

QUALITY OF YOGHURT MADE FROM BUFFALO MILK AND RETENTATE AS AFFECTED WITH THE FORTIFICATION WITH SKIM MILK POWDER AND RETENTATE POWDER.

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ABSTRACT

Yoghurt was made from buffalo milk in the presence of different levels of skim milk powder and retentate powder. The retentate was also used in making yoghurt by reconstituting it to obtain the same composition of buffalo milk, and by the fortification with different concentrating of skim milk powder and retentate powder. Yoghurt made from buffalo milk in the presence of 1% retentate powder was the best from the chemical, microbiological and organoleptic points of view. Meanwhile, the yoghurt made from retentate in the presence of 3% retentate powder was shown to be the best among the groups made from retentate.

INTRODUCTION

There has been a phenomenal increase in the production of fermented milk in developed countries. Yoghurt is a very popular flavorful and healthful dairy product in Egypt. Its production and consumption is growing continuously due to its therapeutic properties beside its high nutritive value (Karagul *et al.*, 2004). The health promoting properties of live lactic acid bacteria in yoghurt include protection against gastrointestinal upsets, enhancement of digestion of lactose by maldigesters, decreasing the risk of cancer, lower blood cholesterol, improving the immune response and helping the body to assimilate protein, calcium and iron (Perdigeon *et al.*, 1998; Marona and Pedrigo, 2004).

Ultrafiltration (UF) is the most fascinating technology which have been recently introduced for application in the dairy industry, not only to improve the traditional dairy products but also to create new products.

Therefore, this work was carried out to investigate the effect of manufacturing yoghurt from UF. The resultant products were stored at 5 C for 14 days, and all of the measurements were carried out while fresh and after 7 and 14 days.)

MATERIALS AND METHODS

Fresh buffalo's milk and cream were obtained from the Dairy Department, faculty of agriculture, Mansoura University. Skim milk powder "moisture: 4% fat: 1.25% used in this work was made in Poland by "VARIMEX". Retentate powder: { protein: 69.8% lactose:17.2 % ash: 7.2% moisture: 4.4% fat: 1.4%} was used. Yoghurt starter (*S. salivarius* subsp. thermophilus and *L. delbrückii* subsp. *bulgaricus*) was obtained from the Dairy Dept., Fac. of Agric., Mans. Univ.,. All portions were inoculated with 3.0% yoghurt starter. Fat and total solids (T. S) were estimated by the method described by British Standard Institution's (B. S. I) Method (1955). pH

measured by a digital pH-meter Janway 3010 – England. Total volatile fatty acids (T. V. F. A) were estimated according to Kosikowski (1982). Total nitrogen (T. N), soluble nitrogen (S. N), non-protein nitrogen (N. P. N) and titratable acidity (T. A) were estimated as described by Ling (1963). The curd tension is determined by using the method of Chandrasekhare et. Al (1957). Yoghurt stored at 4 -5 °C and examined for total bacterial count (T. C), moulds and yeasts (M & Y), coliform bacteria and staphylococci as mentioned in the Standard Methods for Examination of Dairy Products (1985). Lipolytic and Proteolytic bacterial count were carried out as described by Chalmers (1962).

RESULTS AND DISCUSSION

Table (1) The Chemical composition of buffalo milk fortified with different levels of skim milk powder or retentate powder.

Test Treatment	T.S%	Acidity%	pH	F%	T.V.F.F.A Mg/100g	T.N%	S.N%	N.P.N%
Control	15	0.13	6.6	6	1.20	0.56	0.077	0.0196
T1	15.9	0.16	6.5	5.6	1.22	0.63	0.084	0.0210
T2	17.2	0.19	6.3	5.2	1.64	0.7	0.091	0.0224
T3	18.1	0.20	6.2	4.6	1.66	0.77	0.098	0.0238
T4	16.3	0.14	6.5	5.4	1.21	0.7	0.084	0.0231
T5	17.8	0.17	6.4	4.8	1.23	0.84	0.084	0.0245
T6	18.9	0.18	6.3	4.3	1.25	0.98	0.105	0.028

Control: Buffalo milk

T1: Buffalo milk+1% Skim milk powder.

T4: Buffalo milk+1% Retentate powder.

T2: Buffalo milk+2% Skim milk powder

T5: Buffalo milk+2% Retentate powder .

T3: Buffalo milk+3% Skim milk powder

T6: Buffalo milk+3% Retentate powder

Table (2) The Microbiological properties of buffalo milk fortified with different levels of skim milk powder and retentate powder.

Test Treatment	T.C 10 ⁶ x	Lipolytic 10 ³ x	Proteolytic 10 ³ x	M&Y 10 ³ x	E.coll 10 ³ x	Staph. 10 ³ x
Control	55	8	11	3	-	-
T1	46	6	10	2	-	-
T2	54	3	6	1	-	-
T3	63	9	5	-	-	-
T4	45	7	12	1	-	-
T5	34	4	16	-	-	-
T6	35	3	13	-	-	-

Data in Table (3) showed that the acidity of yoghurt increased gradually by increasing their SNF contents. During storage, the acidity in all treatments increased gradually at reaching the maximum after 15 days of storage. Yoghurt samples prepared from UF retentate has the highest acidity. In all treatments and along the storage period samples of yoghurt made with the addition of retentate showed higher acidity than yoghurt from buffalos milk. This might be due to the competitive properties of organisms using lactose in fermentation of milk. These results disagreed with those mentioned by ELGazzar and Marth (1991).

Table (4) showed the viscosity of yoghurt manufactured with different levels of SNF and stored at 5° C for 15 days.

Table (3) Effect of S.N.F. level on PH and acidity of fortified with different levels of skim milk powder and retentate powder yoghurt during storage.

Treatments	Storage period (days)																		
	yoghurt manufactured from buffalo milk									yoghurt manufactured from retentate									
	S.N.F%			fresh		7 days		14 days			S.N.F%			fresh		7 days		14 days	
	fresh	7 days	14 days	Acidity	PH	Acidity	PH	Acidity	PH		fresh	7 days	14 days	Acidity	PH	Acidity	PH	Acidity	PH
CN	10	10	11.3	0.78	4.7	1.2	4.4	1.27	4.2	CR	10	11	11.5	0.86	4.5	1.0	4.3	1.06	4.21
T1	11.5	12.4	12.9	0.85	4.5	1.6	4.2	1.65	4.0	T1"	11.5	12	12.3	1.30	4.3	1.6	4.1	1.19	3.9
T2	13.4	14.4	14.5	0.87	4.4	1.9	4.1	2.02	3.9	T2"	13.4	13.9	14.8	1.63	4.1	2.1	3.9	1.43	3.75
T3	14.9	15.1	15.4	0.91	4.2	2.3	3.8	2.35	3.4	T3"	14.7	15.9	17.1	1.85	3.8	2.5	3.5	1.53	3.3
T4	11.9	13.5	13.4	0.83	4.6	1.3	4.3	1.57	4.1	T4"	11.8	12.4	13.1	0.94	4.2	1.6	4.0	1.15	3.91
T5	13.7	14.2	14.2	0.86	4.5	1.6	4.2	1.64	4.0	T5"	13	14	14.9	1.38	4	1.8	3.8	1.24	3.5
T6	15.2	15.3	15.6	0.88	4.4	2.03	4.0	1.93	3.9	T6"	14.9	15.6	16.4	1.54	4.1	1.9	3.9	1.27	3.7

(CN) control: yoghurt made from buffalo milk

T1: yoghurt made from buffalo milk +1%skim milk T 4: yoghurt made from buffalo milk +1%retentate powder

T2: yoghurt made from buffalo milk +2%skim milk T5: yoghurt made from buffalo milk +2%retentate powder

T3: yoghurt made from buffalo milk +3%skim milk T6: yoghurt made from buffalo milk +3%retentate powder

(CR) control: yoghurt made from retentate

T1": yoghurt made from retentate+1%skim milk T 4": yoghurt made from retentate+1%retentate powder

T2": yoghurt made from retentate+2%skim milk T5": yoghurt made from retentate+2%retentate powder

T3": yoghurt made from retentate+3%skim milk T6": yoghurt made from retentate+3%retentate powder

Table (4) Effect of S.N.F. level on cured tension of fortified with different levels of skim milk powder and retentate powder yoghurt during storage.

Treatments	Storage period (days)												
	yoghurt manufactured from buffalo milk						yoghurt manufactured from Retentate						
	S.N.F%			Curd tension(gm)			S.N.F%			Curd tension(gm)			
	fresh	7 days	14 days	fresh	7 days	14 days		fresh	7 days	14 days	fresh	7 days	14 days
CN	10	10	11.3	4.9	5.1	5.3	CR	10	11	11.5	4.6	4.9	5.2
T1	11.5	12.4	12.9	5.1	5.3	5.6	T1"	11.5	12	12.3	4.2	4.5	4.6
T2	13.4	14.4	14.5	5.3	5.4	5.8	T2"	13.4	13.9	14.8	4.8	5.1	5.3
T3	14.9	15.1	15.4	5.3	5.5	5.9	T3"	14.7	15.9	17.1	5.2	5.5	5.7
T4	11.9	13.5	13.4	5.6	5.9	6.3	T4"	11.8	12.4	13.1	4.6	5.1	5.5
T5	13.7	14.2	14.2	5.9	6.1	6.4	T5"	13	14	14.9	5.3	5.6	5.7
T6	15.2	15.3	15.6	6.5	6.8	7.5	T6"	14.9	15.6	16.4	5.6	6.2	6.4

(CN)control: yoghurt made from buffalo milk

T1: yoghurt made from buffalo milk +1%skim milk T 4: yoghurt made from buffalo milk +1%retentate powder

T2: yoghurt made from buffalo milk +2%skim milk T5: yoghurt made from buffalo milk +2%retentate powder

T3: yoghurt made from buffalo milk +3%skim milk T6: yoghurt made from buffalo milk +3%retentate powder

(CR)control: yoghurt made from retentate

T1": yoghurt made from retentate+1%skim milk T 4": yoghurt made from retentate+1%retentate powder

T2": yoghurt made from retentate+2%skim milk T6": yoghurt made from retentate+2%retentate powder

T3": yoghurt made from retentate+3%skim milk T6": yoghurt made from retentate+3%retentate powder

The results showed that in all treatments cured tension increased as SNF increased. These results are in agreement with Abrahamsen and Holmen (1980), who found that yoghurt made from ultrafiltrated milk gave the best viscosity . The high cured tension of products manufacture from UF retentate might be due to their high protein content. Proteins are capable to bind and imbibe more water, and consequently increase the cured tension .

Table (5) Effect of S.N.F. level on the organoleptic properties of fortified with different levels of skim milk powder and retentate powder yoghurt during storage.

Treat- ments	Storage period (days)												
	yoghurt manufactured from buffalo milk						yoghurt manufactured from UF Retentate						
	S.N.F%			Total points (100)			S.N.F%			Total points (100)			
	fresh	7 days	14 days	fresh	7 days	14 days	fresh	7 days	14 days	fresh	7 days	14 days	
CN	10	10	11.3	70	84	74	CR	10	11	11.5	65	84	86
T1	11.5	12.4	12.9	69	81	82	T1^m	11.5	12	12.3	70	78	79
T2	13.4	14.4	14.5	79	85	85	T2^m	13.4	13.9	14.8	73	81	83
T3	14.9	15.1	15.4	77	89	88	T3^m	14.7	15.9	17.1	79	85	85
T4	11.9	13.5	13.4	81	91	96	T4^m	11.8	12.4	13.1	75	81	88
T5	13.7	14.2	14.2	77	81	90	T5^m	13	14	14.9	78	83	83
T6	15.2	15.3	15.6	79	89	94	T6^m	14.9	15.6	16.4	81	89	92

(CN)control: yoghurt made from buffalo milk
 T1: yoghurt made from buffalo milk +1%skim milk
 T2: yoghurt made from buffalo milk +2%skim milk
 T3: yoghurt made from buffalo milk +3%skim milk
 T 4: yoghurt made from buffalo milk +1%retentate powder
 T5: yoghurt made from buffalo milk +2%retentate powder
 T6: yoghurt made from buffalo milk +3%retentate powder
 (CR)control: yoghurt made from retentate

Results given in table (5) show that the organoleptic- score points of yoghurt increased gradually in all treatments during the storage periods . The highest score was gained in T4 (in buffalos yoghurt)and T6(in yoghurt manufactured from UF retentate), which might be due to their high level of proteins. The obtained results are in agreement with Abrahmsen and Holmen (1980), who found that yoghurt made from ultrafiltrated milk was of acceptable and had good flavor. Also, fermented milk produced from Ultrafiltrated milk of lower lactose and calories than that produced by the traditional method.Results in Table (6)indicated that T.V.F.A in yoghurt manufactured from buffalo milk fortified by different levels of skim milk and retentate increased when fat content increased during the cold storage. But, T.V.F A in yoghurt manufactured from UF retentate fortified by different levels of skim milk and retentate decreased when fat content increased . this might be due to the higher heat treatment during drying process. It is obvious from table (7) that T.N and S.N content increased during storage , however, N.P.N content decreased in yoghurt made from buffalo milk fortified with different levels of skim milk and retentate.

Table (6) Effect of storage period on the Fat and T.V.F.F.A contents in fortified with different levels of skim milk and retentate yoghurt during storage.

Treatments	Storage period (days)												
	yoghurt manufactured from buffalo milk						yoghurt manufactured from Retentate						
	F%			T.V.F.F.A mg/100g			F%			T.V.F.F.A mg/100g			
	fresh	7 days	14 days	fresh	7 days	14 days	fresh	7 days	14 days	fresh	7 days	14 days	
CN	5.5	5.6	5.8	1.51	1.93	2.02	CR	5.5	5.7	5.9	0.54	0.53	0.51
T1	4.8	4.8	5.1	1.73	1.95	2.08	T1"	4.6	5.1	5.6	0.55	0.55	0.54
T2	4.1	4.2	4.5	1.91	2.21	2.24	T2"	4	4.4	4.7	0.59	0.58	0.56
T3	3.7	4.0	4.2	2.01	2.33	3.10	T3"	3.8	3.8	4.1	0.67	0.65	0.63
T4	4.3	4.6	4.9	1.55	1.64	1.73	T4"	4.8	4.9	5.3	0.55	0.54	0.53
T5	4.4	4.7	5.3	1.63	1.74	2.14	T5"	4.5	4.5	4.9	0.58	0.56	0.55
T6	4.1	4.5	4.9	1.72	1.83	2.35	T6"	4.2	4.3	4.8	0.59	0.58	0.58

(CN)control: yoghurt made from buffalo milk

T1: yoghurt made from buffalo milk +1%skim milk T 4: yoghurt made from buffalo milk +1%retentate powder

T2: yoghurt made from buffalo milk +2%skim milk T5: yoghurt made from buffalo milk +2%retentate powder

T3: yoghurt made from buffalo milk +3%skim milk T6: yoghurt made from buffalo milk +3%retentate powder

(CR)control: yoghurt made from retentate

T1": yoghurt made from retentate+1%skim milk T 4": yoghurt made from retentate+1%retentate powder

T2": yoghurt made from retentate+2%skim milk T5": yoghurt made from retentate+2%retentate powder

T3": yoghurt made from retentate+3%skim milk T6": yoghurt made from retentate+3%retentate powder

Table (7) Effect of storage period on the Total nitrogen, Soluble nitrogen and Non- protein nitrogen contents in fortified with different levels of skim milk powder and retentate powder yoghurt during storage.

Treatments	Storage period (days)																		
	yoghurt manufactured from buffalo milk									yoghurt manufactured from UF Retentate									
	Total nitrogen%			Soluble nitrogen%			Non- protein nitrogen%			Total nitrogen%			Soluble nitrogen%			Non- protein nitrogen%			
	fresh	7 days	14 days	Fresh	7 days	14 days	fresh	7 days	14 days		fresh	7 days	14 days	fresh	7 days	14 days	fresh	7 days	14 days
CN	0.7	0.81	0.83	0.079	0.111	0.118	0.0203	0.018	0.016	CR	0.989	1	1.01	0.079	0.083	0.104	0.013	0.023	0.025
T1	0.672	0.69	0.71	0.085	0.113	0.121	0.0213	0.016	0.015	T1"	1.02	1.05	1.05	0.088	0.095	0.108	0.0133	0.023	0.025
T2	0.77	0.81	0.84	0.093	0.121	0.129	0.0229	0.017	0.015	T2"	1.07	1.09	1.11	0.100	0.113	0.114	0.0139	0.025	0.026
T3	0.84	1.01	1.04	0.099	0.123	0.131	0.0246	0.019	0.017	T3"	1.17	1.19	1.20	0.103	0.117	0.118	0.0143	0.026	0.028
T4	0.77	0.93	0.97	0.086	0.116	0.125	0.0235	0.018	0.017	T4"	1.21	1.23	1.24	0.090	0.097	0.111	0.015	0.026	0.029
T5	0.87	1.03	1.05	0.085	0.120	0.129	0.0248	0.019	0.018	T5"	1.25	1.32	1.36	0.092	0.110	0.118	0.017	0.027	0.031
T6	1.04	1.15	1.18	0.107	0.141	0.148	0.0336	0.026	0.023	T6"	1.40	1.45	1.45	0.111	0.128	0.135	0.020	0.035	0.039

(CN)control: yoghurt made from buffalo milk

T1: yoghurt made from buffalo milk +1%skim milk T 4: yoghurt made from buffalo milk +1%retentate powder

T2: yoghurt made from buffalo milk +2%skim milk T6: yoghurt made from buffalo milk +2%retentate powder

T3: yoghurt made from buffalo milk +3%skim milk T6: yoghurt made from buffalo milk +3%retentate powder

(CR)control: yoghurt made from retentate

T1": yoghurt made from retentate+1%skim milk T 4": yoghurt made from retentate+1%retentate powder

T2": yoghurt made from retentate+2%skim milk T5": yoghurt made from retentate+2%retentate powder

T3": yoghurt made from retentate+3%skim milk T6": yoghurt made from retentate+3%retentate powder

On the other hand ,It was observed on increase in the N.P.N content of yoghurt made from retentate during storage .This could be ascribed to a limited hydrolysis of proteins during storage(EL- Shibiny *et al.*, 1979).

Table (8) Microbiological properties of Yoghurt fortified with different of skim milk powder and retentate powder.

Test Treatment	T.C $10^4 \times$	Lipolytic $10^3 \times$	Protolytic $10^3 \times$	M&Y $10^3 \times$	E.coli $10^3 \times$	Staph. $10^3 \times$
CN	65	18	13	1	-	-
T1	71	9	18	-	-	-
T2	82	12	15	-	-	-
T3	97	8	13	-	-	-
T4	55	14	36	-	-	-
T5	40	11	44	-	-	-
T6	51	12	25	-	-	-

(CN)control: yoghurt made from buffalo milk
 T1: yoghurt made from buffalo milk +1%skim milk
 T2: yoghurt made from buffalo milk +2%skim milk
 T3: yoghurt made from buffalo milk +3%skim milk
 T 4: yoghurt made from buffalo milk +1%retentate powder
 T5: yoghurt made from buffalo milk +2%retentate powder
 T6: yoghurt made from buffalo milk +3%retentate powder

Table (9) Microbiological properties of Yoghurt fortified with skim milk powder and retentate powder after 7 days of storage in 4-5° C.

Test Treatment	T.C $10^4 \times$	Lipolytic $10^3 \times$	Protolytic $10^3 \times$	M&Y $10^3 \times$	E.coli $10^3 \times$	Staph. $10^3 \times$
CN	80	12	19	-	-	-
T1	99	3	22	-	-	-
T2	109	6	25	-	-	-
T3	111	4	26	-	-	-
T4	109	2	46	-	-	-
T5	117	1	55	-	-	-
T6	98	2	66	-	-	-

From Tables (8,9 and 10) it is obvious that the total count and protolytic bacteria increased during storage, but Libolytic bacteria decreased during storage. However , coliform, Molds, yeasts and staphylococcus spp were not detected, whether in fresh or stored yoghurt made from buffalo milk fortified by different levels of skim milk and retentate.

Data presented in Tables (11,12and 13) show that total count and protolytic bacteria increased during storage, but Libolytic bacteria decreased during storage . However , coliform ,molds, yeasts and staphylococcus spp were not detected, whether in fresh or stored yoghurt made from retentate fortified by different levels of skim milk and retentate.

Data presented in Tables (14,15 and 16)show that yoghurt made from buffalo milk+1% Retentate had the highest organoleptic- scoring points whether ,when it was fresh or after cold storage for 7 or 14 days. It had 81when it was fresh and 91 and 96 after 7and 14 days of storage ,respectively .

Table(10) Microbiological properties of Yoghurt fortified with skim milk powder and retentate powder after 14 days of storage in 4-5° C.

Test Treatment	T.C 10 ⁴ x	Lipolytic 10 ³ x	Protolytic 10 ³ x	M&Y 10 ³ x	E.coli 10 ³ x	Staph. 10 ³ x
CN	95	2	26	-	-	-
T1	101	1	24	-	-	-
T2	120	3	28	-	-	-
T3	131	1	28	-	-	-
T4	118	1	52	-	-	-
T5	125	-	62	-	-	-
T6	112	-	75	-	-	-

Table (11) Microbiological properties of Yoghurt fortified with skim milk powder and retentate powder.

Test Treatment	T.C 10 ⁶ x	Lipolytic 10 ³ x	Protolytic 10 ³ x	M&Y 10 ³ x	E.coli 10 ³ x	Staph. 10 ³ x
CR	79	2	9	-	-	-
T1"	87	2	6	-	-	-
T2"	96	2	4	-	-	-
T3"	97	2	3	-	-	-
T4"	51	1	2	-	-	-
T5"	44	-	3	-	-	-
T6"	68	-	6	-	-	-

(CR)control: yoghurt made from retentate
 T1": yoghurt made from retentate+1%skim milk
 T2": yoghurt made from retentate+2%skim milk
 T3": yoghurt made from retentate+3%skim milk
 T 4": yoghurt made from retentate+1%retentate powder
 T5": yoghurt made from retentate+2%retentate powder
 T6": yoghurt made from retentate+3%retentate powder

Table (12) Microbiological properties of Yoghurt fortified with skim milk powder and retentate powder after 7 days of storage in 4-5° C.

Test Treatment	T.C 10 ⁶ x	Lipolytic 10 ³ x	Protolytic 10 ³ x	M&Y 10 ³ x	E.coli 10 ³ x	Staph. 10 ³ x
CR	80	2	13	-	-	-
T1"	99	1	11	-	-	-
T2"	109	3	11	-	-	-
T3"	111	1	20	-	-	-
T4"	109	-	38	-	-	-
T5"	117	-	45	-	-	-
T6"	98	-	56	-	-	-

Table (13) Microbiological properties of Yoghurt fortified with skim milk powder and retentate powder after 14 days of storage in 4-5° C.

Test Treatment	T.C 10 ⁶ x	Lipolytic 10 ³ x	Protolytic 10 ³ x	M&Y 10 ³ x	E.coll 10 ³ x	Staph. 10 ³ x
CR	95	2	91	-	-	-
T1"	101	1	18	-	-	-
T2"	120	3	25	-	-	-
T3"	131	1	26	-	-	-
T4"	118	-	46	-	-	-
T5"	125	-	55	-	-	-
T6"	112	-	66	-	-	-

Table (14) Organoleptic properties of yoghurt from buffalo milk fortified with skim milk powder and retentate powder.

Treatments	Appearance 10	Body & Texture 40	Flavor 50	Total 100
CN	3	32	35	70
T1	7	30	32	69
T2	8	30	41	79
T3	9	28	40	77
T4	7	31	43	81
T5	7	30	40	77
T6	7	30	42	79

(CN) control: yoghurt made from buffalo milk
 T1: yoghurt made from buffalo milk +1%skim milk
 T2: yoghurt made from buffalo milk +2%skim milk
 T3: yoghurt made from buffalo milk +3%skim milk
 T4: yoghurt made from buffalo milk +1%retentate powder
 T5: yoghurt made from buffalo milk +2%retentate powder
 T6: yoghurt made from buffalo milk +3%retentate powder

Table (15) Organoleptic properties of yoghurt from buffalo milk fortified with skim milk powder and retentate powder after 7 days of storage in 4-5° C.

Treatments	Appearance 10	Body & Texture 40	Flavor 50	Total points 100
CN	7	28	49	84
T1	7	32	42	81
T2	7	39	39	85
T3	8	39	42	89
T4	9	37	44	91
T5	6	36	39	81
T6	10	39	40	89

From Tables (17,18 and 19)show that yoghurt made from retentate +3% retentate powder had the highest organoleptic- scoring points whether ,when it was fresh or after cold storage for 7 or 14 days. It had 81when it was fresh and 89 and 92 after 7and 14 days of storage, respectively .

Table (16) Organoleptic properties of yoghurt from buffalo milk fortified with skim milk powder and retentate powder after 14 days of storage in 4-5° C.

Treatments	Appearance 10	Body & Texture 40	Flavor 50	Total points 100
CN	7	30	37	74
T1	5	37	40	82
T2	8	37	40	85
T3	8	35	45	88
T4	9	38	49	96
T5	9	36	45	90
T6	9	38	47	94

Table (17) Organoleptic properties of yoghurt made from retentate fortified with skim milk powder and retentate powder.

Treatments	Appearance 10	Body & Texture 40	Flavor 50	Total points 100
CR	5	30	30	65
T1"	5	30	35	70
T2"	5	28	40	73
T3"	5	34	40	79
T4"	4	31	40	75
T5"	4	30	44	78
T6"	6	32	43	81

(CR)control: yoghurt made from retentate

T1": yoghurt made from retentate+1%skim milk

T2": yoghurt made from retentate+2%skim milk

T3": yoghurt made from retentate+3%skim milk

T4": yoghurt made from retentate+1%retentate powder

T5": yoghurt made from retentate+2%retentate powder

T6": yoghurt made from retentate+3%retentate powder

Table (18) Organoleptic properties of yoghurt fortified with skim milk powder and retentate powder after 7 days of storage in 4-5° C.

Treatments	Appearance 10	Body & Texture 40	Flavor 50	Total points 100
CR	8	31	45	84
T1"	8	27	43	78
T2"	6	36	39	81
T3"	7	29	49	85
T4"	6	31	44	81
T5"	9	29	45	83
T6"	8	38	43	89

Table (19) Organoleptic properties of yoghurt fortified with skim milk powder and retentate powder after 14 days of storage in 4-5° C.

Treatments	Appearance 10	Body & Texture 40	Flavor 50	Total points 100
CR	7	34	45	86
T1"	7	32	40	79
T2"	6	36	41	83
T3"	7	35	43	85
T4"	8	35	45	88
T5"	7	33	43	83
T6"	9	37	46	92

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تأثير تدعيم الألبان المختمرة المصنعة من اللبن الجاموسى و مركز اللبن باللبن
الفرز المجفف و مركز اللبن المجفف على جودة الألبان المختمرة.
محمد شلبي جمعة ، السيد شوقي السكرى، محمد يونس مهني و
محمد السوقي عبد العزيز
قسم الألبان- كلية الزراعة- جامعة المنصورة - المنصورة- مصر

عند صناعة اللبن المختمر من اللبن الجاموسى و مركز اللبن بعد تعديله لنفس تركيب
اللبن الجاموسى مع تدعيمه بمستويات مختلفة من اللبن الفرز المجفف و مركز اللبن المجفف
أثبتت النتائج ارتفاع جودة الألبان المختمرة من الناحية الكيميائية و البكتريولوجية و الحسية عند
صناعتها من اللبن الجاموسى المدعم بـ ١% مركز لبن مجفف و كذلك عند صناعتها من مركز
اللبن المدعم بمركز لبن مجفف بنسبة ٣% .

قام بتحكيم البحث

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