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Effect of total and partial replacing the Milk Powder Used in the Made of Ice Cream by the Whey Protein Concentrate and Soy flour on Product Quality.

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ABSTRACT

Ice-cream was made by partial substitution of skim milk powder (T1:75%skim milk powder: 25%whey protein concentrate,T2: 75%skim milk powder: 25%soy bean protein,T3:50%skim milk powder: 50%whey protein concentrate,T4: 50%skim milk powder: 50%soy bean protein,T5: 25%skim milk powder:75%whey protein concentrate,T6: 25%skim milk powder: 75%soy bean protein, and total substitution of skim milk powder in T7: 52.5% whey protein concentrate and T8: 52.5%soy bean protein) of each with whey protein concentrate or soy protein in 8 batches and control without addition. The result traded ice cream batches were chemically, microbiological and organoleptically analyses when fresh and after 30 days storage at -18˚ c. All treatments decreased in the activity PH values were deserved in all variants after 30 days. The same hand was also observed for the T.S., nitrogenous continents and fat contents. The highest overrun of 36% was detected in T5 and the lowest of 32% in T8. Organoleptic score of 91 was gained in the control, whereas the range of 87 – 70 in all treatments compared with the control. The corresponding range of 83 – 67 was detected after 30 days, compared with 83 in the control. On the other hand, It showed effect of adding the mastic gum on the organoleptic score of 91 was gained in the control, whereas the range of 76 – 74 in all treatments compared with the control. The corresponding range of 71 – 68 was detected after 30 days, compared with 83 in the control, in another direction. The milting point increased after 30days compared with the fresh products either at 30, 60 or 90 mints. All of the examined treatments were completely free from *Staphylococcus aurous* group and coliform either when fresh or during storage.

Keywords: Ice-cream - skim milk powder - whey protein concentrate- soy protein.

INTRODUCTION

Attributed the popular ice cream and frozen desserts to cool update, sweet exhilarated properties along with their nutritional value. Recently, low-calorie foods and diabetes become increasingly in all sectors of the food industry popular. Can reduce the calories is achieved by reducing or replacing fat, sugar or protein, or both.And it encouraged researchers to study the appropriate local alternatives to replace them. Skim milk powder fat partially in the ice cream industry such as protein whey solids (Khala-Falla, *et al*., 1975, Rotwell, 1982 ; Naibu *et al*., 1986 ; Vulink &soy bean protein (Saleem *et al*., 1989 ; Flack, 1992), rice (Takehisa & Hamada ,1992) and legumes which play an important role in human nutrition, and appeared to have great popularity at a faster rate in the food service segment as they are easy to be prepared suitable for batch cooking time, repeatable, and can be controlled (Morrow, 1991).

MATERIALS AND METHODS

Skim Milk Powder: It was bought skim milk powder fat heat (produced in Germany) from the local market.

Chemical composition of skim milk powder used in making of ice cream (Moisture 4.55%), (Total solids 95.45%), (Total protein 34.26%), (pH 6.80), (Lactose 49.50%)

Butter: It was obtained butter (80% fat) from processing unit diary at the Faculty of Agriculture, Mansoura University

Chemical composition of butter used in making of ice cream: (Moisture 15%) and (fat 80%)

Whey protein concentrate: It was bought whey protein concentrate powder (produced in Germany) from the local market.

Soy flour: Soy flour was obtained from the soy products plant, Agricultural Research center, A.W. A. for food additives company Alexandria, Egypt.

Chemical composition of Soy Flour used in making of ice cream:(Ash 6.00±0.1%) , (Total protein 48.9±1.2%) , (fat 1.00±0.1%)

Vanilla : was obtained from the local market

Manufacturing Technique of Ice Cream: It was made using the method describes by Arbuckle (1986).

Raw materials
Mixing
Pasteurizationat85ºCfor10min
Homogenization (by blender) Aging (0 to-4ºC)
Adding the ingredients
(Fruits,etc.)
Packaging
Storage (<-18ºC)
Transportation (<-18ºC)

Fig. 1. flow chart of ice cream processing

Total solids content (TS): It was determined by AOAC (2005).

Fat content, Treatable acidity, pH value, Nitrogenous fractions: were examined as ds described by ling (1963).

Total viable bacterial count (TVBC): was detected according to the methods described by Marshall (1993).

Lipolytic and Proteolytic bacterial count: was carried out as described by Chalmers (1962)

Coliform bacteria: was determined according to the method described in the American public Health Association (A.P.H.A., 1960)

Organoleptic properties of ice cream: The parameters evaluated were Flavour (50 points), body & texture (40 points), and melting quality (10 points) according by Fathi and Fatma (1999).

Melting Resistance (Meltdown) %: was carried out according to Garcia, *et al*., (1995),

Overrun calculation: According to Sommar, (1951), Rheological tests according to (Chandrasekhara *et al*., 1957) .in ice cream

Curd tension: is determined by using the method of (Chandrasekhara *et al*., 1957).

RESULTS AND DISCUSSION

Total solids content (TS): Replacing whey protein concentrate and soybean protein markedly has increased the (TS) of the resultant ice cream , as the percentage of whey protein concentrate and soybean protein increased , to total solids content (Table 1) . This is due to the lower total solids content of soy bean

PH value and titratable acidity (T.A): Data presented in Table (1) indicate that the pH-value were highly significant increased by increasing the level of whey protein concentrate and soy bean protein as a protein source. However, the titrable acidity decreased by increasing the levels of whey protein concentrate and soy bean protein, compared with the control treatment when fresh or stored ice cream. For example TA% were 0.23, 0.21, 0.20, 0.18, 0.17, 0.15, 0.14 and 0.13 for t T1, T2, T3 ,T4, T5, T6, T7 and T8 treatments, respectively, which were lower than the control ice cream (0.27)%.

Table 1. The Effect of total and partial replacement by whey protein concentrate and soy bean protein on the chemical properties of Ice Cream during storage

Treatments	Storage days	TS%	F%	TA%	PH
Control	Fresh	37.36	14.0	0.25	6.25
	30	38.11	14.6	0.27	6.19
T1	Fresh	37.10	13.9	0.23	6.35
	30	38.18	14.4	0.27	6.25
T2	Fresh	35.37	13.5	0.21	6.40
	30	34.22	13.8	0.28	6.22
T3	Fresh	37.40	13.2	0.20	6.55
	30	38.30	13.9	0.24	6.35
T4	Fresh	37.44	13.0	0.18	6.59
	30	38.52	13.6	0.22	6.44
T5	Fresh	37.44	12.8	0.17	6.65
	30	38.76	13.1	0.23	6.45
T6	Fresh	37.55	12.7	0.15	6.70
	30	38.66	13.0	0.19	6.52
T7	Fresh	37.70	12.3	0.14	6.73
	30	38.72	12.8	0.19	6.57
T8	Fresh	36.00	12.1	0.13	6.80
	30	35.73	12.7	0.34	6.70

T1:75%skim milk powder: 25%whey protein concentrate (3:1)
T2: 75%skim milk powder: 25%soy bean protein (3:1)
T3:50%skim milk powder: 50%whey protein concentrate (1:1)
T4: 50%skim milk powder: 50%soy bean protein (1:1)
T5: 25%skim milk powder:75%whey protein concentrate(1:3)
T6: 25%skim milk powder: 75%soy bean protein (1:3)
T7: 52.5% whey proteins concentrate (total replacement)
T8: 52.5%soy bean protein (total replacement)

pH value increased to 6.35, 6.40, 6.55, 6.59, 6.65, 6.70, 6.73, and 6.80 for T1, T2, T3 ,T4, T5, T6, T7 and T8 treatments, respectively , which were higher than that of control ice cream (3.25). On the other hand, after 30 days of storage the TA% increased to T1, T2 ,T3 ,T4, T5, T6, T7 and T8 treatments, respectively, compared with for control (control), this was highly significant increased. However, the pH value decreased for treatments T1, T2, T3, T4, T5, T6, T7 and T8, respectively. This is in agreement with Hayakams and Nakai (1985) who noticed that there was slight increase in pH value in ice cream.

Fat Content: Results in Table (1) show that control ice cream (control) had the highest fat content compared with whey protein concentrate and soy bean protein the ice cream (treatments T1, T2, T3, T4, T5, T6, T7, and T8). This is attributed to the low fat content of whey protein concentrate and soy bean. , On the other hand, the fat content increased in all treatments during storage. It increased from after 30 days of storage in the control. Where the fat content of the whey protein concentrate and soy bean ice cream mixes increased from 13.9 to 14.4 ,13.5 t0 13.8, 13.2 to 13.9 ,13 to 13.6 ,12.8 to13.1 ,12.7 to13.0 ,12.3 to12.8 and 12.1 to12.7 after 30 days for treatments T1, T2, T3, T4, T5, T6, T7, and T8 respectively. This was highly significant increase in fat content which could be attributed to the concentration of all (TS) as a result of losing some of the free water.

Total nitrogen (TN and TN / TS): Changes in total protein, /TN, SN/TN of fresh and stored ic cream were tabulated in Table (2). There was a slight increase in the WSN/TN, NPN/TN during storage periods. This was a trend similar to those Aobulg it) Eid 2009 (which may be attributed to the gradual increase in total solids during storage periods. Resulted a gradual increase in the concentration of whey protein and the concentration of soybean protein to an increase in the age of WSN/TN, NPN/TN comparison with the control. The results are similar Studi by (Marefat *et al*., 2007). At the same time, the slight increase in WSN/TN, NPN/TN may be due to the increased activity of the protein bacteria start in all treatments during storage.Also these data revealed that the addition of whey protein concentrate and soy bean protein enhanced the proteolytic activity of the used starter bacteria, but this activation varied from another, so the addition had more enhancing effect than maltodextrin by adding different concentration.

Non-Protein nitrogen content (N-PN): It's clear from, Table (2) that the control ice cream had the highest value of non-protein nitrogen (NPN) content, compared with the other treatments containing soybean. NPN content and the increases were highly significant. The same trend was of during the freezing storage where NPN content was recorded as for the 30 days stored control ice cream (T0) compared the control treatment kept of the highest (NPN) content compared with the. These results could be due to the low nitrogen content of soybean protein.

Overrun: It's clear from Table (2) that the Overrun of the soy bean protein containing ice cream was lower than that of the control ice cream. This could be owing to the higher viscosity and high her total solids content of soy bean protein in T2, T4, T6,and T8 than control ice cream compared with T1, T3 ,T5 , and T7 treatments in which whey protein concentrate Results and Discussions. These results indicated that the overrun values decreased upon increasing the soybean protein levels in different treatments. This results are in agreement with Her, *et al*., (2005) who found that overrun of soy ice cream was significantly lower than that of milk ice cream.

Table 2. The Effect of total and partial replacement by whey protein concentrate and soy bean protein on the nitrogen constituents of ice cream during storage

Treatments	Storag days	TN%	TN/TS%	SN/TN%	NPN%	Overrun %
control	fresh	0.612	1.63	4.16	0.039	34.2
	30	0.753	1.97	4.46	0.046	
T1	fresh	0.625	1.68	4.08	0.036	34.6
	30	0.666	1.72	4.51	0.035	
T2	fresh	0.648	1.81	4.63	0.033	33.8
	30	0.687	2.00	4.77	0.042	
T3	fresh	0.645	1.74	5.16	0.032	35.4
	30	0.696	1.83	5.59	0.039	
T4	fresh	0.684	1.82	5.50	0.030	32.9
	30	0.729	1.89	5.83	0.043	
T5	fresh	0.698	1.86	5.23	0.028	36
	30	0.748	1.92	5.43	0.044	
T6	fresh	0.718	1.91	5.58	0.027	32.7
	30	0.772	1.99	5.81	0.052	
T7	fresh	0.520	1.37	4.90	0.027	36.1
	30	0.630	1.62	5.12	0.033	
T8	fresh	0.742	2.06	5.27	0.025	32.0
	30	0.809	2.26	6.00	0.054	

T1:75%skim milk powder: 25%whey protein concentrate (3:1)
T2: 75%skim milk powder: 25%soy bean protein (3:1)
T3:50%skim milk powder: 50%whey protein concentrate (1:1)
T4: 50%skim milk powder: 50%soy bean protein (1:1)
T5: 25%skim milk powder:75%whey protein concentrate(1:3)
T6: 25%skim milk powder: 75%soy bean protein (1:3)
T7: 52.5% whey proteins concentrate (total replacement)
T8: 52.5%soy bean protein (total replacement)

Table 3. Effect of total and partial replacement by whey protein concentrate and soy bean on microbiological analysis of ice cream during storage

Treatments	Storag days	T. C $x10^6$	Libo. $x10^3$	Prot. $x10^3$	colifor m $x10^3$	Staph. $x10^3$
control	fresh	28	18	21	ND	ND
	30	8	7	15	ND	ND
T1	fresh	19	16	22	ND	ND
	30	13	9	8	ND	ND
T2	fresh	11	27	7	ND	ND
	30	6	21	2	ND	ND
T3	fresh	18	11	31	ND	ND
	30	12	3	18	ND	ND
T4	fresh	9	22	10	ND	ND
	30	8	16	30	ND	ND
T5	fresh	16	14	21	ND	ND
	30	11	10	16	ND	ND
T6	fresh	8	8	19	ND	ND
	30	6	3	7	ND	ND
T7	fresh	14	28	9	ND	ND
	30	10	20	7	ND	ND
T8	fresh	4	3	12	ND	ND
	30	2	1	5	ND	ND

T1:75%skim milk powder: 25%whey protein concentrate (3:1)
T2: 75%skim milk powder: 25%soy bean protein (3:1)
T3:50%skim milk powder: 50%whey protein concentrate (1:1)
T4: 50%skim milk powder: 50%soy bean protein (1:1)
T5: 25%skim milk powder:75%whey protein concentrate(1:3)
T6: 25%skim milk powder: 75%soy bean protein (1:3)
T7: 52.5% whey proteins concentrate (total replacement)
T8: 52.5%soy bean protein (total replacement)

Data in Table (3) indicate that the total viable bacterial count (TVBC) of whey protein concentrate and soy bean protein in ice cream was generally lower than that of ice cream (control treatment). This could be due to the effect that skim milk powder, whey protein concentrates and superior for supporting the microbial growth than soybean protein. It's noticed from table (3) that the total viable bacterial count of the resultant ice cream decreased with increasing the level of whey protein concentrate and soy bean protein. The total viable bacterial count (TVBC) was11 ,9,8, and 4 x 10^6 c.f.u/gm 19,18,16,and 14 x10^6 cfu/gm for fresh ice cream prepared in control treatments, respectively. On the other hand, the TVBC decreased to 6.0, 8.00, 6.0 and 2 x10^6 c.f.u/gm and 13, 11, 12 and 10 x10^6 c.f.u/gm of whey protein concentrate and for control and treatments after 30days of storage respectively, .It is seen from Table (3) that both coliform and *Staphylococcus aurous* group were not detected whether in fresh or stored ice cream made from whey protein concentrate and soy bean protein only or mixed with soymilk. This shows that the manufacture of ice cream was carried out using proper hygienic practices, which resulted in preventing the contamination with such undesirable bacteria.

A result presented in Table (4) indicates the melting of ice cream. These data revealed that the addition of protein concentrate and soy bean protein at different levels showed a significant impact on melting during storage at 30 days. These results are in agreement with (Brennan and Tudoraka, 2008), who reported that the use of soy bean protein processing in the cream ice cream reduce synergies and improve their characteristics and rheological formative. The treatment T8 have melting resistance compared to all treatments and control, these results may be due to the formation of a strong gel from soy bean protein network and binding a lot of water, which led to the delay Frauke movement and synchronize free water. The findings come in harmony with those reported (Chin *et al*., 1998a). Table (4) indicates that the control of the ice cream (control) made from the treatment T8 showed the lowest value of drip-soluble and thus higher melting resistance compared with treatments respectively these results are consistent with those reported by Her *et al*., (2005) Melting resistance was However, ice cream storage was associated with slight increase in the values of melting resistance in all treatments and this could be due to the loss of some free water and raising the ice cream .

Table 4. Effect of total and partial replacement by whey protein concentrate and soy bean protein on the Rheological analysis organoleptic properties of ice cream during storage

Treatments	Storage days	Melting (min)		
		30m	60m	90m
control	fresh	9.13	47.06	57.33
	30	11.32	49.52	65.93
T1	fresh	13.86	27.96	38.33
	30	17.74	32.64	40.00
T2	fresh	2.66	17.40	26.33
	30	4.12	24.86	34.31
T3	fresh	9.69	27.33	50.66
	30	13.61	29.64	56.81
T4	fresh	0.6	6.66	23.53
	30	1.28	12.31	33.51
T5	fresh	16.13	41.16	57.50
	30	21.75	48.84	63.14
T6	fresh	0.3	2.60	23.53
	30	1.10	4.16	28.54
T7	fresh	31.01	49.22	84.83
	30	46.08	62.25	77.03
T8	fresh	0	0	13.6
	30	0.1	0.6	14.4

T1:75%skim milk powder: 25%whey protein concentrate (3:1)
T2: 75%skim milk powder: 25%soy bean protein (3:1)
T3:50%skim milk powder: 50%whey protein concentrate (1:1)
T4: 50%skim milk powder: 50%soy bean protein (1:1)
T5: 25%skim milk powder:75%whey protein concentrate(1:3)
T6: 25%skim milk powder: 75%soy bean protein (1:3)
T7: 52.5% whey proteins concentrate (total replacement)
T8: 52.5%soy bean protein (total replacement)

Data presented in table (5) show that the whey protein concentrate and soy flour containing ice cream had lower total scores than that of the control ice cream. The control ice cream had higher total score (91) when it was fresh compared with 83after 30 days of storage, These results are in agreement with those reported by Her *et al*., (2005).On the other hand, the average values of each flavor, body and texture and melting characteristics of ice cream manufactured from different whey protein concentrate and soybean levels are presented in table (5) it could be seem from these data that ice cream made by treatment T2 had the highest total score. This ice cream was made of soy flour protein 25% compared with treatments which, ice cream was made using 25% and 50% whey protein concentrate. The highest points of each character were recorded for the control ice cream made, while increasing the level of soy flour resulted non-significant decreasing in the points scored for each character, compared with the control. These results are in agreement with those reported by Abdullah *et al*., (2003).On the other hand, it could be seen that storage for 30 days resulted in highly significant lowering the score of the flavor whereas the score points for body & texture and melting were highly significant increased. In general, the body & texture and melting in the product made from soy bean were excellent, either after 30 days of storage. These results are in agreement with those reported by Salem (1994). However, sensory evaluation showed that ice cream containing 25% and 50% soy flour was compared to control. This suggests that acceptable ice cream can be made using up to 50% soy bean and whey protein concentrate. In addition to the ice-cream mixes containing soybean with decreased the production cost. These results are in a good accordance with those reported by Li-Xin Hong (2004).

Table 5. Effect of total and partial replacement by whey protein concentrate and soy bean protein on Rheological analysis the organoleptic properties of ice cream during storage.

Treatments	Storage day	Flavor (50)	Body texture (40)	Melting (10)	Total (100)
control	fresh	48	35	8	91
	30	45	31	7	83
T1	fresh	43	35	8	86
	30	40	32	6	78
T2	fresh	45	35	7	87
	30	41	33	5	79
T3	fresh	43	35	7	85
	30	39	32	5	76
T4	fresh	44	32	7	83
	30	44	32	6	82
T5	fresh	35	35	6	76
	30	34	33	5	72
T6	fresh	41	31	7	82
	30	40	30	6	76
T7	fresh	30	35	5	70
	30	29	33	4	67
T8	fresh	40	31	8	80
	30	41	34	8	83

T1:75%skim milk powder: 25%whey protein concentrate (3:1)
T2: 75%skim milk powder: 25%soy bean protein (3:1)
T3:50%skim milk powder: 50%whey protein concentrate (1:1)
T4: 50%skim milk powder: 50%soy bean protein (1:1)
T5: 25%skim milk powder:75%whey protein concentrate(1:3)
T6: 25%skim milk powder: 75%soy bean protein (1:3)
T7: 52.5% whey proteins concentrate (total replacement)
T8: 52.5%soy bean protein (total replacement)

Data from (Table 6) was the work of treatment T1 which is about adding Mastic Gum increased by 0.25% and 0.50% respectively Mastic Gum taste was evident in the treatment of the first two o'clock where she earned degrees arbitration sensuous less than a sample comparison. Conclude from Table 6 that the treatments T 1 and T 2 were a total score have 76 and 74 respectively, which are less than 91 controls.

Table 6. Effect of adding the mastic gum on the organoleptic properties of ice cream

Treatments	Storage days	Flavor (50)	Body texture (40)	Melting (10)	Total (100)
control	fresh	48	35	8	91
	30	45	31	7	83
T1	fresh	35	34	7	76
	30	33	32	6	71
T2	fresh	30	36	8	74
	30	28	33	7	68

Control: ice cream without mastic gum
T1: 0.25 %(1.25gm) mastic gum
T2: 0.50 %(2.50gm) mastic gum

Table (7) data in these two treatments T1 and T2 which was about adding Mastic Gum increased by 0.2% and 0.5% respectively, melting treatment T2, an increase of Mastic Gum where the first where it has less than the melting point of the sample comparison.

Table 7. Effect of adding the mastic gum on Melting properties of ice cream during storage.

Treatments	Storage days	Melting (min)		
		30m	60m	90m
control	fresh	9.13	47.06	57.33
	30	11.32	49.52	65.93
T1	fresh	5.23	36.26	63.63
	30	6.16	42.63	67.43
T2	fresh	3.3	12.7	23.36
	30	4.12	26.86	34.01

Control: ice cream without mastic gum
T1: 0.25 %(1.25gm) mastic gum
T2: 0.5 %(2.50gm) mastic gum

Table 8. Effect of added of papaya juice (*Carica papaya)* on the organoleptic properties of ice cream.

Treatments		Storage	Color (10)	Appearance (30)	Flavour (60)	Total (100)
control		zero	7	22	44	73
		30	5	20	40	65
T1	A	zero	6	26	54	86
		30	6	24	53	83
	B	zero	7	27	49	83
		30	6	26	47	79
	C	zero	8	25	56	89
		30	6	24	50	80
T2	A	zero	7	28	55	90
		30	5	24	49	78
	B	zero	6	28	56	90
		30	5	26	50	85
	C	zero	8	29	54	91
		30	6	27	52	85
T3	A	zero	7	23	53	84
		30	5	21	50	76
	B	zero	7	26	49	82
		30	4	26	49	79
	C	zero	6	29	57	82
		30	4	28	51	73
T4	A	zero	8	21	59	78
		30	5	18	46	69
	B	zero	7	26	51	84
		30	6	25	49	80
	C	zero	5	26	54	85
		30	5	25	52	84
T5	A	zero	8	22	57	87
		30	6	20	54	80
	B	zero	9	24	50	83
		30	6	23	48	77
	C	zero	6	26	58	80
		30	4	23	50	77
T6	A	zero	9	25	54	88
		30	6	23	50	79
	B	zero	7	27	50	84
		30	6	25	45	76
	C	zero	5	27	53	85
		30	4	24	49	67
T7	A	zero	8	28	55	91
		30	8	25	51	84
	B	zero	8	19	59	96
		30	7	17	56	80
	C	zero	9	25	53	87
		30	7	22	46	75
T8	A	zero	5	30	57	87
		30	4	28	53	77
	B	zero	6	29	44	79
		30	5	29	40	74
	C	zero	5	26	46	77
		30	5	23	41	69

T1:75%skem milk powder_ 25%whey protein concentrate (3:1)
T2: 75%skem milk powder_ 25%soy flour (3:1)
T3:50%skem milk powder_ 50%whey protein concentrate (1:1)
T4: 50%skem milk powder_ 50%soy flour (1:1)
T5: 25%skem milk powder_ 75%whey protein concentrate (1:3)
T6: 25%skem milk powder_ 75%soy bean (1:3)
T7: 52.5%skem milk powder (total replacement)
T8: 52.5%soy flour (total replacement)
A: 5% papaya juice
B: 10% papaya juice
C: 15% papaya juice

The result showed in Table (8) that the added of papaya juice(*Carica papaya)* to the Ice cream supported in the whey protein concentrate and soy flour were better in terms of appearance and Flavour .we find that the best proportion of addition of papaya juice in T7 (96) compared by control .this shows that in Table (8) the strengthening of papaya *(Carica papaya*) increases the organoleptic properties of ice cream .

CONCLUSION

The addition of whey protein concentrate, soy flour, and mastic gum and papaya juice ***(Carica papaya***) were the most appropriate in making of Ice cream. This treatment improves the sensory, nutritional value and chemically properties of resultant Ice cream.

REFERENCES

A. P. H. A. (1960). Standard methods for the examination of dairy products microbiological and chemical. American Public Health Association.

Ling, E. R. (1963). textbook of dairy chemistry.

Marshall, R. T. 1993. Standard methods for the examination of dairy products. American Public Health Association.

Chalmers, C. H. 1962. Bacteria in relation to milk supply. Edward Arnold (publishers) LTD. London.

Chandrasekhara, *et al* (1957). The use of mammalian milk and processed milk foods in the feeding of infants. Indian J. Child. Health, D, 70L.

Sommar, H. H. (1951). The theory and practice of ice cream making.6th Ed Published by the authors Madison, Wis. 129-131, 286.

Arbuckle, W. S. (1986). Ice cream, 4th Ed. The AVI publishing, Ince west part, connectieut, USA.

Abdullah *et al* (2003). Effect of skim milk in soymilk blend on the qualityoficecream. Pakistan Journal of Nutrition. 2(5): 305-311.

AOAC(1984) Official methods of analysis 14th ed , S.Williams(ed).Association of official analytical chemists inc ., Arlington , VA, USA .284 .

Fathi and Fatma (1999). Survival of bifidobacterium Bifidum in ice creamsupplemented with fruit syrup foruseasaprobioticfood.J.Agric.Sci.MansouraUniv.,24:743-748.

Flack, E. (1992). Functional ingredients in frozen desserts Dairy Sci,Abst.54:(4).

Garcia, *et al* (1995).Low fat ice-cream from freeze concentrated versus heat concentrated non fat milk solids J.dairy Sci. 78: 2345-2351.

Her *et al* (2005). Oligo Saccharide Supplemented soy ice cream for diabetic patients: quality characteristics and effects on bloodsugar and lipids in streptozotocin induced diabetic rats. Korean Journal ofNutrition. Korean Nutrition Society, Seoul Korea Republic, 38 (8): 663-671.

Khalafalla, *et al* (1975). The use of whey solids in ice cream. Egyptian J. Dairy Sci., 3: 43.

Lixin Hong (2004). Application of soybean in ice cream production. ChinaDairy Industry. National Dairy Information Center, Harbin, China, 32(10): 15-16.

Morrow, B. (1991). The rebirth of legumes food Tech., 45, 96-98.

Naibu, *et al* (1986).Effectofutilizationof whey in ice cream. Indian J. Dairy Sci., 39: 94.

Rothwell, J. (1982). Use of whey powder in ice cream. IDF Bulletin. 194. 83.

Saleem, *et al* (1989). The use of soy milkin ice cream mixes EgyptianJ.DairySci.,17:281.

Salem, S. A. (1994). The production of frozen yoghurt by ultrafiltration. J.Dairy and Technology. Fac. Of Agric., Alex. Univ. Alexandria, Egypt

Takehisa and Hamada Y.. (1992). Frozen desserts containing rice.Diary Sci. Abst. 54: (5).

Mervat *et al* (2007). Chemical,Rheological and Sensory Evaluation of Yoghurt Supplemented with Turmeric". International J. of Dairy Science., 2: 252- 259.

Chin, *et al* (1998). Journal of Food Science., 63: 801- 807.

Brennan, C. S. and Tudorica, C. M. (2008). Carbohydrate based fat replacers in the modification of the rheological, textural and sensory quality of yoghurt: comparative study of the utilisation of barley beta-glucan, guar gum and inulin. Int. J. Food Sci. & Technol., 43(5): 824-833.

تاثير الاستبدال الكلى و الجزئى لمسحوق اللبن الفرز المستخدم في صناعة الايس كريم بمركز بروتينات الشرش ودقيق الفول الصويا على جودة المنتج.

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تم صنع الآيس كريم عن طريق استبدال جزئي من اللبن الفرز المجفف بنسب(T1٧٥ % لبن فرز مجفف : ٢٥%بروتين شرش مجفف و T2 ٧٥% لبن فرز مجفف : ٢٥% بروتين فول الصويا وT3 ٥٠%لبن فرز مجفف : ٥٠% بروتين شرش مجفف وT4 ٥٠%لبن فرز مجفف : ٥٠% بروتين فول الصويا وT5 ٧٥%بروتين شرش مجفف : ٢٥% لبن فرز مجفف وT6 ٧٥%بروتين فول الصويا : ٢٥% لبن فرز مجفف واستبدال كلى للبن الفرز المجفف فى T7 ٥٢.٥ % بروتين شرش مجفف وT8 ٥٢.٥% بروتين فول الصويا) ببروتين الشرش المجفف و بروتين فول الصويا على ٨ معاملات بالاضافة الى العينة الكنترول دون إضافة. وكانت النتيجة تحليل الآيس كريم كيميائيا، الميكروبيولوجية وتحلل حسي للعينات الطازجة وبعد ٣٠ يوما تخزين على -١٨° م . جميع المعاملات حدث انخفاض فى قيم PH بعد ٣٠ يوما من التخذين . وقد لوحظت نفس التغيرالحادث في PH على نسبة المواد الصلبة الكليه و نسبة البروتين والدهون. تم الكشف عن ارتفاع فى نسبة overrun الى ٣٦٪ في T5 و انخفاضها الى ٣٢٪ في T8. فى الاختبار الحسى للعينات حصلت العينة الكنترول على درجة ٩١ درجة في حين أن تراوحت درجات التقيم الحسى فى باقى العينات من ٨٧-٧٠ مقارنة مع الكنترول. و اظهرت نتائج التحكيم الحسى انخفاضة بعد ٣٠ يوم الى ٨٣ - ٦٧ بعد ٣٠ يوما، مقارنة مع ٨٣ في الكنترول و فى الجانب الاخر اظهرت اضافة المستكه تاثير على الخواص الحسية حيث انخفضت الى ٧٤-٨٦ درجة مقارنة مع ٩١درجة في الكنترول وبعد ٣٠ يوما انخفضت الى ٧١-٦٨ مقارنة بالكنترول . و فى الاتجاة الاخر زادت milting point بعد ٣٠ يوما مقارنة مع المعاملات الطازجة إما في ٣٠، ٦٠ أو ٩٠ دقيقة. وكانت جميع المعاملات التي تم فحصها خالية تماما من *Staphylococcus aurous group* وcoliform إما عندما طازجة أو أثناء التخزين.