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ABBREVIATIONS

A.O.A.C	Official Methods of Analysis of the Association of Official Chemists
A.P.H.A	American U.S.A public Health. Assoc
B¹	Barley + <i>Bif.lactic Bb12</i>
B²	Barley + <i>Lb.acidophilus 20552</i>
B¹.H	Barley + <i>Bif.lactic Bb12</i> + Honey
B².H	Barley + <i>Lb.acidophilus 20552</i> + Honey
B¹.M	Barley + <i>Bif.lactic Bb12</i> + Mango
B².M	Barley + <i>Lb.acidophilus 20552</i> + Mango
B¹.M.H	Barley + <i>Bif.lactic Bb12</i> + Mango + Honey
B².M.H	Barley + <i>Lb.acidophilus 20552</i> + Honey + Mango
E.S	Egyptian Standard Specifications
I.D.F	International Dairy Federation
I.C.M.F	International Commission on Microbiological Specification for Foods
1	<i>Bifidobacterium lactis coded Bb 12</i>
2	<i>Lactobacillus acidophilus ATCC 20552</i>

SUMMARY

The term 'Foods for special dietary uses' used for the diets which prepared for special groups to meet their needs and not consumed as ordinary foods. These diets include many types of foods such as infant foods. Infants need enough quantities from nutritive which needed for growth. This may be obtained by breast feeding then complementary foods. Recently, there were some types of complementary foods which had been advised to take behind breast feed from four or six months. These complementary foods must be evaluated chemically and microbiologically because infants are most sensitive for malnutrition.

Part 1: Chemical and microbiological evaluation of some local and imported infant foods in Egyptian market.

Nineteen different samples of, local and imported infant foods collected from Cairo and Giza markets over a period between September 2003 to August 2004, then compared with Egyptian Standard, on the other hand when there was no standard the comparison was done depending on its label. The samples were classified into four categories according to their components

Group one: infant foods manufacture from cereals (from sample No.1 to sample No.8).

Group two: dried infant foods used as drinks (from sample No. 9 to sample No.12).

Group three: dried infant milk (from sample No. 13 to sample No. 15).

Group four: Infant pastes contain fruits, vegetable and chicken (from sample No.16 to sample No. 19).

A- Chemical evaluation.

Chemical evaluation included determination of protein, moisture, lipids, ash, fiber, total solids and energy. The results indicated that:

- 1- All samples in group one were compared in, their chemical composition, with Egyptian Standard, No.3284/ (2005) for infants and children processed cereal-based food. Sample (8) was higher in moisture content than standard limited. Samples (1,7,8) were lower in protein content than standard limited. Samples (1,2,5,6,7,8) were lower in fat content than standard limited. Sample (2) was higher in ash content than standard limited. Samples (2,7,8) were lower in energy content than standard limited.
- 2- All samples in group two were compared, in their chemical composition, with Egyptian standard No. 2912/ (1995) for general requirements for foods of special dietary uses which assured to write all contents and percentage on labels but the results indicated that all samples didn't write moisture, ash and fiber percentage on their labels. Moreover, about 50% from tested samples did not write the content of protein, carbohydrate and lipid percent.
- 3- All samples in group three were compared in chemical composition, with Egyptian standard No. 2912/ (1995) for general requirements for foods of special dietary uses which interested to write all contents and percentage on the products labels. The results were nearly closed in there average except sample (15) which was above its label's content.
- 4- All samples in group four were compared, in their chemical composition, with Egyptian standard No. 2912/ (1995) for general requirements for foods of special dietary uses, which assured to write all contents and percentage on their labels. The results indicated that all samples didn't write the moisture and fiber content. On the other hand some samples didn't write the ash and energy percent in their label.

B- Microbiological evaluation.

- 1- All samples of group one compared with Egyptian standard No. 3284/(2005) in their microbiological properties, these samples were microbiologically safe in their content except samples (2) and (4) which increased than standard limits. Meanwhile, all samples were safe in their count of yeasts & molds except samples (1) and (4) which exceed than standard limits.
- 2-Samples of group two which include dried infant drinks were compared to Egyptian standard No. 2730/ (1994) in microbiological properties. All samples were safe in bacterial count and yeasts & molds except sample (11) which was higher than stander limits.
- 3- Samples of group three which included dried infant milks were compared to Egyptian standard No. 1648/(2005) in microbiological properties. All samples not exceed limits of bacterial count except sample (15) exceed in yeast and molds counts.
- 4- Samples of group four which included vegetables, fruit and chicken pasts compared with Egyptian standard No. 5448/(2006) in microbiological properties. All samples exceed limits of bacterial count but not exceeded in yeasts and molds count

So in general, the numbers of fully accepted samples were (3), (4), (9), (12) (13), (14).

Part 2: Evaluation of prepared fermented porridge as probiotic foods

This part aim to using malt flour and skim milk powder to prepared porridge then (*Bifidobacterium lactis Bb12*⁽¹⁾ and *Lactobacillus acidophilus 20552*⁽²⁾) were added to get fermented porridge. Fermented porridge divided in to four formulas:

Formula 1 (B¹,B²): consist of (140g malt flour+ 140g skim milk powder+ 30g rice flour+ 30 maize flour+2% starter culture.

Formula 2 (B¹.H) (B².H): consist of (140g malt flour+ 120g skim milk powder + 30g rice flour+ 30 maize flour + 100 honey+ starter culture.

Formula 3 (B¹.M) (B².M): consist of (140g malt flour+ 120g skim milk powder + 30g rice flour+ 30 maize flour+100 mango pulp+2%starter culture.

Formula 4 (B¹.M.H) (B².M.H): consist of (140g malt flour+ 120g skim milk powder + 30g rice flour+ 30 maize flour+50 honey+ 50 mango pulp+2% starter culture.

All formulas had been completed to achieve (1) kg and evaluated chemically, microbiologically and sensory in zero time and during storage period (21days) at (4-5 °C). The obtain results were as follow:

A- Chemical properties:

- 1- Moisture content between the treatments changed according to their components. The value of moisture content in (B².M) (75.55%) was lower than all treatments in the zero time of storage period and decreased to (74.64%) after 21 days of storage. On the other hand, value of (B¹.M) (79.88%) was higher than all treatments in zero time then decreased to (79.85%) at the end of storage period.
- 2- Protein percent in all treatments increased during storage up to 21 days. The value of protein in (B².H) was the

- lowest (4.10%) in zero time then increased to (5.14%) after 21 days of storage period. Meanwhile, (B¹) was higher than all treatments, wherever in zero time (5.70%) or after 21 days of storage period (6.80%).
- 3- Because of different percent of skim milk powder were used the ash percent changed between all treatments. Treatments (B¹ & B²) were higher than other treatments in zero time of storage. Their were (1.10%) and (1.20%) respectively. At the end of storage period (21 days) ash percent increased in all treatments.
 - 4- Fiber content decreased in all treatments because of *Bif.lactis Bb12* & *L acidophilus 20552* activity. Treatment (B¹.M.H) had the lowest value in fiber content (0.5%). Meanwhile, treatment (B¹.M) 1.70% was higher than all treatments at the end of storage period.
 - 5- Because of different percent of honey and mango pulp had been used, the carbohydrate was varied between treatments. Generally all treatments were follow the next order in zero time of storage (15.90-(18.42%) (15.89-17.21%) (12.27%-16.94%) (13.73 17.21%) in (B^{1.2}.H)> (B^{1.2}.M.H)> (B^{1.2}.M)> (B^{1.2}.B) respectively. Treatment with mango (B¹.M) was lower but treatment (B¹) was the lowest.
 - 6- Energy values were varied between all treatments. Treatments (B².M.H) and (B².H) were higher than all treatments in zero time or after 21 days of storage period.
 - 7- Determination of minerals included (Ca, P, Mg, Fe, Zn, Cu, Na, and K). All samples were higher in calcium phosphorus and magnesium as compared with other minerals contents. The use of 180 to 230g in the preparation of each formula would be enough to cover the daily requirements of calcium. Meanwhile, the content of phosphorus and magnesium in all treatments would be enough to meet infants daily requirements.

- 8- Determination of vitamins included (vitamin A, Vitamin C, Thiamine and Riboflavin). All samples were lower vitamin A, but results indicated that (B¹.M & B².M) which were higher than other treatments. Also results indicated that 100 g of both previous formulas give approximately 40% from (R.D.A) for infants requirements. All prepared treatments had highest values of Thiamine and Riboflavin to meet (R.D.A) requirements.
- 9- pH values were varied according to the growth of both strains (*Bif.lactis Bb12* & *Lb.acidophilus 20552*). Treatments contain *Bif.lactis Bb12* was lower in pH values than other treatments which contain *Lb.acidophilus 20552*.
- 10- Lactic acid and acetic acid content were varied according to the ability of both strains to produce organic acids by the fermentation of sugar. Lactic and acetic acids were increased during storage period. Meanwhile, in treatments contain *Bif.lactis Bb12* the values were higher than these treatments contain *Lb.acidophilus 20552*. Treatment (B¹.M) was higher in lactic acid and acetic acid (0.15%), (0.165%) after 21 days of storage period respectively.
- 11- Glucose and fructose values were decreased in all treatments during storage period up to 21 days. Treatments contain honey (B¹.H & B².H) were higher than other treatments in zero time and after 21 days of storage period.

B- Microbiological evaluation.

- 1- The counts of *Bif.lactis Bb12* were determined during storage period up to 21 days. The count increased during the 1st up to 15 days, and then gradually decreased till the end of the storage period in some treatments (B¹.M & B².H).

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- 2- The count of *Lb.acidophilus* 20552 reached maximum growth starting from during starting fresh to 15 days, then slightly decreased till the end of the storage period 21 days in all treatments. In general the count of *Bif.lactis Bb12* was higher than *Lb.acidophilus* in all treatments.
 - 3- Coliforms were not detected in all porridge treatments with probiotic bacteria in fresh or throughout the storage period. While, yeasts and moulds counts were detected in all treatments after 21 days of storage period which ranged from Log (2.6 to 1.23 cfu/ml).
- C- Sensory evaluations.**

Sensory evaluation showed that treatments (B².M & B².M.H) which contained *Lb.acidophilus* had the highest total scores in all characteristics till 15 days of storage period, then slightly decrease up to the end of storage period (21 days). From the previous data it was recommended that the best formula for infants were samples treated with mango and mango & honey according to their evaluation.