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# EVALUTION OF THE MICROBIOLOGICAL QUALITY OF YOGHURT BLENED WITH SOME FRUIT JUICE

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## ABSTRACT

A study was carried out on the plain yoghurt was prepared on laboratory in a scale production from cow's milk obtained from dairy farm in Cairo. Plain yoghurt blended with fresh juice (Guava, Mango, Strawberry juice) and commercical yoghurt fortified by juice have been investigated. The microbiological quality of yoghurt, yoghurt juice blends and fresh juice samples were investigated during refrigerated storage at 40C for two weeks, and six months for juice kept frozen. The microbial analyses including Yeast and moulds counts, and coliform organisms were recorded statistically evaluated. The result of the study showed that fresh juice had significant effect on acceptability of yoghurt before and after storage.

## INTRODUCTION

Yoghurt is a one of the best-known of the food that contains probiotics. its defined by the codex Alimentarius of 2003 as a coagulated milk product that results from the fermentation of lactic acid in milk by *Lactobacillus delbrueckii* ssp*. Bulgaricus and streptococcus thermophilus*. The nutritive value of yoghurt is based on the nutrient composition of milk, and it is popular fermented milk product. To preserve its inherent quality and sensory characteristics, its blending with juice is essential. The shelf life of yoghurt is short, i.e., one day under ambient condition (25–30 $^{o}$C) and around five days at 7 $^{0}$C *(*Salji *et al.,* 1987*)*. In addition to its high nutritional value, yoghurt possesses antagonistic and therapeutic values (Gilliland, 1991). Yoghurt provides higher levels of protein, carbohydrate; calcium and certain B vitamins than milk (Gurr, 1987; Deeth and Tamime, 1981*).* Several health benefits have been claimed to be associated with the consumption of fermented milk products *(*Yamamoto *et al.,* 1994, Deeth and Tamime*,* 1981*; IDF, 1984)*. Lactic acid bacteria have been paid increasing attention because of their beneficial effects for the health of their host, and are called probiotics (Fuller, 1989; Prasad *et al.,* 1998*).* In order to act as probiotics, the bacteria should be delivered alive to the intestine of their host (Lian, Hsiao, & Chou, 2003; Picot & Lacroix, Matsuo *et al.,* 2009). The fruit pulp is high in prebiotic dietary fiber, vitamin C, polyphenols and provitamin A carotenoids. Acidified milk drinks (AMDs) are a diverse group of beverages including drinking yoghurts and milk/juice drinks (Nakamura*, et al.,* 2006*).*

Therefore the present work was designed to study the quality of yoghurt blended with fruit juice to improve its microbiological characteristic. The effect of contaminating microorganisms on yoghurt and blends of yoghurt

with juice as well as fruit juice after their storage at $4^0$C for two weeks and six months at $-18^0$C respectively was aimed.

## MATERIALS AND METHODS

**Source of fruit samples:**

Commercially grown mature guava (Psidium guajava L.), mango (*Mangifera indica,* L.) and strawberries (*Anna delicious*) were used for this study. Ripe fruits were processed on the same day of purchasing from a local supermarket in Cairo, Egypt.

**Extraction of fruit juices:**

Fruit juicing was performed at room temperature. guava, mango and strawberries fruits were sanitized before making juice by immersing for 1min. in 200ppm Cl2 (Sodium hypochlorite solution, NaClO) and then rinsing with water to remove the Cl2 residue.

The used equipment and glassware for production the juice were sanitized by immersion in 1000ppm Cl2 (Sodium hypochlorite solution, NaClO), pH 6.5 (adjusted with citric acid) for 1min and then rinsed with water to remove the residue. All containers in which the juices were to be held were autoclaved in a AMSCO Scientific, SV-120, (USA) at 121o C for 30min.

Guava (G) and Mango (M) fruits were rinsed with water, sectioned to longitudinal slices, and juiced with an Acme Supreme Juicerator Model 6001 (Acme Juicer Mfg. Co., Lemoyne, PA) lined with a 46 x 57cm strip of Whatman No.1 filter paper. Juice was collected in a beaker containing 1% antifoam emulsion (Sigma Chemical Co, St Louis, MO), to prevent foaming during extraction of the juice, and ascorbic acid (5mg/100ml juice) with stirring.

Strawberries (S) were rinsed with water, cut into small pieces and pureed in a Waring blender for 2-3min., then extracted by cheese cloth and kept in glass for six months at $-18^0$C.

**Collection of samples**

The study includes examination of sixty six samples of yoghurt representing: (i) six samples of plain yoghurt made in the laboratory ; (ii) six random samples of market plain yoghurt ; (iii) 18 samples of fortified yoghurt made in the laboratory, six samples fruit juice each of Guava, Mango, Strawberry; (iv) 18 samples of market plain yoghurt fortified in the lab .By using guava, mango, strawberry juices (six samples each); (vi) 18 samples of fortified market yoghurt including Guava ,Mango ,and strawberry (six samples each).18 samples made in the laboratory with fruit juice , six samples each of Guava, Mango, and Strawberry.

**Milk used for making of lab. Yoghurt:**

Raw buffalo's milk used for making yoghurt, the milk was obtained from a dairy farm at Sharkia Governorate. Starter cultures used for making plain yoghurt Old plain yoghurt obtained from *HACCP* certified & *ISO22000:* 2005 Dairy Company was used as a source of the starter culture.

**Making yoghurt:**

Raw Buffalo milk was subjected to a heat treatment at $92^0$C for 20 min to kill microorganisms and to evaporate 25% of water followed by cooling to 40 – $45^0$C. As starter culture yoghurt, one day old yoghurt was added to the milk, followed by mixing, and packed in sterilized glass capped cups 100ml capacity, followed by incubation at $42^0$ C for 3-4 hours till gel forms (pH 4.5).

Freshly yoghurt was cooled and stored at refrigeration at $5^0$C till examination to slow down the physical, chemical and microbiological degradation.

**Preparation of fruit juice:**

Guava, Mango, Strawberry fruits were procured from the local fruit market. The fruits were washed, peeled, crushed and passed through pupler to obtain pulp. Fruits were peeled and passed through a screw type juice extractor to obtain juices which were stored and freezed at -$18^0$C for six months till analyzed.

**Preparation of Fortified yoghurt:**

Fruit juices were added to yoghurt, so drinking yogurt is essentially stirred. Yogurt that has a sufficiently low total solids content to achieve a liquid or pourable consistency and which has undergone homogenization to further reduction of the viscosity. Fruit and flavour may be incorporated at this time, and then packaged. The product is then cooled and stored at (5°C), to slow down the physical, chemical and microbiological degradation. Sweeteners, flavouring and colouring materials are invariably added.

**Analytical method**

Ascorbic acid was estimated by using 10 from the sample blended with 100 ml distilled water for 30sec then the suspension was filtrated through filter paper (whatman NO .541 ). Then 10 ml from filtrated solution was tacked with 10 ml from 1.0 % oxalic acid then the mixture was titrated with 2,6 *dichlorophenol].* Ascorbic acid was determined according to the methods recommended by the AOAC (2000) using 2.6 *dichlorophenol indophenol dye* (Sigma Chemical Co., Germany).

**Color characteristics determinations:**

Color is one of the more important quality parameters in processed products. Undoubtedly, possible color changes would influence the Organolyptic properties of samples and would limit their potential applications. Hunter a*, b* and L* parameters were measured with a color difference meter using a spectrocolorimeter (Tristimulus Color Machine) with the CIE lab color scale (Hunter, Lab Scan XE - Reston VA, USA) in the reflection mode. The instrument was standardized each time with white tile of Hunter Lab Color Standard (LX No.16379): X= 72.26, Y= 81.94 and Z= 88.14 (L*= 92.46; a*= -0.86; b*= -0.16) (Sapers and Douglas, 1987*).*

The Hue-Angle (H)*, Chroma (C)* and Browning Index (BI) were calculated according to the method of *Palou et al. (*1999*)* as follows:

H* = tan-1 [b*/a*] …… (1)

C* = square root of [a2* + b2*]...…….…. (2)

BI = [100 (x-0.31)] 10.72 ……. (3)

Where: X = (a*+ 1.75L*) / (5.645L*+ a* - 3.012b*)

**Total phenol determination:**

Total phenol content of the untreated and treated samples was measured by the method of *Amerine and Ough (1980),* the absorbance was measured at 765nm using Spectrophotometer, UVD-3500, Labomed, USA and the results were expressed as milligram of garlic acid as standard equivalent per gram.

**Determination of pH:**

The pH of fruit sample was measured using a combination pH electrode with a digital pH mater *(HANNA, HI 902 meter, Germany)* standardized with stirring as described in *(A.O.A.C.,* 2000*).*

**Determination of total soluble solids (TSS):**

The percent total soluble solids, expressed as $^{o}$Brix, were determined with a refractometer *(ATAGO, Japan).*

**Determination of Titratable acidity (TA):**

Titratable acidity were determined as described by *(Tung Sung Chung, et al.,* 1995*)* by using approximately 10 g portion of fruit sample blended with 100 ml distilled water for 30 sec in blender and was titrated to pH 8.0 with a 0.1N NaOH solution. The end point was determined with a pH meter.

Titratable acids in the sample were calculated as percent of citric acid or malic acid.

**Microbiological Examination of samples**

**Preparation of yoghurt samples for examination:**

The collected yoghurt samples as well as fruit juice were prepared for microbiological examination according to *American Public Health Association (APHA,* 1992*).*

**Preparation of fruit juice samples: (APHA, 1992)**

Fruit juice samples were prepared for microbiological examination according to *American public health Association* (APHA, 1992). Preparation of 10 folds decimal dilution.

**Determination of Aerobic Bacteria:**

The total count of the aerobic mesophillic bacteria was determined using the total plate count method, standard plate count agar (oxoidLtd,Basing stoke, Hampshire-England). The number of colonies was counted and recorded as colony forming units per/gram of sample (cfu/g).

**Determination of Yeast and Mould Count: (ISO, 1994)**

Duplicate plates of chloramphenicol yeast extract agar were inoculated with 0.1 ml of previously prepared serial dilutions and evenly spread on to the surface of agar plates. Inoculated plates were incubated at 25$^{o}$C for 3 to 5 days. The first examination was done after 3days of incubation to determine the degree of mould growth. After 5 days, yeast as well as mould colonies were enumerated on countable plates separately. The yeast and mould count per gram of examined samples was calculated and reordered.

**Determination of *Escherichia coli* content (MPN/g) using *E. coil*- MUG method *(ISO,* 1994*)***

One ml portion from each of the previously prepared decimal dilutions was inoculated into a series of 3 fermentation tubes containing *E.coli* broth-MUG, supplemented with inverted Durham's tubes for detection of gas. Inoculated tubes as well as control were incubated at $35^0$C for 48 ± 2 hours. Gas positive tubes (Coliforms positive) were exposed to long wave (365nm) UV light; positive MU exhibits a bluish fluorescence that is easily visualized in the medium. Calculation and recording the MPN/g of *Escherichia coli* in the samples were detected.

**Determination of Coliform Count (MPN/g)**

One ml of prepared sample and from each of the previously prepared decimal dilutions was inoculated into a series of 3 fermentation tubes containing Lauryl sulphate tryptose broth (LST*)*, supplemented with inverted Durham's tubes for collection of gas. Inoculated tubes as well as control one were incubated at $35^oC$ for 48 ± 2 hours, and then examined for gas production. MPN/g. of the examined samples was obtained from the results recorded.

**Sensory Evaluation:**

Sensory evaluation of the studied was carried out by untrained panelists of 10 selected judges utilizing a 10-point hedonic scale where: 9=good and 1=discolored for appearance evaluations, and 10 =fresh-good and 1=poor for aroma evaluations and overall acceptability (Crandall*, et al.,* 1990*)*. The all tested samples subjected to sensory evaluation after two weeks in yoghurt products and after 6 months in fruit juices.

**Statistical Analysis:**

Analyses for experiments were performed in duplicated, and results were averaged. A. Duncan Multiple Range Test was carried out by means of the “shortest significant ranges SSR” (Larmond, 1974) to determine the differences between the treatments using HDSS statistical analysis program.

## RESULTS AND DISCUSSION

Data represented in Tables (1&2) reported that, coliforms were detected in 33.33%, 66.76%, 50.00% and 33.33%of of examined Lab made plain yoghurt and Lab made fortified yoghurt (Guava, Mango and Strawberry juice) respectively. On the other hand coliforms were present in market plain yoghurt in 66.66.00% of the examined samples, while fortified yoghurt with Guava, Mango and Strawberry the incidence of coliforms was 50.00%, 83.33 % and 66.66% respectively.

The prevalence of Coliforms was illustrated in Table (3) from which it was clear that Coliforms was present in 66.76 %, 50.00% and 33.33% of examined Guava, Mango and Strawberry juice samples respectively.

**Table (1): Incidence of Coliforms in examined lab made yoghurt samples.**

| Type of samples | No of Samples | Positive samples | % |
|---|---|---|---|
| plain yoghurt | 6 | 2 | 33.33 |
| Yoghurt fortified with Guava | 6 | 4 | 66.76 |
| Yoghurt fortified with Mango | 6 | 3 | 50.00 |
| Yoghurt fortified with Strawberry | 6 | 2 | 33.33 |

**Table (2): Incidence of Coliforms in stored for two weeks market yoghurt samples.**

| Type of samples | No of Samples | Positive Samples | % |
|---|---|---|---|
| plain yoghurt | 6 | 4 | 66.66. |
| Fortified yoghurt by Guava | 6 | 3 | 50.00 |
| Fortified yoghurt by Mango | 6 | 5 | 83.33 |
| Fortified yoghurt by Strawberry | 6 | 4 | 66.66 |

**Table (3): Incidence of Coliforms in stored juice examined Juice samples for six months.**

| Type of samples | No. of samples | Positive samples | % |
|---|---|---|---|
| Guava Juice | 6 | 4 | 66.76 |
| Mango Juice | 6 | 3 | 50.00 |
| Strawberry Juice | 6 | 2 | 33.33 |

Nearly similar findings were reported by Saudi 1980; Abeer 1997. Lower findings were recorded by Lopez *et al.* 1993; Shahid *et al.* 2002; Zakai & Erdogan 2003 and Riadh Al Tahiri 2005, where as higher counts were reported by Hafez 1984; Ayoup1986 and Aboubaker 2004.

It is clear from the obtained results that all the examined yoghurt samples were positive to coliforms and are not agreement with the Egyptian Standard Specification *(2005)*, which recommended that coliforms count should be less than 10 cells /gm in the product.

Lucea 1995 mentioned that coliforms are unable to survive at low pH in yoghurt and this inhibition is reinforced by the production of antibiotic substances which might be produced by the bacteria constituting the starter.

High coliforms count in dairy products render the product to inferior quality and cause economic losses (ICMSF,1980).Coliform tests for dairy products are not intended only to indicate fecal contamination but do reflect over all dairy farms and plant sanitation *Reinbold,1983*

Coliforms are proven to be used as safety indicator, so used as a component of safety programs such as HACCP system. The presence of coliform in food, especially, heat-processed foods is probably due to improper sanitation after heat treatment *Ray, 2004*, contamination with fecal matter and their presence related to presence of enteric pathogen.

Results recorded in Table (4) showed that the minimum, the maximum and the mean MPN/g of coliforms in plain yoghurt were 10x10, 9.8x106 and $6.35x10^5 \pm 2.95x10^5$/gm. While the mean value of coliforms in fortified yoghurt with Guava, Mango and Strawberry juice were $6.35x10^4 \pm 2.78x10^4$; $2.71x10^6 \pm 1.32x10^6$ and $13.06x10^5 \pm 6.90x10^5$ /gm in examined yoghurt

samples respectively. The high frequency (36.36%) lied within the range$10^4$-$10^6$ (Table 5).

**Table (4): Statistical Analyses of Coliform MPN count/gm found in lab made yoghurt Samples .**

| Type of samples | No of Samples | +ve Samples | Min | Max | Mean | S.E.M ± |
|---|---|---|---|---|---|---|
| plain yoghurt | 6 | 2 | 10x10 | $9.8x10^6$ | $6.35x10^5$ | $2.95x10^5$ |
| Yoghurt fortified with Guava | 6 | 4 | 37x10 | $5.5x10^5$ | $6.35x10^4$ | $2.78x10^4$ |
| Yoghurt fortified with Mango | 6 | 3 | 5.1x10 | $3x10^7$ | $2.71x10^6$ | $1.32x10^6$ |
| Yoghurt fortified with Strawberry | 6 | 2 | 43x10 | $2.2x10^7$ | $13.06x10^5$ | $6.90x10^5$ |

**Table (5): Frequency distribution of examined yoghurt samples based on their coliform count/gm.**

| Intervals | No of positive samples | % |
|---|---|---|
| 10-$10^2$ | 2 | 18.18 |
| $10^2$-$10^4$ | 2 | 18.18 |
| $10^4$-$10^6$ | 4 | 36.36 |
| $10^6$-$10^8$ | 3 | 27.28 |
| Total | 11 | 100.00 |

Inspection of Table (6) showed that the minimum coliforms in market plain yoghurt respectively was $10x10^3$, the maximum was $20x10^7$ and the mean was $6.72x10^6$± $6.66x10^6$ /gm.

As regarded here in this study and recorded in Table (6), it is clear that the minimum coliform content in fortified market yoghurt with guava, mango and Strawberry were $94x10^2$, $8.0x10^2$. and $3.3x10^2$; while the maximum were$10x10^9$, 3.3x10 and $1.4x10^9$ respectively with a mean average of$7.31x10^8$±$4.55x10^8$, 2.44x107±$1.20x10^7$ and $8.85x10^7$±$5.17x10^7$ /gm respectively.

**Table (6): Statistical Analyses of Coliform MPN count/gm found in market yoghurt Samples.**

| Type of samples | No. of samples | +ve Samples | Min | Max | Mean | S.E.M ± |
|---|---|---|---|---|---|---|
| plain yoghurt | 6 | 4 | $10x10^3$ | $20x10^7$ | $6.72x10^6$ | $6.66x10^6$ |
| Yoghurt fortified with Guava | 6 | 3 | $94x10^2$ | $10x10^9$ | $7.31x10^8$ | $4.55x10^8$ |
| Yoghurt fortified with Mango | 6 | 5 | $8.0x10^2$ | $3.3x10^8$ | $2.44x10^7$ | $1.20x10^7$ |
| Yoghurt fortified with Strawberry | 6 | 4 | $3.3x10^2$ | $1.4x10^9$ | $8.85x10^7$ | $5.17x10^7$ |

The findings in Table (7) display the frequency distribution of coliform count and show that the highest frequency distribution of coliform count per gm of market plain yoghurt (26.23%) lies within the range($10^4$-$10^6$) and($10^6$-$10^8$) .

**Table (7): Frequency distribution of examined market plain yoghurt samples based on their coliform count.**

| Intervals | No of positive samples | % |
|---|---|---|
| $10^2$-$10^4$ | 3 | 15.78 |
| $10^4$-$10^6$ | 5 | 26.32 |
| $10^6$-$10^8$ | 5 | 26.32 |
| $10^8$-$10^{10}$ | 3 | 15.78 |
| Total | 16 | 100 |

Data tabulated in Table (8) show that the minimum and maximum coliform counts / gm. of examined guava, mango and strawberry juice samples were 10, 30x103; 10,90x103 and 20,15x$10^3$, with a mean value of 57.97x$10^2$±19.38x$10^2$,84.84x$10^2$± 42.64x$10^2$ and 19.11x$10^2$± 6. 19x$10^2$ in examined juice samples respectively. The high frequency distribution of coliform (38.46%) lies within the range10-$10^2$ (Table9) .

**Table (8): Statistical Analyses of Coliform MPN count/gm found in juice.**

| Type of samples | No. of samples | +ve Samples | Min | Max | Mean | S.E.M ± |
|---|---|---|---|---|---|---|
| Guava Juice | 6 | 4 | 10 | 30x$10^3$ | 57.97x$10^2$ | 19.38x$10^2$ |
| Mango Juice | 6 | 3 | 10 | 90x$10^3$ | 84.84x$10^2$ | 42.64x$10^2$ |
| Strawberry Juice | 6 | 6 | 20 | 15x$10^3$ | 19.11x$10^2$ | 6.19x$10^2$ |

**Table (9): Frequency distribution of examined Juice samples based on their coliform count/gm.**

| Intervals | No. of positive samples | % |
|---|---|---|
| 10-$10^2$ | 5 | 38.46 |
| $10^2$-$10^3$ | 4 | 30.77 |
| $10^3$-$10^4$ | 4 | 30.77 |
| Total | 13 | 100.00 |

Results in Table (10) revealed that 2 (33.33%); 2 (33.33%); 3 (50.00) and 1(16.66%) of plain and fortified (Guava, mango and strawberry) yoghurt examined samples contained molds and yeast respectively.

**Table (10): Incidence of Mold &yeast in examined lab made yoghurt samples**

| Type of samples | No of Samples | Positive samples | % |
|---|---|---|---|
| Plain yoghurt | 6 | 2 | 33.33 |
| Yoghurt fortified with Guava | 6 | 2 | 33.33 |
| Yoghurt fortified with Mango | 6 | 3 | 50.00 |
| Yoghurt fortified with Strawberry | 6 | 1 | 16.66 |

It is clear from the results given in Tables (11) and that the minimum, maximum and mean mold & yeast count / gm of plain and fortified with guava, mango and strawberry, yoghurt samples were (100,100,50 and 100);( $10x10^3$, $75x10^3$, $176x10^2$ and $6x10^5$ );( $10x10^{2+}$ ± $5x10^2$, $8.25x10^3$ ± $2.69x10^3$, $10x10^2$ ± $6.34x10^2$ and$21.89x10^3$ ± $12.84x10^3$)respectively.

**Table (11): Statistical Analyses of Mold &yeast count/gm found in fortified yoghurt Samples.**

| Type of samples | No of Samples | +ve Samples | Min | Max | Mean | S.E.M ± |
|---|---|---|---|---|---|---|
| Plain yoghurt | 6 | 2 | 100 | $10x10^3$ | $10x10^2$ | $5x10^2$ |
| Yoghurt fortified with Guava | 6 | 2 | 100 | $75x10^3$ | $8.25x10^3$ | $2.69x10^3$ |
| Yoghurt fortified with Mango | 6 | 3 | 50 | $176x10^2$ | $10x10^2$ | $6.34x10^2$ |
| Yoghurt fortified with Strawberry | 6 | 1 | 100 | $6x10^5$ | $21.89x10^3$ | $12.84x10^3$ |

The highest frequency (50.00 %) lies within the range $10^2$-$10^3$ (Table12)**,** in Table (13) show that 3 (50.00%); 3 (50.00%); 2 (33.33) and 2(33.33%) of market plain and fortified with Guava, mango and strawberry) yoghurt examined samples contained molds and yeast respectively.

**Table (12): Frequency distribution of examined Lab made yoghurt samples based on their Mold & yeast count/gm.**

| Intervals | No of positive samples | % |
|---|---|---|
| 10-$10^2$ | 1 | 12.50 |
| $10^2$-$10^3$ | 4 | 50.00 |
| $10^3$-$10^4$ | 3 | 37.50 |
| Total | 8 | 100.00 |

**Table (13): Incidence of Mold &yeast in examined market yoghurt samples.**

| Type of samples | No of Samples | Positive Samples | % |
|---|---|---|---|
| plain yoghurt | 6 | 3 | 50.00 |
| Fortified yoghurt by Guava | 6 | 3 | 50.00 |
| Fortified yoghurt by Mango | 6 | 2 | 33.33 |
| Fortified yoghurt by Strawberry | 6 | 2 | 33.33 |

It is clear from the data obtained in Tables (14) that the minimum, maximum and mean mold & yeast count / gm of market plain and fortified (guava, mango and strawberry) yoghurt samples were **(**$10x10^3$, $11x10^2$, $77 x10^4$ and$83x10^4$);( $20x10^7$, $74x10^5$, $27x10^8$ and$79x10^7$);( $6.72x10^6$±$6.66x10^6$, $92.35x10^4$±$21.16x10^4$, $13.66x10^6$±$57.27x10^6$ and $21.43 x10^7$ ±$10.37x10^7$) respectively. It was found that (40%) out of the samples were found to be within the range $10^6$-$10^8$(Table15).

**Table (14): Statistical Analytical Results of Microbiological Examination of examined market yoghurt Samples based on their Mold & yeast/count/gm.**

| Type of samples | No. of samples | +ve Samples | Min | Max | Mean | S.E.M ± |
|---|---|---|---|---|---|---|
| plain yoghurt | 6 | 3 | $10x10^3$ | $20x10^7$ | $6.72x10^6$ | $6.66x10^6$ |
| Yoghurt fortified with Guava | 6 | 3 | $11x10^2$ | $74x10^5$ | $92.35x10^4$ | $21.16x10^4$ |
| Yoghurt fortified with Mango | 6 | 2 | $77 x10^4$ | $27x10^8$ | $13.66x10^6$ | $57.27x10^6$ |
| Yoghurt fortified with Strawberry | 6 | 2 | $83x10^4$ | $79x10^7$ | $21.43x10^7$ | $10.37x10^7$ |

**Table (15): Frequency distribution of examined Market plain yoghurt samples based on their Mold & yeast count/gm.**

| Intervals | No of positive samples | % |
|---|---|---|
| $10^2$-$10^4$ | 1 | 10.00 |
| $10^4$-$10^6$ | 3 | 30.00 |
| $10^6$-$10^8$ | 4 | 40.00 |
| $10^8$-$10^{10}$ | 2 | 20.00 |
| Total | 10 | 100 |

Nearly similar findings were reported by*; Abeer* 1997 *and Hanaa 1999,* while higher findings were reported by *Uden and Sousa* 1957 and lower values were recorded by Lopez, *et al.* 1993*,* and Egyption standard specifications (2005) stated that the fungal count must be ≤ 10 cell/g. and with permissible limit of mycotoxins.

The high contamination level with yeasts and moulds in the samples of balady yoghurt indicates neglected hygienic measures during production, handling and distribution of such product. Abou Donia 1980.

Reported the contamination of most local yoghurt with yeast& mould. Con *et al.* 1996 mentioned that the high contamination level within yoghurt examined samples was due to contamination from air and the used cult re. *Yaygm and Kilic* 1980*.* Showed that yoghurt made from pure culture has no growth of yeast and mould up to four days the storage.

The main microbiological problems associated with yoghurt, juice, blends of yoghurt juice drinks, is the spoilage caused by yeast and mould Garbutt *et al*. 1997. Yeast are very common in yoghurt, juice, blends of yoghurt juice drinks, compared with moulds Robinson, 1990, Alekieva and Mirkov 1979 found that 3.5% of the yoghurt lots presented for sale on markets contained yeast, while one lot had mould. Li and Li (1998) recorded that 56.67% of examined yoghurt samples were contaminated with yeast but of 67.33% of the examined samples which were contained with yeast and mould.

Yeast contamination the yoghurt and its products results in economic losses through the indesirable changes such as frothy consistency and yeasty flavour. Moreover, some species of yeasts constitute a public hazard such as gastrointestinal disturbance, endocarditis, and occasionally fatal

systemic diseases Marth *et al.* 1972 and Jaquet & Teherani, 1976.the survival parameters of Escherichia Coil O157: H7during milk fermentation carried out the LIM or "longer incubation method" at 300C; or by the SIM or " short incubation method" at 430Cand storage of homemade yoghurt at refrigeration temperatures (2, 4,or $8^0$C) were studied . M.Bachrouri, et al. 2006. The death time decreased with the increase of the storage temperature in the yoghurt produced by fermentation at $30^0$C ; however, a clear relationship between death time and storage temperature was not evident at $43^0$C. The PH values of the yoghurt ranged from 0.4to 4.7. S. Petti and G. Tarsitani. 2008. Although the presence of mould in yoghurt constitute a serious economic losses because it associated with a visible spoilage, off flavor, discoloration and rejection of the product but also isolation of some species have raised the possibility that contaminated yoghurt could be source of mycotoxins which were implicated in outbreaks of human food poisoning and many several diseases such leukemia, cancer and kidney toxicity Bullerman, 1981, and Robinson, 1990.

**Conclusion**

From thefore mentioned results it could be conclude that the examined samples of Yoghurt, whether plain or flavoured with guava, mango, strawberries are selected to microbial deterioration, part whether made in the laboratory. The occurrence of deterioration due to risks of contamination due to lack of hygienic and sanitary measures adjusted during manufacturing handling, transportation and marketing.

The unclean hands of worker, poor quality of milk used, unhygienic conditions of manufacturing unit, inferior quality of materials used and water supplied for washing utensils, could be the source of accelerating the bacterial contamination and the post- manufacturing contamination of these products. Lake of proper cooling storage with ambient summer temperature of Egypt is also factors magnitude of the problem of bacterial contamination.

Therefore, to safeguard consumers from being infected and after storage at $4^0$C for two weeks for yoghurt and 6months for juice at-$18^0$C, to save a lot of the products from being spoiled on the market, more elaborative measures from the point of production of yoghurt, juice, and blends of yoghurt juice drinks to the point of consumption and at all intermediary levels are required:

Therefore, it seems necessary that concerned authorities should impose regulations and bacteriological standards for yoghurt, juice, and blends of yoghurt juice drinks, taking active part in the control of yoghurt, juice, and blends of yoghurt juice drinks production and handling as well as improving the quality of produced yoghurt, juice, and blends of yoghurt juice drinks.

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# تقيـيم الجـــودة الميكروبيـــة فـــي الحليـــب و الزبـادي المخلـوط بـبعض الفواكـه وعصائرها

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***** قسم الصناعات الغذائية – المركز القومى للبحوث - مصر**

هذه الدراسة توضح أن اليوجورت العادي يصنع بحجم إنتاج المعمل من ألبان الأبقار المأخوذة من بعض المزارع المعتمدة من القاهرة، اليوجورت التجارى ،اليوجورت الممزوج مع عصائر طازجة وهى (عصير الجوافة- عصير المانجو- عصير الفراولة) ، اليوجورت (التجارى) الممزوج بعصائر طازجة وهى (عصير الجوافة- عصير المانجو- عصير الفراولة) ، والعصير الطازج .وأيضا يتم دراسة اليوجورت تجاريا الممزوج مع عصائر طازجة. وأيضا تم تقييمهم ميكروبيولوجيا حيث تم تخزينهما على درجة حرارة ٤ درجة مئوية لمدة اسبوعين فى حين ان العصير لمدة ستة اشهر على درجة حرارة -١٨ درجة مئوية . لذلك التحليل الجرثومى يوضح تأثير نمو الخميرة والعفن ، والكوليفورم قبل وبعد التخزين . ونتيجة لهذا اتضح أن العصير الطازج له تأثير كبير على درجة جودة اليوجورت قبل وبعد التخزين.

قام بتحكيم البحث

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