spp., *Rhizopus* spp. and *Penicillium* spp. could be isolated from 8%, 8% and 24% respectively.

Grading of examined sweetened condensed milk samples according to **Egyptian Standards (1990)** for microbiological examination showed that none of examined samples exceeded the standard limits for coliforms, while total colony count showed that 20% of examined samples were exceeded the standard limits.

Grading of examined sweetened condensed milk samples according to **Suggested Microbiological Standards, Robinson (1990b)** showed that 24% and 36% of samples exceeded the standard limits for total colony count and mould & yeast respectively, while none of samples exceeded the standard limits for coliforms.

Spectrophotometric determination of nitrates and nitrites levels in examined condensed milk samples indicated that the mean values  $95.425 \pm 6.943$  and  $0.3726 \pm 0.032771$  mg/kg respectively, while the average values in examined evaporated milk samples were  $7.937 \pm 0.36718$  and  $0.047034 \pm 0.002791$  respectively.

Out of 25 examined condensed milk samples 22 (88%) had nitrate concentration above the permissible limit, while all examined samples had nitrite lower than the recommended permissible limit. Meanwhile, all examined evaporated milk samples contain nitrate and nitrite below the recommended permissible limits.

Heat treatment increased nitrate contents of milk as pasteurized milk has 2.01 times nitrate content than that of raw milk while sterilized and UHT milk has 3.16 and 2.16 times than that of raw milk respectively.

The public health significance and economic importance were discussed.