J. Food and Dairy Sci., Mansoura Univ., Vol. 8 (6): 257 - 262, 2017

Formulation and Characterization Aspects of Light Sour Cream

Hassan, M. N. A. [1] ; A. M. Mehriz[1]; Aida. S. Salem[2] and Hoda. H. Abozied[2]
[1] Dairy Science Department, Faculty of Agriculture, Cairo University.
[2] Dairy Tech. Dept. Animal Production Research Institute, Agric. Research Center, Dokki, Giza, Egypt.

ABSTRACT

This study was conducted to develop light, rich protein, sour cream with a high nutritional value. From the organoleptic results of several preliminary experiments, it was possible to select four treatments: the first of which (T_1) is a fermented cream with 18 % fat that complies with the minimum fat content of fermented cream according to the Egyptian Standards specification and served as a control. The other three treatments are characterized with low fat content, and with increased protein content (~ 5%), the three treatments differed in its fat and stabilizers content as follows: Treatment 2 (T_2) cream with 9 % fat + 0.5% MG218 + 0.75% of formulated stabilizer emulsifier (FSE). Treatment 3 (T_3) cream with 9 % fat + 0.5% MG218 only. Treatment4 (T_4) cream with 5 % fat + 0.5% MG218 + 0.75% of FSE. The resultant sour creams from all treatments were stored at 6 ±1˚C for 15 days. During storage period, creams were analyzed for titratable acidity, pH value, rheologically for viscosity and syneresis, microbiologically for Total bacteria, coliform and moulds & yeasts counts. Sour creams were also organoleptically assessed. The obtained results indicated that titratable acidity increased during storage in all treatments. Coliform bacteria were found in a few numbers, which were within the permissible range by the Egyptian Standards specification and were disappeared during storage. Moulds & yeasts were detected in all samples at the end of the storage period. Viscosity of samples were higher in T_2, T_3 and T_4 compared with T_1. Syneresis in experimental sour creams were arranged in the following descending order $T_1 > T_3 > T_4 >$ while T_2 revealed no syneresis. Organoleptically, sour creams acceptability were arranged in the following descending order $T_2 > T_3 > T_1 > T_4$. From the foregoing results, it could be concluded that Light sour creams with high nutritional and organoleptic properties manufactured from 9% fat and 5% protein with added stabilizers (T_2 &T_3) are applicable and highly recommended.

Keywords: sour cream, light, stabilizer, emulsifier, protein concentrate, syneresis, viscosity.

INTRODUCTION

Consumers more and more believe that foods contribute directly to their health. Today foods are not intended to only satisfy hunger and to provide necessary nutrients for humans, but also to prevent nutrition-related diseases. In this regard, functional foods play an outstanding role.

One of the important categories of Functional food of low fat dairy products is of importance in order to combat obesity and is useful for the individuals suffering from heart disease and hypertension. High fat intake is associated with an increased risk for the previously mentioned disorders (AHA, 1996).

Sour cream has a delicate sour taste with a pleasant, buttery-taste, and characterized by limited shelf-life It is made from souring pasteurized cream with lactic acid-bacteria (Meunier-Goddik, 2004, USDA-AMS, 2005, and Tamime , 2006). Full fat sour cream contains 18% fat, reduced fat sour cream has a minimum of 25% fat, light or lite sour cream has a minimum of 50% fat reduction and Low-fat sour cream contains 6% or less total fat (USDA-AMS, 2005 and Stevens, 1996). Milk proteins and non dairy stabilizers were used to improve the texture and to overcome the problem of whey synersis ot the sour cream (Hunt and Maynes ,1997 and Costello, 2009). Fat content plays an important role in the in flavor of the sour cream(Cadwallodar and Singh , 2009 Jervis *et al*., 2014).

Concerning the cream types produced in Egypt, in 2014 a new Egyptian Standards (ES: 780/1/2014) was appeared under the title " Cream and prepared creams", it included four main types of cream namely
1- Liquid cream , 2- Reconstituted cream , 3- Imitated cream and 4- Prepared cream. This later type include the following six cream brands

a-Packed liquid cream, b- Cream ready to be whipped,C-Packed cream under pressure, d- Whipped cream,e-Ripened or cultured cream , f- Acidified cream.

Sour cream lies under e or f cream without any specifications. Accordingly, there is no standard specification for low fat sour cream. As mentioned above low fat dairy products are very important from the nutritional and healthy point of view for the consumer. Therefore, this study was designed to investigate the possibility of producing acceptable nutritionally and healthy light sour cream by using milk fat with combination of some emulsifier and stabilizers and protein concentrate and suggest it as a new type of cream for Egyptian Standard association.

MATERIALS AND METHODS

Fresh buffalo's skim milk and fresh cream were obtained from Dairy Technology Unit, Faculty of Agriculture, Cairo University. Low heat skim milk powder (36% protein**)** and milk protein concentrate (70% protein) imported from Sweden were purchased from the Consumer Association of Food Stuffs, Feisal St., Giza, Egypt. Laboratory formulated stabilizer/ emulsifier, (FSE) was prepared by mixing food grade gelatin, guar gum, mono & di glycerides and starch which were used to prepare mixed stabilizer/emulsifier (formalized stabilizer/emulsifier, FSE) were purchased from El Gomhoria Company, Cairo, Egypt. Stabilizer\Emulsifier (MG218) consists of gelatin, carrageenan, CMC and sodium mono glyceride was obtained from the General Scientific Association Co., El Obour city, first industrial region, Cairo, Egypt. Freeze dried sour cream culture (FD-DVS) CH-11 was obtained from Chr. Hansen's Lab., Copenhagen Denmark. Agri-mark Whey protein concentrate (WPC 80**)** was obtained from U.S Dairy Export Council, while simplesse-100 **(**Cpke Ico, Eu) and sodium citrate powder were obtained from Dairy Science Dept. Cairo University.

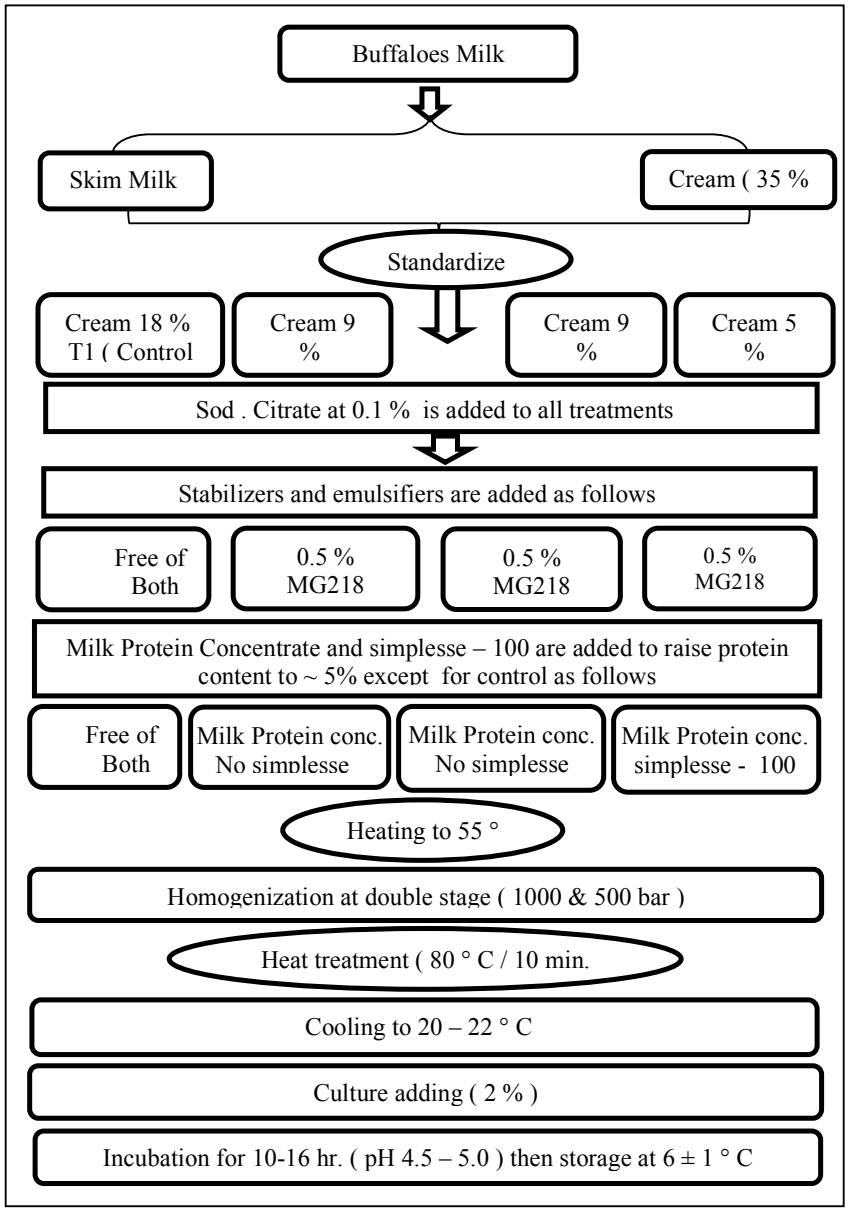

Fig. 1 flow diagram for sour , light and low fat sour cream preparation

Titratable acidity (TA), total solids (TS) and fat content in cream were determine according to A.O.A.C. (2002). pH value was measured using a laboratory pH meter (Type, WTW, Inolab 720, Germany).

The apparent viscosity of sour and light sour cream was determined using a Brookfield viscometer LTV (Brokfield Engineering Laboratories, MA, and USA) with spindle RV5 at 20 rpm and the reading on the viscometer was taken after 3 min for each sample. Sample temperature was maintained at 4°C and viscosity value was expressed in centipoises (cP). Susceptibility of sour and light sour cream to syneresis was determined by using the method described by Cooper and Watts (1981). The amount of liquid collected (ml) in a 2 hr. period was reported as syneresis according to the method of Adapa and Schmidt (1998).

Sensory properties for the traditional and light sour cream were assessed by panelists from the Staff members of Dairy Science Departments of Faculty of Agriculture, Cairo University and Dairy Tech. Dept. Animal Production Research Institute according to the method described by Costello (2009). Scores for flavor (50 points), body & texture (30points) and for appearance & color (20points) were applied according to the score card recommended by John *et al.*, (1964).

Coliform, Total bacterial count and moulds & Yeasts counts were determined according to A.P.H.A (1992).

Statistical analysis was carried by using randomize complete block design with two factor was used for analysis of all data with three replications for each parameter. The treatment means were compared by least significant difference (L.S.D.) test as given by Snedecor and Cochran (1976) by using Assistant program.

RESULTS AND DISCUSSION

To produce low calorie (light) sour cream with the absence of any standard specifications, it was necessary to

examine different fat levels ranging from 5% to 10% , while maintaining the minimum total solid as in the traditional sour cream containing 18% fat (~ 24% TS). Therefore, it was thought worth- while to prepare light sour cream with high protein content to ensure nutritional and healthy product to the consumer. Therefore, fresh skim milk, and protein concentrate were used in addition to the cream to reach the required total solid. From several preliminary experiments, four different creams vartiants were examined which differed in its fat content namely 5, 7, 9 and 10% and two different stabilizers mixture were tried Mixture1 (MG218, which consists of gelatin, carrragenan, carboxy methyl cellulose (CMC) and Sodium mono glyceride) and Mixture 2 (FSE) which consists of starch, gelatin, guar gum and mono &di glycerides. These two types of stabilizer mixes were tested in different levels to choose the most suitable one. Depending on the panelist's assessment and after four trails starch was excluded from the second stabilizer due to the high thickening appeared in the cream. The best chosen percentages from the two stabilizers were 0.5 % and 1.25 % from MG218 and FSE, respectively.

In another series of experiments a mixture of both stabilizers was tried with the different fat percentages and it was concluded that a mixture of both stabilizers at a ratio of 0.5 % and 0.75% from MG218 and FSE respectively could be used. Also no differences were noticed between 5 and 7 % fat cream and also between 9 and 10 % fat cream. Therefore it was decided to continue the experiment with 5 and 9 % fat cream in this work to produce light sour cream and choose the best one to be recommended.

Data presented in Table (1) summarize the average chemical composition of traditional sour cream, and the other two light and low fat sour cream treatments. From these data, it was easy to observe that the traditional sour cream was characterized by its high total solid value 26.2% due to its high fat content, in comparison with other treatments which characterized by its fat reduction by 50% in T2 and T3 and by 72.2 % in T4. It was also clear from the same Table that, although there was high fat reduction in cream treatments, the total solids in these treatments (T2 and T3) were not very low due to fortification with protein concentrate, stabilizers and sodium citrate. Treatment 4 was the only one to be low in its total solids due to the high reduction in its fat content.

Table 1. Chemical composition of different blends for sour light and low fat sour cream treatments

Treatments	TS%	Protein%	Lactose%	Fat%	MSNF%
$T_{1\ control}$	26.2	3.31	4.18	18	8.2
T_2	20.5	5.5	4.0	9.0	11.5
T_3	20.1	5.5	4.0	9.0	11.1
T_4	16.1	5.5	4.0	5.0	11.1

T_1 18% fat (control.)
T_2 9% fat, 0.5% MG218, 0.75% FSE
T_3 9% fat, 0.5% MG218 only.
T_4 5% fat, 0.5% MG218, 0.75% FSE

Data in Table (2) show the changes in titratable acidity (T.A) and pH values of sour cream, light and low fat sour cream treatments during storage at refrigeration temperature for 15 days. One of the most important parameter to determine the quality and shelf life of dairy products is the acidity and pH value. It could be observed from the presented data that the T.A of fresh creams ranged from 0.54 to 0.64, then increased gradually to reach 0.88 % in control cream, and to reach 1.14, 1.12 and 1.1 % in T2, T3 and T4, respectively. It was very important to control the incubation temperature (22-24 ºC) and to control the incubation period to get a fresh cream with T.A. in the range of 0.5 to 0.65 % as a fresh cream with high T.A. more than 0.65% was not acceptable by the panelists due to its high sour taste. The obtained T.A. in fresh sour creams are in agreement with the recommended value for fresh sour cream as reported by the U.S code of federal regulations (Costello *et al*., 2009). Concerning the pH values of the four treatments, the same Table reveals that the pH value of the fresh creams ranged from 5.1 to 5.2 for all treatments then as storage progressed the pH values decreased gradually to reach values of 4.82 to 4.49 by the end of storage period.

Table 2. Titratable acidity and pH value of sour cream, light and low fat sour cream as affected by fat, protein and stabilizer percentages during cold storage (6±1˚c)

Storage period (days)	Treatments			
	$T_{1\ Control}$	T_2	T_3	T_4
	T.A. %			
Fresh	0.54	0.60	0.64	0.52
5	0.74	0.79	0.76	0.78
10	0.80	0.89	1.03	0.90
15	0.88	1.14	1.12	1.10
	pH values			
Fresh	5.19	5.12	5.08	5.1
5	5.00	4.88	4.53	4.82
10	4.80	4.86	4.5	4.68
15	4.82	4.6	4.49	4.59

Data in Table (3) and illustrated in Fig.(2) summarize the changes occurred in the syneresis (ml) in low fat sour creams, as compared with traditional sour cream. It is obvious from the presented data that the control sour cream had a high value of expelled whey either when fresh or during cold storage as it recorded 2.6 ml when fresh and 2.3, 2.8 and 3 ml after 5,10 and 15 days of cold storage.

When these values in control treatment were compared with the other treatments, it could be noticed that T2 revealed no syneresis either when fresh or during storage, while T3 recorded higher syneresis than that recorded in T4. Statistically, there were significant differences between control treatment and each of T3 and T4, while there were no significant differences between T3 and T4 . These variations in the ability of sour cream to expel whey might be due to the variation in solids not fat content, and also to the presence or absence of stabilizers which differ in its quantity and variety. It is well known that the manufacturer of the cream can effectively bind water and inhibit to some extent whey expulsion (syneresis) in the container by increasing the milk solids not fat fraction (Caudle *et al*., 2005).

It is clear from these data that the increment of protein content in the three treatments to more than 5% played an important role in decreasing the extent of syneresis in T3 and T4, comparing with T1. Also the presence of the stabilizer either MG218 in T3, which consists of gelatin, carboxy methyl cellulose (CMC), K.carragenan and sodium mono glyceride or FSE which consists of gelatin, guar gum and mono& di glycerides +

MG218 in T2 and T4 surely affected the level of syneresis because all of these component, had the capability to form a viscous solution and form gel and has its effect in binding water and as a thickening agents. Also, K. carragenan has been widely used in dairy product to prevent whey separation on account of its interaction with casein micelles. Addition of these stabilizers in the mix state as in T2 or in T4 explains the reason of no syneresis in T2 and the low syneresis in T4 .These results are in agreement with what was previously reported by Lzydorczk, *et al*., (2005).

Table 3. Syneresis values of sour cream , light and low fat sour creams during storage at refrigerated temperature (6 ±1°c)

Treatments	Syneresis (ml)				
	Storage period (days)				
	Fresh	5	10	15	Average*
$T_{1\ control}$	2.6	2.3	2.8	3	2.68^{A}
T_2	0	0	0	0	0^{C}
T_3	1	1.6	1.8	1.9	1.58^{B}
T_4	0.5	1.1	1.4	1.5	1.12^{B}

*** different super script (A, B, C) at the same column are significantly different.**

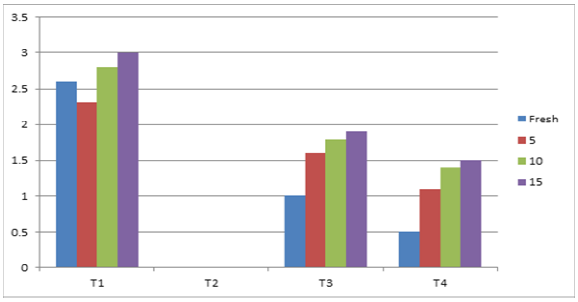

Fig. 2. Syneresis values of sour cream and light sour cream during Storage at refrigerated temperature (6 ±1°c)

Viscosity as a rheological property of sour cream is influenced by the fermentation temperature and the rate of acid production. Therefore it was recommended that the fermentation temperature should be between 20 and 30 °C not more than 30 and not less than 20 (Hunt and Maynes., 1997). Also a weak body or low viscosity can result from low fat content, low milk solids not fat and incubation at too low temperature. Data presented in Table (4) show that T_1cream (control) recorded the lowest values of viscosity either when fresh or during storage until the end of storage period as it recorded 5000 cP when fresh and increased to reach 7112 cP after 15 days, while the other treatments recorded higher values in descending order as follows $T_2 > T_4 > T_3$. The low viscosity value in T_1 is due mainly to the lower protein content and to the absence of stabilizer. These results are in line with that obtained by Salem *et al* (1998) and Salem (2001),while the highest viscosity value in T_2 is due to the higher content of protein (Lee and lucey, 2010) and to the higher amount of stabilizer added (Harris., 1990), (0.5% MG218 + 0.75% of FSE) and the various types of colloidal materials in these stabilizers. Although that of T_4 contained the same stabilizer either in types or quantity as in T_2, it recorded a lower viscosity value when compared with T_2, This is mainly due to the lower fat content as the fat % in this treatment is equal to 5% which is 44.4 % lower than in T_2. The viscosity value in T_3 is lower than that in T2 although it contained the same fat and protein content , this lower viscosity value is mainly due to the lower content of stabilizer as it contained only 0.5%. It is worthy to mention here that although there was a clear variations in cream viscosity values which was clearly approved by the statistical analysis they were all acceptable from all panellists and no one comment on these variations, in other words, these variations in viscosity were not sensible for most panelists.

Table 4. Apparent viscosity (cP) of sour cream, light and low fat sour creams during storage at refrigerated temperature (6 ±1°c)

Treatment	Viscosity (cP)				
	Storage period (days)				
	Fresh	5	10	15	Average*
$T_{1\ control}$	5000	6050	6290	7112	6113^{D}
T_2	12022	15940	15990	16417	15092^{A}
T_3	8805	9906	10498	11284	10123^{C}
T_4	11989	12076	12196	12248	12127^{B}

*** different super script (A, B, C, D) at the same column are significantly different.**

In Egypt there is no standard specifications for the microbiological properties of low fat sour cream due to the absence of a standards specification for sour cream itself. In fact there is only one standard specification for cream and prepared creams ES: 780-1/ 2014. This standard include 6 types of cream one of them is the fermented cream 2 / 4 / 5 which was defined as the dairy product obtained by fermentation of liquid cream, reconstituted or imitated cream by the action of suitable cultures. This standard specifications recorded general microbiological properties for all types of cream as follow: 1- free of pathogenic bacteria and its toxins. 2- Coliform bacteria must not exceed 10 cfu/g for pasteurized cream only. 3- Free of E.coli 4- Moulds and Yeasts spores must not exceed 20 cfu/g for pasteurized cream only.

Data in Table (5) represent the average cfu/g for Coliform, Moulds & Yeast and Total bacterial count of sour cream treatments during storage at refrigerated temperature for two weeks. It was clear from the presented data that coliform bacteria were found in all treatments when fresh within the limits allowed by the Egyptian standard except in T_1 which exceed this limit and recorded 15 cfu/g. During refrigerated storage coliform bacteria decreased and not detected in T_1, T_3 and T_4 after 5 days while in T_2 coliform bacteria revealed some fluctuations during storage. The decrease in coliform bacteria and its disappearance might be due to the high acidity of the cream devolped during storage. Concerning Mould & Yeast, one can easily say that M&Y were not detected through the first 10 days, and it appeared by the end of the storage period in a very low count within the allowed limit according to the Egyptian standard ES 780/1/2014.

As for total bacterial count, it increased gradually all over the storage period. The highest values were recorded with T_1 and the lowest was recorded with T_2 , while T_3 and T_4 recorded a total bacterial count between T_1 and T_2. From these data, one can say that sour cream or low fat sour creams microbiological properties were within the allowed microbiological properties recommended by the Egyptian standard ES 780 /2014 and were in limits

recommended by the EU council directive 92 /46 /EE, (1992) and the national dairy code/Canada, (2005). Regarding Moulds figures it were too much lower than the Albanian standard and the EU recommendation (Kallco and Ajce., 2014) which reported the limit of >1000 cfu\g in sour cream.

Table 5. Microbiological properties of sour cream , light and low fat sour creams during storage at (6±1°c) for two weeks .

Group of bacteria	Storage period (days)	Treatments			
		$T_{1\ control}$	T_2	T_3	T_4
Total Count (10^5cfu/g)	Fresh	34.4	27.7	51.2	45.5
	5	52.9	47.3	73.6	58.7
	10	108.3	69.3	89.9	88
	15	171.6	101.4	130.2	117.2
Coliform (10 cfu/g)	Fresh	15.2	7.5	7.0	9.2
	5	2.0	11.0	2.0	N.D
	10	N.D	12	N.D	N.D
	15	N.D	15	N.D	N.D
Molds/Yeasts (10^1 cfu/g)	Fresh	N.D	N.D	N.D	N.D
	5	N.D	N.D	N.D	N.D
	10	N.D	N.D	N.D	N.D
	15	20.0	15.0	13.0	5.0

N.D : not detected

Sensory assessment is one of the most important criteria on which the producer decides to continue or discontinue processing or suggest some modifications to improve or develop the product to increase its acceptability for consumers. Assessment is carried out by some well-trained panelists to evaluate the product from the color, appearance, body & texture and flavor point of view. It should be noted that one of the most important questions directed to the panelists is to say their expectations for the fat content of the different creams under assessment.

Data in Table (6) summarize the panelists' observations and average of their evaluations and comments on the four cream treatments (T_1, T_2, T_3 and T_4).

It is worthy to mention here that most panelists expectation about the fat content were amazing as they reported fat% in T_2 and T_3 between 25-30% and for $T_1$and T_4 ~ 20%. From the acceptability point of view , the four treatments could be arranged in a descending order as follow T_3> T_2> T_1> T_4. All treatments were free of whey separation, no grainy texture and no gassy appearance. T_2 and T_3 were characterized by glossy appearance with high viscosity and mild and pleasant acidic taste through the first 10 days of storage. At 15 days the acidic taste was acceptable in T_2 and clearly high sour taste in T_3 but the richness feeling made it acceptable.

T_1 at 15 days was characterized by sour and slightly yeasty flavor , while T_4 was characterized by high diacetyl taste (harsh flavor). Statistically, there were significant differences between flavor, body & texture, appearance and total scores of the four treatments as it was shown in Table (6).

Table 6. Organoleptic assessment of sour cream , light and low fat sour creams during storage at refrigerated temperature (6±1°c)

Storage period	Properties				Comments
	Flavor (50)	Body/ texture (30)	Appearance/color (20)	Total score (100)	
				T_1	
Fresh	47	26	16	89	Creamy body not glossy like fatty taste, with acceptable sour taste
5	47	25	15	87	
10	45	24	15	84	High sour taste.
15	43	24	15	82	Low creamy taste, with sour and slightly yeast flavor.
Average	45.5^{B*}	24.75^{B}	15.25^{B}	85.5^{B}	
				T_2	
Fresh	48	28	18	94	Glossy appearance with high richness, high viscosity, body & texture. With clear creamy and mouth feel sensation, delicate flavor.
5	48	28	18	94	
10	48	28	18	94	Pleasant, acceptable sour taste.
15	48	28	18	94	
Average	48^{A*}	28^{A}	18^{A}	94^{A}	
				T_3	
Fresh	48	29	18	95	Glossy appearances, high viscosity, mild acidic flavor, with fatty sensation, clear richness.
5	48	29	18	95	
10	46	29	18	93	From day 10 clear high sour acceptable flavor.
15	46	29	18	93	
Average	47^{AB}	29^{A}	18^{A}	94^{A}	
				T_4	
Fresh	45	24	17	86	
5	43	24	15	82	Creamy body, lack in richness with acceptable flavor.
10	42	24	15	81	
15	42	23	15	80	From 10, 15 days, high sour flavor in cream was observed with high diacetyl flavor (harsh flavor)
Average	43^{C*}	23.75^{B}	15.5^{B}	82.25^{B}	

*** different super script (A, B, C) at the same column are significantly different**

***All cream treatments were free of whey separation.**

***No grainy texture was detected in all cream treatments.**

***No gassy appearance was found due to CO_2 formation in all cream treatments.**

***Fat % expectation by panelists were 25-30% fat for T_2 and T_3 and ~ 20% for T_1 and T_4.**

REFERENCES

A.O.A.C. (2002). Official methods of analysis. Published by the Association of Official Analytical Chemists, Washington, USA.

A.P.H.A. American Public Health Association. (1992). Standard Method for Examination of Dairy Products. American Bublic Health Association, Inc 16th ED Publ. Avico Inc. Westport Connecticut USA.

Adapa, S. and Schmidt, K.A. (1998). Physical properties of low-fat sour cream containing exopolysaccharides-producing lactic acid. Journal of Food Science, 63;No(5): 901–903.

AHA (1996). Dietary guidelines for healthy Americans. Circulation 94: 1795-1800.

Analysis in the Software Assistat-Statistical Attendance. In: World Congress On Computers In Agriculture, 7, Reno-Nv-Usa: American Society Of Agricultural And Biological Engineers. c.f. Stabilizers : indispensble substances in dairy product of high rheology.

Cadwallader, K. R., and T. K. Singh. (2009). Flavors and off-flavors in milk and dairy products. Adv. Dairy Chem. 3:631–690.

Caudle, A.D., Yoon, y and Drake, M.A.(2005). Influence of flavor variability in skim milk powder on consumer acceptability of ingredients. J. Food Sci. 70 (7): 427-431.

Cooper, H.R. and Watts, T.A. (1981). Evaluation of texture characteristics produced in cottage cheese creamed with selected dressings. Can. Inst. Food Sci. Technol. J. 14 (1): 29-35.

Costello, M.J.(2009). Sour Cream and Related Products In S. Clark *et al*. (eds.), The Sensory Evaluation of Dairy Products, Second edition.

Egyptian Organization for Standards And Quality.(2014). ES:780\1\2014 Cream and prepared creams.

EU council directive 92\ 46\ EEC, (1992). Regulatory Standards for Indicator Organisms. C.F. Ledenbach and Marshall (Microbiological spoilage of dairy products) in compendium of the microbiological spoilage of food and beverages, Springer Science, Business Media, 1LC (2009).

Harris, P. (1990). Food gels. Elsevier science publishers LTD. Essex.UK

Hunt, C.C. and Maynes J.R. (1997). Current issues in the stabilization of cultured dairy products. J. Dairy Sai., 80: 2639- 2643.

Jervis S.M., Gerard P., Drake S., Lopetcharat K. and Drake M.A. (2014). The Perception of Creaminess In Sour Cream. Journal of Sensory Studies ISSN 0887-8250.

John, A. Nelson; G. Malcolm Trout and Michigan Agricultural Experimental Station (1964). Judging Dairy Products. 4 th Ed. pp. 332-333. The Olson Publishing Co. N.Y.

Kallco, I. and Ajce, S. (2014). Microbiological evaluation study of milk and dairy products in the city of Korca, Albania. The 2nd International conference on research and education, 30-31 May 2014.

Lee, W. J. and Lucey. J. A. (2010). Formation and physical properties of yogurt. Asian-Aust. J. Anim. Sci. 9: 1127 – 1136.

Lzydorczk, M., Cui, S. W. and Wang, Q. (2005). Poly saccharide gums: structure, functional properties, and a pplication. In Steve W.Cui., Food carbohydrates chemistry, physical properties and application. Taylor & Francis Group. LLC.

Meunier-Goddik, L. 2004. Sour cream and creme fraiche. In: Hui , Y.H., Meunier- Goddik, L., Hansen,A.S., Josephsen, J., Nip, W.-K., Stanfield, P.S. and Toldra, F., editors. Handbook of Food and Beverage Fermentation Technology. Marcel Dekker, New York, NY. Chapter 8; pp. 147 - 157.

National Dairy Code, (2005). Canadian Dairy Information Center, National Dairy Code, 4th ed.

Salem, A.S.(2001).An Imitation cultured cream. Egypt. J. Appl. Sci., 16;(3)161-172.

Salem, A.S.; Abdel-Rafee, S. and El-Ghandour, S.A.(1998). Fortified sour cream. ArabUniv. J. Agric. Sci., 6; (1), 235-247.

Silva, F. de A. S. e. & Azevedo, C. A. V.(2009) de. Principal Components Snedecor G. A. and Cochran W. G. (1976). Statistical Method. Iowa State Univ. Press, Ames.

Stevens, H., Roger (1996). Cultured Dairy products. Indiana Dairy Council, Indianopolis, IN 46256317.482.7133.

Tamime, A.Y.(2006). Fermented Milk. 1st Edn., Wiley – Black well New York, ISBN : 978-0-632-06458-8pp 218-223.

USDA-AMS (US Department of Agricultural Marketing Service). (2005). Specifications for sour cream and acidified sour cream June 5, 2005. Accessed Sep. 27, 2011.

تكوين وتوصيف للقشدة المخمرة المنخفضة الدهن

محمد نجيب على حسن[1] , ابو السمح محمد محرز[1] , عايدة سليمان سالم[2] و هدى همام ابوزيد[2]

[1] قسم الالبان كلية الزراعة - جامعة القاهرة

[2] قسم بحوث تكنولوجيا الالبان - معهد بحوث الانتاج الحيوانى- مركز البحوث الزراعية

تمت هذه الدراسة بغرض إنتاج قشدة مختمرة منخفضة الدهن ومرتفعة في محتواها من البروتين بحيث تكون قشدة صحية وذات قيمة غذائية عالية. ومن نتائج العديد من التجارب المبدئية أمكن التوصل إلى تحضير أربع معاملات على النحو التالي : معاملة 1 قشدة بنسبة دهن 18% مساوية للحد الأدنى للدهن في القشدة المختمرة طبقا للمواصفات القياسية المصرية , معاملة 2 قشدة 9 % دهن + 0.5 % مثبت MG218 + 0.75 % من مثبت FSE, معاملة 3 قشدة 9 % دهن + 0.5 % مثبت MG218، معاملة 4 قشدة 5% دهن+ 0.5 % مثبت MG218+ 0.75 % من مثبت FSE و المعاملات الثلاثة الأخيرة تم رفع نسبة البروتين فيها إلى حوالى 5 % باستخدام مركزات بروتين اللبن . وتم تخزين المعاملات الأربعة على درجة حرارة الثلاجة 6 ±1م° لمدة 15 يوم تم خلالها تحليل القشدة للحموضة وتقدير الـpH ، وريولوجيا للزوجة , خاصية إنفصل سائل (خاصية إنفصال شرش) (Syneresis), و ميكروبيولوجيا وحسيا. وقد أشارت النتائج المتحصل عليها إلى ارتفاع الحموضة وانخفاض الـ pH بالتدريج أثناء التخزين للمعاملات الأربع والى وجود بكتريا الكوليفورم في الحالة الطازجة وبأعداد قليلة تدخل ضمن الحدود المسموح بها طبقا للمواصفات القياسية المصرية واختفائها أثناء التخزين. وبعدم ظهور الخمائر والفطريات إلا في نهاية مدة التخزين. كما ارتفعت اللزوجة في المعاملات 2, 3, 4 بدرجة ملحوظة بالمقارنة بالمعاملة 1 (الكنترول), ومن حيث خاصية إنفصال شرش كان ترتيب المعاملات تنازليا كالآتي : معاملة 1 > معاملة 3 > معاملة 4 بينما كانت قشدة المعاملة 2 خالية من إنفصال شرش سواء أكانت طازجة أو أثناء فترة التخزين ومن حيث الخواص الحسية و درجة القبول كان الترتيب على النحو التالي معاملة 2 > معاملة 3 > معاملة 1 > معاملة 4. وتوصى الدراسة بإمكانية إنتاج قشدة مختمرة منخفضة الدهن وذات قيمة غذائية عالية وذات خواص حسية مقبولة بدرجة عالية من قشدة 9 % دهن مع تعديل تركيبها برفع نسبة البروتين إلى 5 % وإدراجها ضمن المواصفات القياسية المصرية للقشدة .