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## TABLE OF ABBREVIATIONS

<b>Abbreviations</b>	<b>Term</b>
<b>APC</b>	Aerobic plat count
<b>ADPI</b>	American Dairy Products Institute
<b>AOAC</b>	Association of Official Analytical Chemists
<b>APHA</b>	American Public Health Association
<b>FDA</b>	Food and Drug Administration
<b>FSA</b>	Food Standards Agency
<b>ICMSF</b>	International Commission on the Microbiological specification of Food
<b>IDF</b>	International Dairy Federation
<b>MPN</b>	Most propapol number
<b>NDPRC</b>	National Dairy Products Research Centre
<b>NRC</b>	National Research Council
<b>USDA</b>	United State Grading and Inspection
<b>USPHS</b>	U.S Public Health Service
<b>USDHHS</b>	U.S.Department of Health and Human Services

### 7.0. SUMMARY

One hundred and twenty random samples of full cream concentrated milk samples, comprises 60 samples each of unsweetened evaporated and sweetened condensed milk, were collected from different supermarkets in Alexandria Governorate. Samples were directly transferred, with a minimum of delay, to the laboratory where they subjected for sensory, chemical and microbiological examinations.

#### **7.1. Sensory evaluation:**

##### **A. closed cans examination: -**

**I.** All samples were examined before opened, both sweetened and unsweetened concentrated milks, 20% of the sweetened condensed milk samples and 46.7% of the unsweetened evaporated milk samples) were having criticisms in the appearance of the cans as rust (13.3, 10%), seam integrity (11.7, 20%), cleanliness (0, 16.6%), overfilling (3.3, 0 %) and attractiveness (16.7, 0 %).

**II.** The labeling requirements: - The protein, fat and whole milk solid contents should be clearly marked, product name, name of the importer and his address, and the country from which he imported the product, net weight, the production date, the expired date and the shelf life, finally the patch number all were clearly written so, 100% of both milk samples were having the labeling requirements.

##### **B. opened cans examination:-**

**1. Flavor :** condensed milk had a clean, sweet, and cooked milk taste except ten samples (16.7%) were having strong flavor , while 100% of evaporated milk samples were having a milky taste and smell after dilution by water as in Table (1&2).

**2. Body & Texture:** The consistency was fine and smooth, with the texture even and the viscosity more in condensed milk but they both more than raw milk.

**3. Colour& Surface appearance,** both sweetened and unsweetened condensed milk surface were free from any cream layer or butter-like particles, any fungus growth or any abnormalities, there were no sandiness or fat separation, and the colour was pale, golden color and had a luster in condensed milk except in ten samples (16.7%) were having dull color tended toward a light brown color, while for evaporated milk it was milky yellow and had a luster too, and all evaporated samples were complying.

##### **4. Viscosity:**

Table (1& 2) showed that 16.6% of the examined sweetened condensed and 8.3% unsweetened evaporated milk samples showed less viscosity than other samples.

When doing the feathering test no samples appear neither feathering nor fat oils on the surface of the hot coffee.

The ten samples (16.6%) of sweetened condensed milk were not complying with these requirements (color, luster, taste, smell, texture or viscosity), they all were from the

same brand and it was somewhat different from the other tested brands just in sensory parameters neither chemical nor microbiological. None of the samples has deformities that render it unfit for human consumption.

### **5.2. Chemical evaluation of concentrated milk samples:-**

After three weeks of incubation period of the four pre-incubated samples their appearance were not changed. No can show any swollen, so the milk samples didn't contain viable gas-producing microorganisms.

So ten milk samples (five condensed and five evaporated) were going under experimental work in the lab by analyzing total milk solids, fat and protein% by both the traditional and the automatic methods via (**Milk content analyzer, Lactostar, No. 3510**). And then obtained results were compared together as shown in Tables (3&4).

#### **5.2.1. Chemical results of full cream sweetened condensed milk**

Table (3) showed total milk solids, fat and protein% obtained by traditional methods was  $31.0 \pm 4.0$ ,  $8.5 \pm 1.1$  and  $7.5 \pm 1.0$  respectively, and the same chemical parameters for the same samples by the lactoscan were  $29.9 \pm 3.9$ ,  $8.6 \pm 1.2$ , and  $8.2 \pm 1.1$  respectively. No significant difference was found between the two different analytical methods so the rest of the samples were go under the automatic methods via (**Milk content analyzer, Lactostar, No. 3510**)

Table (5) shows the mean chemical composition of the sweetened condensed milk samples which were  $29.9 \pm 3.9$ ,  $8.2 \pm 1.1$ ,  $21.4 \pm 2.8$ ,  $8.5 \pm 1.1$  and  $9.0 \pm 0.2$  for total milk solids, protein, solids not fat, fat and lactose %, respectively.

Table (6) a comparative between the samples results, Egyptian and different international standards. Considering the fat percentage all samples complied the Egyptian, American standards, while all samples failed to comply the English standards, which require at least 9% of fat and the samples maximum result was 8.79%, for total milk solid percentage, 75% of sweetened condensed milk samples failed to comply Indian, English requirements which require TMS% not less than 31% of weight, and our maximum result was 31.25% of weight TMS.

#### **5.2.2. Chemical results of full cream unsweetened evaporated milk:-**

Table (4) showed total milk solids, fat and protein% obtained by ordinary methods were  $30.2 \pm 3.9$ ,  $8.2 \pm 1.1$  and  $7.4 \pm 1.0$  respectively, and the same chemical parameter for the same samples by the milk analyzer were  $29.8 \pm 1.3$ ,  $8.4 \pm 1.1$  and  $7.9 \pm 1.0$  respectively, also no significant difference was found between the two different analytical methods so the rest of the samples were go under the automatic methods via (**Milk content analyzer, Lactostar, No. 3510**)

Table (7) shows the chemical composition of the evaporated milk samples which were  $28.92 \pm 1.2$ ,  $7.9 \pm 1.0$ ,  $20.37$ ,  $8.4 \pm 1.1$  and  $10.21 \pm 1.33$  for total milk solids, protein, solid not fat, fat and lactose % respectively.

Table (8) compare between the results of the tested samples, the Egyptian, English and American standards, all samples complied with the Egyptian standards, while all samples failed to comply the English standards which require at least 30% of weight total milk solids and the maximum result was 29.14%, and require at least 9% fat and the maximum results was 8.62 %. Samples complied American standard requirements except 41.67% of them failed to comply the fat requirements which require at least 8.5%.

### **5.3. Microbiological evaluation of concentrated milk samples:-**

#### **5.3.1. Microbiological results of full cream sweetened condensed milk samples:-**

Table (9) showed that the mean value of aerobic plate count in the examined sweetened condensed milk was  $8.46^3 \times 10 \pm 3.2 \times 10^2$  cfu/g.

Table (9) showed that thermophilic and thermophilic bacterial count was reported in a mean of  $2 \times 10 \pm 0.87 \times 10$  and  $4.45 \times 10 \pm 0.57 \times 10$ , respectively. While the yeast and mould count were  $1.5 \times 10 \pm 0.53 \times 10$ .

Table (10) a comparison between the sweetened condensed milk sample results and the Egyptian standard (*ES.2, 2005*) there were 25%, 100% and 47% of the samples were complying the of aerobic, *Coliforms* and yeast and mould count respectively.

Table (11) compared these results with Egyptian and some international standards as shown in that 33.3%, 25% and 83.3% of the samples of sweetened condensed milk were complied with the *ES. 2005* and Compell and Marshall 2008 standard for aerobic plate count respectively, 100% for *Coliforms* and 46.6% for yeast and mould count for the three standards.

Table (14) showed the classification had been done for the mould isolates the results were reported in. *Alternaria alternaria*, *Aspergillus flavus*, *Aspergillus fumigates*, *Aspergillus niger*, *Aspergillus terreus*, *Penicillium spp.* were found in full cream sweetened condensed milk samples with percentage 15.2, 18.2, 9.0, 18.2, 24.2 and 15.2 % respectively.

#### **5.3.2. Microbiological results of full cream unsweetened evaporated milk samples:-**

While in Table (11) the mean value of aerobic plate count in the examined evaporated samples milk was  $8.46 \times 10^2 \pm 3.2 \times 10$  cfu/g.

Table (12) showed that thermophilic and thermophilic bacterial count was reported in a mean  $1.71 \times 10 \pm 0.66 \times 10$  and  $2 \times 10 \pm 0.1 \times 10$  for evaporated milk samples. While the yeast and mould count were  $1.4 \times 10 \pm 0.43 \times 10$ .

Table (13) showed that 65% of the examined samples were complied with both *ES. (2005, 1) and Indian standards* (2008) for their yeast and mould requires as in

Table (14) showed the classification had been done for the mould isolates the results were reported in. *Alternaria alternaria*, *Aspergillus flavus*, *Aspergillus fumigates*, *Aspergillus niger*, *Aspergillus terreus*, *Penicillium spp.* were found in full cream unsweetened evaporated milk samples with percentage 12, 20, 16, 24, 20, and 8 % respectively.

Neither the *Coliforms* nor the anaerobic bacteria could be detected in all examined samples full cream sweetened and unsweetened.

Table (11&13) showed that 100% of both sweetened and unsweetened concentrated milk samples results complied with both the (*ES.2005, 1&2*) as it requires negative *Coliforms*.

By this work we evaluated two types from the concentrated dairy products which are the full cream sweetened condensed milk and the full cream unsweetened evaporated milk, the most common types of the concentrated milks solid in the local markets.

The significance and public health importance of the isolated organisms were discussed and the suggestive control measures for improving the criteria and sanitary condition of the full cream sweetened condensed milk and the full cream unsweetened evaporated milk were discussed.