

## PREPARATION AND EVALUATION OF BANANA STIRRED YOGHURT

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**ABSTRACT:** *Banana stirred yoghurt was prepared by using 0, 5, 10, 15 and 20% banana puree and analyzed for physical, chemical, microbiological and sensory characteristics when fresh and after 7, 14 and 21 days of storage. The statistical analysis indicated highly significant effects of treatment and storage period on physical, chemical, microbiological and sensory characteristics of banana stirred yoghurt. Addition of banana puree to stirred yoghurt increased acidity, total solids, syneresis as well as sensory characteristics. Acidity and syneresis increased gradually during storage periods in all treatments while pH, total solids and fat content decreased during storage period. On the other hand, total bacterial, lactobacillus and streptococcus counts increased in all stirred yoghurt samples during the first 7 days of storage then decreased at that increasing the amount of banana puree added led to higher total bacterial, lactobacillus and streptococcus counts up to 7 days of storage then decreased. Mold and yeast were not detected in control yoghurt and the yoghurt treatments with banana puree up to 7 days of storage. The sensory properties of yoghurt prepared by adding 15% banana puree received the highest score followed by the one with 10%, 20%, 5% respectively compared with control.*

**Key words:** *Banana puree, yoghurt, acidity, storage, microbial counts.*

### INTRODUCTION

Yoghurt is a dairy product that has more benefits than milk. Digestive system in some people has an allergy to lactose (milk sugar), but lactose is transformed to lactic acid in yoghurt and does not cause allergy. On the other hand, calcium of yoghurt is absorbed in body faster than that of milk, because lactic acid in yoghurt turns calcium to soluble form which is absorbed. Therefore, yoghurt devotes calcium to body more than milk (Ariaii *et al.*, 2011). Fruit mixes improve the nutritional value and taste of yoghurt, and therefore plays a considerable role in yoghurt consumption and sales. Banana (*Musa* sp.) fruit contains considerable amounts of amylose, starch, dietary fiber, protein, vitamins, and minerals (Damota *et al.*, 2000 and Wall, 2006). Common processed banana products include banana puree, banana powder or flour, banana chips, canned banana slices, banana jam, banana vinegar, and banana wine (Garcia *et al.*, 1985 and Guerrero *et al.*, 1996). Among these, banana puree is the most important product and is used in the bakery, ice cream, and baby food industries (Damota *et*

*al.*, 2000). In addition, banana puree is used in fruit-flavored yoghurt production.

The demand for fruity yoghurt with different flavors is developing. Adding fruit juice to yoghurt decreases the viscosity and rate of acid development, while whey separation increased. The structure of fruity yoghurt can be improved by using stabilizing agents such as starches, gelatin and pectin (Sera and Ihsan, 2003). Adding different fruit juices to yoghurt increases some minerals such as Mg, Zn, Fe and Cu (Sanchez and Else, 2000).

The objective of this study was to evaluate the physio-chemical, microbiological and sensory quality of yoghurt with added banana puree when fresh and during storage at refrigeration temperature.

### MATERIALS AND METHODS

#### Materials:

Fresh buffaloes' milk was obtained from Food Technology Research Institute, Agricultural Research Center, Giza, Egypt.

Yoghurt starter culture consists of *Streptococcus sativarius* sub sp.

*thermophilus* EMCC 1043 and lyophilized *lactobacillus delbrueckii sub sp. bulgaricus* EMCC 1102 were obtained from Cairo Mircen, Ain Shams University, Egypt.

Banana (*Musa sp.*) and sucrose were obtained from local market.

### **Preparation of banana puree:-**

According to Bakirci and Kavaz, 2008. Banana washed, peeled and sliced, then mixed with 50% sucrose. The mixture were heated at 85 °C for 20 min. and then cooled to 5 °C. The mixture was added to the yogurts at a ratio of 5, 10, 15 and 20% to 100 g yogurt

### **Yoghurt Production:**

Standardized Milk to 3.5% fat and 11% solids non fat was heated to 85°C for 10 min. then cooled to 39±1°C. Starter culture of yoghurt (*L. bulgaricus* and *S. thermophilus*) was added in ratio 1.5% to the milk and completely mixed, then incubated at 40 °C for about 3 hr. to coagulate at pH4.5. The banana puree mixture was added to the yoghurts at ratio of 0% (T1), 5% (T2), 10% (T3), 15% (T4) and 20% (T5). The final product was mixed then filled in 150-ml sterile glass jars and stored at 4°C. All yoghurt samples were subjected to chemical, microbiological, sensory and syneresis analyses at 0, 7, 14 and 21 days.

### **Analytical Methods:**

#### **1- Chemicals & physicochemical analysis:**

Total solids, protein and ash were determined according to the Official Methods of Analysis (AOAC, 2000).

Fat content was determined by Gerber method according to Ling (1963)

Titrateable acidity, expressed as percentage of lactic acid was determined by mixing 10g of yoghurt with 20 ml of distilled water and titrating with 0.1 N NaOH using phenolphthalin as an indicator or to an end point of faint pink color. The measurement was done in triplicate.

The pH samples were measured using digital pH meter (Hanna, Italy). Degree of

syneresis, expressed as amount of free whey, was measured by the method of Al-Kadamany *et al.* (2003) as follow: A mixed-fruit yoghurt sample of 10 g was placed on a filter paper resting on the top of a funnel. After 10 min of draining in a vacuum condition, the quantity of remained fruit yoghurt was weighed and syneresis was calculated as follows:

Free whey (g / 100g): [(weight of the initial sample - weight of the sample after filtration) / weight of the initial sample] X 100.

#### **2- Microbiological analysis:**

*Streptococcus thermophilus* was emmerated using M17 agar (DIFCO) in yoghurt samples and incubated aerobically at 37°C for 72 hours according to Torrian *et al.* (1996). MRS Rogasa agar (DIFCO) was used to enumerate *Lactobacillus delbrueckii* according to Tharmaraji and Shah (2003). Plates were incubated under anaerobic condition at 37°C for 72 hours. Sabauroud agar media was used for the enumeration of mold and yeast according to ALPHA (1992) and Pitt and Hocking (1997).

#### **3- Sensory Evaluation:**

Ten panelists from Food Technology Research Institute, Agricultural Research Center, Giza, Egypt were selected on the bases of their training and experience to evaluate the treatments. They evaluated the samples when fresh and after 7, 14 and 21days of storage of each yoghurt sample and used a quality rating score card for evaluation of flavor (45 points), body texture (30 points), color and appearance (15 points) and acidity (10 points) as described by Nelson and Trout (1981).

#### **4- Statistical analysis:**

Statistical analysis of the data was carried out by ANOVA using SAS statistical software (SAS, 1998). The significant differences among means were assessed by Duncan's multiple range tests (Duncan, 1955).

## **RESULTS AND DISCUSSION**

The chemical composition of buffaloes' milk and banana pulp used in yoghurt making is shown in Table (1).

## ***Preparation and evaluation of banana stirred yoghurt***

**Table 1. The chemical compositions of raw buffaloes' milk and banana puree used for yoghurt making**

Materials	Moisture (%)	Acidity (%)	pH values	Protein (%)	Carbohydrate* (%)	Fat (%)	Ash (%)
Buffalo milk	84.31	0.14	6.2	3.98	4.85	6.2	0.660
Banana (pulp)	82.50	0.37	5.5	2.15	14.04	0.4	0.910

\*Carbohydrate was estimated in buffaloes' milk as lactose.

### **The effect of different ratios of banana puree on titratable acidity (%), pH values, total solids fat and syneresis of stirred yoghurt during the storage periods:-**

The effect of adding different ratios of banana puree on acidity of stirred yoghurt during cold storage periods are presented in Table (2). The acidity of banana stirred yoghurt increased with addition of banana puree. The acidity further increased gradually during storage in all treatments. The development in acidity of yoghurt is mainly due to the conversion of lactose into lactic acid by lactic acid bacteria of yoghurt culture. Bakirci and Kavaz (2008).

The effect of adding different ratios of banana puree on the pH values of the banana-stirred yoghurt during cold (5°C) storage periods are also shown in Table (2). The addition of banana puree resulted in decreasing the pH values of banana-stirred yoghurts. The pH values decreased gradually in all treatments throughout storage periods. The decrease in the pH values was apparently due to the increase in the acidity resulted from the conversion of lactose to lactic acid during the storage period (Hossain et al., 2012& Bakirci and Kavaz 2008). This can be also explained by the further metabolic activities of the starter culture during storage (Bonczar et al., 2002).

The effect of adding different ratios of banana puree on total soluble solids of stirred yoghurt during cold storage periods are also shown in Table (2). Total solids of yoghurts were increased with the addition of banana puree. While during storage periods,

the total solids of yoghurt were decreased in all treatments. The yoghurt prepared with 20% banana pure showed the highest total solids followed by 15, 10, 5% and control, respectively. These results confirm the findings of Bakirci and Kavaz (2008).

The effect of adding different ratio of banana puree on fat of stirred yoghurt during storage periods are presented in Table (3). The addition of banana puree caused a decrease in fat content of banana stirred yoghurt. The fat contents decreased slightly during storage periods. The reduction in fat during storage appeared to be due to the lipolytic activity of micro flora or due to the acidic pH formed during the storage. However, no rancidity was observed because of the storage temperature was low.

The effect of adding different ratios of banana puree on syneresis of stirred yoghurt during storage periods are presented in Table (3). The addition of banana puree to yoghurt increased the syneresis of banana stirred yoghurt and also was further increased during the storage. The addition of banana puree showed a decrease in the syneresis of yoghurt samples due to the decrease in acidity. During storage periods, the syneresis increased which could be due to the increase in acidity during the storage. Bakirci and Kavaz (2008) observed an increase in the syneresis of yoghurt during storage periods. The increase in syneresis could be due to the rearrangement of the protein.

**Table (2). The effect of different ratios of banana puree on titratable acidity (%), pH values and total solids of stirred yoghurt during the storage periods**

Stirred Yoghurt	Storage period (days) acidity			
	Fresh	7	14	21
Titratable Acidity %				
Control	0.55 <sup>d</sup>	0.64 <sup>e</sup>	0.76 <sup>d</sup>	0.89 <sup>d</sup>
5% Banana puree	0.64 <sup>c</sup>	0.78 <sup>d</sup>	0.90 <sup>c</sup>	1.02 <sup>c</sup>
10% Banana puree	0.69 <sup>c</sup>	0.84 <sup>c</sup>	0.95 <sup>bc</sup>	1.15 <sup>b</sup>
15% Banana puree	0.74 <sup>b</sup>	0.90 <sup>b</sup>	1.07 <sup>ab</sup>	1.20 <sup>a</sup>
20% Banana puree	0.80 <sup>a</sup>	0.96 <sup>a</sup>	1.10 <sup>a</sup>	1.27 <sup>a</sup>
pH values				
Control	4.55 <sup>c</sup>	4.45 <sup>a</sup>	4.42 <sup>a</sup>	4.40 <sup>a</sup>
5% Banana puree	5.45 <sup>a</sup>	4.40 <sup>ab</sup>	4.35 <sup>ab</sup>	4.29 <sup>b</sup>
10% Banana puree	5.34 <sup>b</sup>	4.27 <sup>b</sup>	4.20 <sup>b</sup>	4.13 <sup>c</sup>
15% Banana puree	4.28 <sup>d</sup>	4.20 <sup>bc</sup>	4.11 <sup>c</sup>	4.00 <sup>d</sup>
20% Banana puree	4.14 <sup>e</sup>	4.00 <sup>c</sup>	3.95 <sup>d</sup>	3.90 <sup>e</sup>
Total solids %				
Control	14.50 <sup>e</sup>	14.40 <sup>e</sup>	14.30 <sup>e</sup>	14.23 <sup>e</sup>
5% Banana puree	17.25 <sup>d</sup>	17.19 <sup>d</sup>	17.13 <sup>d</sup>	17.07 <sup>d</sup>
10% Banana puree	20.09 <sup>c</sup>	20.04 <sup>c</sup>	19.98 <sup>c</sup>	19.91 <sup>c</sup>
15% Banana puree	25.71 <sup>b</sup>	25.40 <sup>b</sup>	25.33 <sup>b</sup>	25.26 <sup>b</sup>
20% Banana puree	29.69 <sup>a</sup>	29.59 <sup>a</sup>	29.54 <sup>a</sup>	29.45 <sup>a</sup>

Values with different letters in the same column are significantly different at P < 0.05

**Table (3). The effect of adding different ratios of banana puree on fat and syneresis (%) of stirred yoghurt during the storage periods**

Stirred Yoghurt	Storage period (days)			
	Fresh	7	14	21
Fat %				
Control	3.60 <sup>a</sup>	3.58 <sup>a</sup>	3.55 <sup>a</sup>	3.53 <sup>a</sup>
5% Banana puree	3.50 <sup>ab</sup>	3.49 <sup>b</sup>	3.47 <sup>b</sup>	3.45 <sup>b</sup>
10% Banana puree	3.29 <sup>b</sup>	3.28 <sup>c</sup>	3.27 <sup>c</sup>	3.26 <sup>c</sup>
15% Banana puree	3.14 <sup>c</sup>	3.14 <sup>d</sup>	3.12 <sup>d</sup>	3.10 <sup>d</sup>
20% Banana puree	3.06 <sup>d</sup>	3.05 <sup>e</sup>	3.04 <sup>e</sup>	3.02 <sup>e</sup>
syneresis (%)				
Control	1.15 <sup>e</sup>	1.80 <sup>e</sup>	4.00 <sup>e</sup>	5.40 <sup>e</sup>
5% Banana puree	1.30 <sup>d</sup>	1.90 <sup>d</sup>	4.60 <sup>d</sup>	5.80 <sup>d</sup>
10% Banana puree	1.40 <sup>c</sup>	2.00 <sup>c</sup>	4.80 <sup>c</sup>	6.90 <sup>c</sup>
15% Banana puree	1.67 <sup>b</sup>	3.10 <sup>b</sup>	6.00 <sup>b</sup>	8.20 <sup>b</sup>
20% Banana puree	1.90 <sup>a</sup>	3.85 <sup>a</sup>	6.66 <sup>a</sup>	9.43 <sup>a</sup>

Values with different letters in the same column are significantly different at P < 0.05.

## Preparation and evaluation of banana stirred yoghurt

### Microbiological analysis:-

The effect of adding different ratios of banana puree on the total bacterial counts and total mold and yeast counts of yoghurt during the storage periods are shown in Table (4). It is noticed that the total bacterial counts of all samples increased during the early days of storage, then decreased gradually till the end of the storage period. This decrease could be attributed to the developed acidity. The results are in agreement with Keabry (1996).

The increasing of banana puree in stirred yoghurt samples led to increase the total bacterial count at zero time and 7 days of storage. This might be due to the presence of some growth promoter such as some salts and vitamins that have been provided by the added banana puree. Such compounds may stimulate the growth of bacteria. On the other hand, the total bacterial counts in yoghurt samples prepared with 5, 10, 15 and 20% banana puree after 14 and 21 days of storage

rapidly declined, which might be due to the developed acidity.

The effect of different ratios of banana puree on mold and yeast count ( $\times 10^3$  CFU/g) in stirred yoghurt during storage periods is presented in Table (4). All samples were free of yeast and molds at zero time of storage. On the other hand, mold and yeast were detected in yoghurt samples prepared with banana puree after 14 days of storage. These results are in agreement with the findings of Bakirci and Kavaz, 2008.

The effect of different banana purees concentrations on the *str. thermophilus* counts ( $\times 10^6$  CFU/g) in the yoghurt during the storage periods are shown in Table (5). The streptococcus counts were increased until 7 days of storage then decreased gradually in all samples until 21 days of storage periods. These results are in agreement with the findings of Badran (1986).

**Table (4). The effect of different ratios of banana puree on the total bacterial count ( $\times 10^7$  cfu/g ) and Total mold and yeast  $\times 10^3$  CFU/g in the stirred yoghurt during the storage periods**

Stirred Yoghurt	Storage period (days)			
	Fresh	7	14	21
Total bacterial count $\times 10^7$ CFU/g				
Control	12.2 <sup>e</sup>	19.8 <sup>e</sup>	13.2 <sup>e</sup>	5.6 <sup>d</sup>
5% Banana puree	13.3 <sup>d</sup>	22.3 <sup>d</sup>	16.8 <sup>d</sup>	5.9 <sup>cd</sup>
10% Banana puree	15.4 <sup>c</sup>	29.6 <sup>c</sup>	18.9 <sup>c</sup>	6.6 <sup>c</sup>
15% Banana puree	18.3 <sup>b</sup>	33.0 <sup>b</sup>	22.5 <sup>b</sup>	7.8 <sup>b</sup>
20% Banana puree	22.6 <sup>a</sup>	35.6 <sup>a</sup>	24.5 <sup>a</sup>	8.8 <sup>a</sup>
Total mold and yeast $\times 10^3$ CFU/g				
Control	ND	22 <sup>c</sup>	40 <sup>a</sup>	70 <sup>a</sup>
5% Banana puree	ND	ND	35 <sup>b</sup>	62 <sup>b</sup>
10% Banana puree	ND	ND	32 <sup>b</sup>	55 <sup>c</sup>
15% Banana puree	ND	ND	22 <sup>c</sup>	42 <sup>d</sup>
20% Banana puree	ND	ND	20 <sup>c</sup>	35 <sup>e</sup>

Values with different letters in the same column are significantly different at  $P < 0.05$ .

**Table (5). Effect of different ratios of banana puree on *Streptococcus thermophilus* counts and *Lactobacillus bulgaricus* counts (X10<sup>6</sup> CFU/g) in the stirred yoghurt during the storage period**

Stirred Yoghurt	Storage period (days)			
	Fresh	7	14	21
<i>Streptococcus thermophilus</i> counts X10 <sup>6</sup> CFU/g				
Control	52 <sup>d</sup>	71 <sup>d</sup>	39 <sup>c</sup>	22 <sup>c</sup>
5% Banana puree	58 <sup>d</sup>	83 <sup>c</sup>	44 <sup>b</sup>	27 <sup>b</sup>
10% Banana puree	63 <sup>c</sup>	89 <sup>b</sup>	49 <sup>b</sup>	29 <sup>b</sup>
15% Banana puree	70 <sup>b</sup>	95 <sup>a</sup>	63 <sup>a</sup>	33 <sup>a</sup>
20% Banana puree	76 <sup>a</sup>	98 <sup>a</sup>	64 <sup>a</sup>	35 <sup>a</sup>
<i>Lactobacillus bulgaricus</i> counts X10 <sup>6</sup> CFU/g				
Control	50 <sup>d</sup>	87 <sup>e</sup>	54 <sup>e</sup>	43 <sup>e</sup>
5% Banana puree	72 <sup>c</sup>	112 <sup>d</sup>	67 <sup>d</sup>	50 <sup>d</sup>
10% Banana puree	87 <sup>b</sup>	126 <sup>c</sup>	74 <sup>c</sup>	57 <sup>c</sup>
15% Banana puree	93 <sup>ab</sup>	148 <sup>b</sup>	83 <sup>b</sup>	66 <sup>b</sup>
20% Banana puree	98 <sup>a</sup>	159 <sup>a</sup>	97 <sup>a</sup>	71 <sup>a</sup>

Values with different letters in the same column are significantly different at P<0.05.

From the aforementioned data, stirred yoghurt prepared with 20 % banana puree exhibited higher lactobacillus and streptococcus counts. On the other hand, after 14 and 21 days of storage, the count of streptococcus and lactobacillus were markedly decreased, this could be due to the higher acidity development in yoghurt prepared banana puree

The effect of different concentrations of banana puree on the *lactobacillus bulgaricus* counts (X10<sup>6</sup> CFU/g) in stirred yoghurt during the storage periods are presented in Table (5). Lactobacillus counts increased until 7 days of storage and then decreased gradually in all samples till the end of storage period. These results are in agreement with the results of Badran (1986), Kebary (1996) and Hossain *et al.*, (2012).

### Sensory evaluation

Sensory evaluation of yoghurt prepared with different ratios of banana puree compared to control was recorded in Table (6). Analysis of variance showed significant differences in color & appearance, body & texture, flavor and acidity for both control and yoghurt samples prepared by added different ratio of banana puree The yoghurt prepared with adding 15% banana pure received the highest score followed by 10% compared to control when fresh and during storage periods. A noticeable decrease in all sensory characteristics was showed during storage periods could be due to proteolytic activity of bacteria and the production of higher acidity Bakirci and Kavaz (2008) .

## Preparation and evaluation of banana stirred yoghurt

**Table (6). Effects of different ratios of banana puree concentration on the sensory properties of stirred yoghurt**

Properties	Treatment	Storage time (days)			
		fresh	7	14	21
Color and appearance (15 points)	Control T1	10.12 <sup>d</sup>	9.65 <sup>d</sup>	8.64 <sup>e</sup>	6.21 <sup>d</sup>
	T2	11.44 <sup>c</sup>	10.34 <sup>c</sup>	9.21 <sup>d</sup>	6.92 <sup>c</sup>
	T3	12.33 <sup>b</sup>	11.50 <sup>b</sup>	9.65 <sup>b</sup>	8.60 <sup>b</sup>
	T4	14.56 <sup>a</sup>	13.48 <sup>a</sup>	12.30 <sup>a</sup>	10.50 <sup>a</sup>
	T5	12.27 <sup>b</sup>	11.34 <sup>b</sup>	9.50 <sup>c</sup>	8.52 <sup>b</sup>
Body texture (30 points)	Control T1	18.93 <sup>e</sup>	16.42 <sup>d</sup>	15.13 <sup>d</sup>	13.47 <sup>e</sup>
	T2	20.32 <sup>d</sup>	18.82 <sup>c</sup>	16.33 <sup>c</sup>	14.96 <sup>d</sup>
	T3	24.86 <sup>b</sup>	22.55 <sup>b</sup>	19.43 <sup>b</sup>	17.66 <sup>b</sup>
	T4	27.33 <sup>a</sup>	26.85 <sup>a</sup>	25.32 <sup>a</sup>	20.35 <sup>a</sup>
	T5	23.35 <sup>c</sup>	22.30 <sup>b</sup>	19.00 <sup>b</sup>	16.30 <sup>c</sup>
Flavor (45 points)	Control T1	35.21 <sup>d</sup>	33.11 <sup>d</sup>	30.15 <sup>d</sup>	25.82 <sup>d</sup>
	T2	38.63 <sup>c</sup>	35.45 <sup>c</sup>	32.13 <sup>c</sup>	30.55 <sup>c</sup>
	T3	40.33 <sup>b</sup>	37.55 <sup>b</sup>	35.45 <sup>b</sup>	32.87 <sup>b</sup>
	T4	44.61 <sup>a</sup>	43.23 <sup>a</sup>	41.66 <sup>a</sup>	38.55 <sup>a</sup>
	T5	40.11 <sup>b</sup>	36.98 <sup>b</sup>	35.12 <sup>b</sup>	32.44 <sup>b</sup>
Acidity (10 points)	Control T1	4.63 <sup>d</sup>	4.33 <sup>d</sup>	4.00 <sup>d</sup>	3.86 <sup>d</sup>
	T2	5.32 <sup>c</sup>	5.12 <sup>c</sup>	4.60 <sup>c</sup>	4.00 <sup>c</sup>
	T3	7.55 <sup>b</sup>	7.42 <sup>b</sup>	7.00 <sup>b</sup>	6.50 <sup>b</sup>
	T4	9.33 <sup>a</sup>	9.12 <sup>a</sup>	8.50 <sup>a</sup>	8.00 <sup>a</sup>
	T5	7.32 <sup>b</sup>	7.21 <sup>b</sup>	6.82 <sup>b</sup>	6.11 <sup>b</sup>

Values with different letters in the same column are significantly different at  $P < 0.05$ .

T1 is the control yoghurt, T2 is the yoghurt with 5% banana puree, T3 is the yoghurt with 10% banana puree, T4 is the yoghurt with 15% banana puree and T5 is the yoghurt with 20% banana puree.

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## إعداد وتقييم مخلوط الزبادى بالموز

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### الملخص العربى

تم إعداد عينات من الزبادى المخلوط بالموز حيث تم اضافة الموز بنسبة صفر (عينة المقارنة)، ٥ ، ١٠ ، ١٥ ، ٢٠ % فى العينات المختلفة، وتم تخزين العينات على درجة حرارة ٤ م لمدة صفر (عينة المقارنة)، ٧ ، ١٤ ، ٢١ يوم .

وتتم دراسة تأثير اضافة مخلوط الموز على الخصائص الطبيعية و الكيماوية والميكروبية والحسية على تلك العينات من الزبادى المخلوط بالموز عند فترات التخزين المختلفة.

حيث وجد أن نسب اضافة الموز وكذلك إختلاف فترات التخزين لها تأثيرات معنوية عالية على الخصائص الطبيعية، الكيماوية، الميكروبية والحسية لعينات الزبادى .

## ***Preparation and evaluation of banana stirred yoghurt***

وأوضحت النتائج زيادة نسبة الحموضة والمكونات الصلبة ونسبة الشرش وذلك بزيادة اضافة نسبة الموز الى الزبادى خلال فترة التخزين .

حدثت زيادة تدريجية في الحموضة ونسبة الشرش بزيادة مدة التخزين في جميع العينات بينما حدث نقص في ال pH والمكونات الصلبة خلال مدة التخزين .

حدثت زيادة في العدد الكلى للبكتريا وبكتريا اللاكتوباسلس والاستريتوكوكس في الزبادى المخفوق بالموز خلال ال ٧ أيام الاولى من التخزين ثم حدث تناقص في اعداد هذه البكتريا خلال ١٤ - ٢١ يوم من التخزين وكذلك لم تظهر الفطريات أو الخمائر في جميع العينات خلال ال ٧ أيام الاولى من التخزين .

وأوضحت نتائج التقييم الحسى أن الزبادى المضاف اليه الموز بنسبة ١٥ % حصل على أعلى درجات التقييم الحسى خلال فترات التخزين المختلفة .