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TECHNOLOGICAL AND CHEMICAL STUDY ON WHITE CHEESE (QUESO BLANCO)
II- EFFECT OF TYPE OF MILK ON THE QUALITY OF QUESO BLANCO CHEESE

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ABSTRACT

Milk of 3% fat was processed into Queso Blanco cheese namely, cows'(C) milk (T1), buffaloes (B) milk (T2), admixture of cows' and buffaloes milk 1:1 (T3), C+B 3:1 (T4), C+B 1:3 (T5) and cows milk with 1% skim milk powder (SMP) (T6), 2% SMP (T7) and 4% SMP (T8). The resultant cheese were kept at refrigerator at 5 ± 2 Cº for 21 days. Samples of fresh, 7, 14 and 21 days were chemically, microbiologically and organoleptically analyzed. Fat losses into whey was higher in SMP whey, while TN was higher in cows' milk and SMP whey as compared with cows' milk whey. Buffaloes milk and admixture containing buffaloes milk had higher yield as compared with cows' milk cheese, also, SMP had higher yield as compared with cows' milk cheese only. The addition of SMP to cows' milk increased acidity, total solids, lactose and total nitrogen. Buffaloes milk and their admixtures had less acidity and moisture content values and higher TN and lactose content. Fat content of cows milk cheese was higher than buffaloes milk cheese and SMP cheese.

Ripening indices SN/TN, NPN/TN and TVFA were higher in cows' milk cheese as compared with buffaloes' milk cheese as well, the addition of 1% SMP increased the ripening indices while 2 or 4 % SMP decreased such indices in cheese. For all treatments as storage period advanced Fat/DM, TN/DM, acidity and ripening indices increased while yield and pH decreased. Although the cheese produced from heated milk at 85Cº/for 20 minutes. Total bacterial counts increased as storage period advanced, buffaloes milk and SMP cheese had the higher (TC) and Moulds & yeasts. Organoleptic scoring showed that cows milk cheese had highest scoring points, as the percentage of buffaloes milk increased the cheese gained less scoring points, the addition of 2% SMP led to accepted Queso Blanco cheese. It is recommended to process this type of cheese from cows milk, and if buffaloes milk was added, should be only C+B (3:1) and if SMP is necessary to be added preferably to be 2%.

INTRODUCTION

Queso Blanco cheese is the generic name for white, semi-soft cheese produced in Central and South Latin America. Queso Blanco cheese processed by heating standardized milk to 80Cº or more then acid was added and gently agitated until completed coagulation been occurred (Robinson and Tamime, 1991). The cheese is freshly consumed, it is distinguished by creamy taste, highly salted and acid in flavour (Kosikowski, 1966). Also it is used for filling cheese cakes and pies. It could be sliced for sandwich use.

The relatively high temperature applied for acid / heat coagulation process overcomes problem of high contaminated milk in addition to its simple manufacture procedure which certifies Queso Blanco cheese for producing in the tropical countries. In Egypt major amount of Ricotta are

imported for the purpose of processing pies, cheese cakes and different bakeries. Queso Blanco cheese is normally processed from whole cows milk or skim milk. The present work has been planned to investigate the possibility of manufacturing Queso Blanco cheese from different type of milk using lactic acid to find out the best of them which fit Egyptian consumer's taste.
The following 3% fat milk treatments are follows:
Cows' milk (T1), Buffaloes milk (T2), C+B 1:1 (T3), C+B 3:1 (T4), C+B 1:3 (T5), C+ 1% skimmilk powder (SMP) (T6), C+ 2% SMP (T7) and C+4% SMP (T8).

MATERIALS AND METHODS

Buffaloes and cows milk used in the present study were obtained from the herds of El-Gemmeiza, Animal Production Research Station Ministry of Agriculture, Egypt. Skimmilk powder was bought from local market, (Imported from New-Zealand). Acidulants lactic acid edible grade was bought from El-Gomhoria Company for Chemical, Cairo, Egypt. Starter used was obtained from Ch. Hansen Laboratories Denmark Lypholiszed starter culture of *Streptococcus saliverus* sub sp *thermophilus* and *Lactobacillus delprukii* sub sp *bulgaricus* (1:1) were separately activated by culturing in 15% reconstituted skim milk. Fine salt was obtained from "El-Nasr Company of Alexandria Egypt".

Cheese making : The method adopted for making Queso Blanco cheese was recommended by Kosikowski, (1966) and modified as follows. 3% fat cows or buffaloes milk were used. The lactic acid was diluted 1:3 then separately added to the heated milk at 85 Cº stirring three minutes for complete coagulation then 3% salt were added, the curd was left at the temperature for 15 minutes filled in special allumonium hoops, pressed by a weight equal to 50% of the milk weight. The following day the cheese is stored at refrigerator at 5 ± 1Cº for 21 days.

Cheese samples were examined for the moisture, fat content, total nitrogen (TN), soluble nitrogen (SN) non protein nitrogen (NPN), pH value and titratable acidity, according to the methods described by Ling (1963). Salt content was estimated according to the method described by Kosikowski (1979). Total volatile fatty acids (TVFA) was determined according to Ostoewx et al (1958) with some modification described by El-Nemre (1968). Lactose content was determined as given by Barnett and Abd EL-Twab (1957). Total bacterial count were achieved according to Difco Manual (1971). Moulds & Yeasts counts were determined using malt extract agar medium Pitt (1979). The organoleptic properties of cheese were evaluated according to method of Scott (1981).
Cheese samples were chemically, microbiologically and organoleptically analysed for fresh, 7, 14 and 21 days old cheese.

RESULTS AND DISCUSSION

From Table (1) it is clear that, the addition of buffaloes milk to other types of milk raised the total solids (TS) of the mixture also as SMP increased the total solids of the blend increased, while the pH and fat value decreased.

Table (1): Chemical composition of different milks cheese.

Composition	Type of milk							
	T1	T2	T3	T4	T5	T6	T7	T8
Acidity %	0.17	0.18	0.18	0.18	0.19	0.18	0.19	0.21
pH	6.41	6.35	6.35	6.39	6.26	6.52	6.33	6.24
TS %	11.53	13.07	12.39	12.03	12.56	12.65	13.47	15.24
Fat %	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
TP %	2.94	4.58	3.64	3.21	4.20	3.81	4.21	5.08
Lactos %	4.40	5.20	4.80	5.00	4.60	4.96	5.33	6.51

T1= Cows milk (C) T2= Buffaloes milk (B) T3= C+B 1:1 T4=C+B 3:1 T5=C+B 1:3 T6=C +1%SMP T7= C+2%SMP T8= C +4% SMP

From Table (2), cows' milk whey had higher Ts as compared with buffaloes' milk whey (T2). As the percentage of SMP increased, the total solids of its whey also increased. Fat losses in whey was highest (0.72%) for 4% SMP treatments, while the lowest was for cows' milk whey (0.54%). The TN/DM values ranged between 0.803 and 1.294%. On the other hand acidity values were the highest for cows' milk + SMP samples. Humphreys and Planket (1969) found that, an increase in the titratable acidity and reduction in the coagulation time due to the addition of skim milk powder (SMP). Hassan (1993) showed that as reconstitution of powder milk increased the acidity increased proportionally.

Table (2): Gross composition of released whey.

Composition	Treatments							
	T1	T2	T3	T4	T5	T6	T7	T8
Acidity %	0.42	0.27	0.31	0.37	0.23	0.44	0.47	0.51
pH	5.17	5.55	5.43	5.28	5.60	5.13	5.05	4.96
TS %	6.95	6.47	6.61	6.81	6.59	6.97	7.17	7.31
Fat %	0.54	0.67	0.60	0.57	0.62	0.64	0.69	0.72
Fat/DM %	7.76	10.35	9.07	8.37	9.40	9.18	9.62	9.84
TN %	0.090	0.052	0.058	0.065	0.075	0.075	0.089	0.095
TN/DM %	1.294	0.803	0.877	0.954	1.138	1.070	1.240	1.290

Table (3) illustrates with the yield, moisture, acidity and PH values of different cheeses. Buffaloes milk cheese had the highest (16.25%) yield, while cows milk cheese had the lowest yield (12.50%), as the percentage of buffaloes milk increased in the blend the yield gradually increased for T3 (14.68%). On the other hand the incorporation of skim milk powder to cows milk increased the yield of cows milk cheese, as the SMP % increased the yield increased being 12.87, 13.25 and 14.27 % for T6, T7, and T8 respectively. In general as storage period progressed the yield of the cheese decreased. After 21 days of storage yield of cheese reached 11.58, 15.75, 14.25, 12.37, 14.64, 12.43, 12.77 and 13.55% for T1, T2, T3, T4, T5, T6, T7

and T8 respectively. Nawar (1986) found an opposite trend for Edam cheese made from cows milk fortified with 1, 2 and 4% skim milk powder. Moisture content of cows milk cheese was higher (57.2%) than those of buffaloes milk cheese (53.59%). As the percentage of cows' milk increased (T4) the moisture content of the blend (B+C) increased (56.44%). The addition of SMP to cows milk decreased the moisture content of the resultant cheese, being 56.67, 55.41 and 54.75 % for T6, T7 and T8 treatments respectively. The type of milk had marked effect on the moisture content of different cheeses, as the total solids of the milk increased the total solids of the cheese also increased. Concerning acidity and pH values of cheese (Table 3). For all treatments as the storage period increased, the acidity increased and the pH decreased. Although all type of milks were acidified with the same amount of lactic acid, the acidity varied between (0.41 and 0.55%) for fresh cheese, and (0.50 and 0.69%) for 21 days old cheese. Hefnawy et al (1984) and Nawar (1986) found an increase in the acidity of the cheese as the rate of added skim milk powder increased and explained the data by the higher lactose content in skim milk powder, which led to more lactic acid production. Omar (2001) found higher acidity, when 2% skim milk powder was added to milk for Kareish like-cheese production. pH value took opposite trend of acidity values and also skim milk powder had the lowest pH values.

Table (3):Effect of type of milk on gross composition of resultant cheese during cold storage.

Composition	Storage period (days)	Treatments							
		T1	T2	T3	T4	T5	T6	T7	T8
Yield %	Fresh	12.50	16.25	14.68	13.00	15.12	12.87	13.25	14.27
	7	12.37	16.00	14.62	12.87	15.06	12.71	13.12	14.00
	14	12.12	15.85	14.43	12.68	14.82	12.55	12.95	13.73
	21	11.85	15.75	14.25	12.37	14.62	12.43	12.77	13.55
Moisture %	Fresh	57.25	53.59	55.21	56.44	54.71	56.67	55.41	54.75
	7	56.67	53.26	54.65	56.06	54.39	56.28	54.72	54.38
	14	56.21	52.71	54.18	55.52	54.11	55.85	54.07	54.12
	21	55.89	51.45	53.83	54.81	53.35	55.46	53.59	53.68
Acidity %	Fresh	0.55	0.41	0.46	0.50	0.42	0.43	0.49	0.55
	7	0.58	0.43	0.47	0.52	0.45	0.47	0.53	0.56
	14	0.60	0.47	0.51	0.57	0.49	0.50	0.58	0.62
	21	0.64	0.50	0.53	0.60	0.55	0.56	0.65	0.69
pH	Fresh	5.22	5.35	5.36	5.30	5.39	5.36	5.30	5.19
	7	5.19	5.32	5.34	5.27	5.37	5.30	5.22	5.06
	14	5.17	5.25	5.28	5.21	5.33	5.23	5.17	4.98
	21	5.11	5.21	5.20	5.16	5.27	5.19	5.08	4.83

Table (4) shows fat, TN, lactose and salt contents of different cheeses as affected by the type of milk. Although fat content of different milks were standardized to 3% resultant cheese had different fat content either for fresh or ripened cheese. The marked observation is the less fat content of cheese made from buffaloes milk F/DM (31.20%) or admixture of T5 F/DM (32.67%), while cows milk cheese T1 had the highest fat content F/DM (38.83 %). This observation can be explained by the larger fat globules of buffaloes milk than cows milk, and from Table (2), losses of fat in whey was higher in

buffaloes milk whey as compared with cows milk whey. From the same Table (4) it is clear that, as the percentage of SMP increased the Fat/DM decreased, this owing to the increase in total solids Omar (2001). For all treatments as storage period advanced, F/DM% content increased. This apparent increase is owing to the increase in TS of the cheese. Contrary to fat content, TN of cheese from buffaloes milk is higher than those of cows' milk and this is well known that buffaloes milk had higher protein content as compared with cows milk. On the other hand, the addition of SMP raised the TN/DM values, as well as the percentage of SMP increased TN/DM values paralelly increased. This may be explained that about 45% of SMP contents are proteins. Also as storage period advanced slight increase in TN/DM was observed. Lactose content of different cheese ranged between 5.12 and 7.93 % as lactose/DM, the higher values were for cheese containing SMP. It is well known that about 50% of SMP contents are lactose. As storage period advanced, lactose/DM values decreased, this is may be due to the lactose hydrolysis by LAB, Hefnawy et al (1984). The obtained results are in agreement with those observed by El-Hofi et al, (1970), El Abd et al, (1992) and El-Shafie et al, (1995). The type of milk had slight effect on the salt of different cheese, salt in moisture for fresh cheese ranged between 3.91 and 4.35%, these values slightly increased as storage period advanced. The addition of powder had no marked effect on the salt/moisture content.

Table (4): Fat, Lactose, Salt and TN content of cheese during cold storage.

Composition	Storage period (days)	Treatments							
		T1	T2	T3	T4	T5	T6	T7	T8
Fat/DM %	Fresh	38.83	31.20	33.93	36.27	32.67	37.61	35.65	33.59
	7	39.00	31.23	34.39	36.41	32.88	37.96	35.77	33.75
	14	39.27	31.71	34.70	36.87	33.34	38.50	36.14	34.43
	21	39.90	31.92	35.52	37.61	33.86	38.84	36.84	34.54
TN/DM %	Fresh	7.23	8.19	7.80	7.64	8.13	7.36	7.45	7.72
	7	7.30	8.28	7.88	7.73	8.19	7.43	7.53	7.80
	14	7.41	8.68	7.96	7.87	8.28	7.53	7.60	7.90
	21	7.54	8.63	8.04	7.92	8.35	7.61	7.67	8.05
Lactose/DM%	Fresh	5.12	6.01	5.49	5.34	5.63	6.16	6.75	7.93
	7	4.96	5.77	5.33	5.16	5.45	5.90	6.53	7.80
	14	4.74	5.56	5.08	4.96	5.22	5.66	6.29	7.58
	21	4.57	5.14	4.93	4.73	4.99	5.45	6.03	7.36
Salt in moisture %	Fresh	3.91	4.62	4.22	4.00	4.35	4.11	4.13	4.10
	7	4.02	4.69	4.28	4.08	4.44	4.26	4.29	4.19
	14	4.10	4.81	4.41	4.21	4.58	4.35	4.43	4.32
	21	4.32	5.05	4.53	4.39	4.74	4.50	4.60	4.45

Table (5) included the ripening indices of the cheese during 21 days of storage. The type of milk had marked effect on the SN, NPN and TVFA. In general, SN/TN is very high for cows' milk cheese (7.6%) as compared with milk cheese (3.34%) as the buffaloes milk ratio increased in the blend, the SN/TN % decreased T5 (4.12%) on the other hand the addition of SMP increased the protein hydrolysis T6 (8.39%), when SMP increased the SN/TN started to decrease 6.5 and 5.64% for T7 and T8 respectively. As the storage

period increased, SN/TN gradually increased. Abdel-Kader (1993) found the same trend for protein cows milk and their mixtures. He reported that cows milk cheese showed higher values for SN and NPN than mixed milk and buffaloes milk cheese. Non protein nitrogen (NPN) behaved similarly to SN, the lowest value of NPN/TN always higher for cows milk cheese and very small for buffaloes milk cheese and their blends-Low level of SMP raised the NPN, while high percentage of SMP did not encourage proteolysis. Hefnawy et al, (1984) reported that, proteolysis increased in cheese with low ratio of skim milk powder than higher ratio. Omar and Buchheim (1983) reported that SN/TN% of Gouda cheese was less in dried milk cheese than in fresh milk cheese. Total volatile fatty acids (TVFA) which considered as an indicator for cheese ripening, cows milk cheese gave higher TVFA values than buffaloes milk cheese. All treatments showed increase in TVFA as storage time progressed. At the end of storage (21 days) the difference in TVFA content was 8.4 between cows and buffaloes milk cheese. This increase in TVFA during storage in both cows and mixed milk cheese confirmed the results obtained by Grigorov (1967); Nasr (1980) and Abdel-Kader (1981). The TVFA content (Table 5) also proportionally decreased as the amount of skim milk powder increase. A similar trend of result was found by Nawar (1986) for the fresh cheese.

Table (5): Effect of type of milk on the ripening indices of the cheese.

Composition	Storage period (days)	Treatments							
		T1	T2	T3	T4	T5	T6	T7	T8
SN/TN %	Fresh	7.60	3.34	5.18	6.04	4.12	8.39	6.55	5.46
	7	8.16	3.90	5.54	6.71	4.66	8.76	7.06	6.12
	14	8.38	4.24	6.17	7.20	5.29	9.29	7.67	6.75
	21	9.29	5.36	6.81	7.68	6.03	9.90	8.56	7.18
NPN/TN %	Fresh	4.88	1.76	3.14	3.81	2.56	5.26	3.93	2.69
	7	5.66	2.17	4.11	4.45	3.13	5.87	4.60	3.28
	14	6.19	2.72	4.69	5.09	3.71	6.55	5.26	3.88
	21	6.76	3.46	5.24	5.61	4.72	7.42	6.03	4.50
TVFA %*	Fresh	18.00	8.80	10.00	12.00	15.20	15.50	12.00	8.00
	7	20.00	12.00	12.80	14.80	17.60	16.00	15.20	12.00
	14	23.20	15.20	16.00	17.20	20.00	19.20	20.00	16.80
	21	28.00	19.60	19.20	20.00	21.20	25.20	28.20	22.00

***ml 0.1 N NaOH /100gm. Cheese**

Concerning cows, buffaloes milk and blends of both, results of the organoleptic judging (Table 6) indicated that, sensory evaluation scores of different treatments of Queso Blanco cheese gave higher scores by storage. The cows milk cheese gained higher score than buffaloes milk cheese. This might be attributed to the slower breakdown of buffaloes milk protein. Concerning appearance, the buffaloes milk cheese scored higher degrees because of the whiteness and the brightness of this cheese. Also the consumers like white colored of soft cheese. The addition of buffaloes milk to cows milk decreased the score points of body & texture. Many investigators found body & texture of buffaloes milk cheese was usually hard more than cows milk cheese (Abdel-Kader, 1993; El-Zoghby, 1994 and Ismail, 2001).

Concerning flavour of cheese, the flavour of cows milk cheese and that of higher cows milk cheese (3:1) has more acceptable than those contained higher buffaloes milk. At the end of storage cows milk cheese gained 88 points and (T4) milk cheese gained 84 points, while buffaloes and (T5) cheese gained only 74 points over total score 100 respectively. Concerning SMP cheese, the highest scoring points gained by samples of 1% SMP followed by 2% and lastly for those of 4%. This means that as the amount of added skim milk powder increased the lowest quality of cheese had reported. At the end of storage the score points 88, 78, 83, and 73 were obtained for T1, T6, T7 and T8, respectively. Similar results were obtained by Nawar (1986) who used the same skim milk powder percentage of Edam cheese experiments. More hard body & texture was observed when percentage of added skim milk powder was increased, 6 for 10 Judgers detected cooked flavour in T7 and T8 cheese. Also as the skim milk powder increased the yellow color could be detected esailly. An adverse trend was stated by Omar (2001) for Kariesh like –cheese. He found that the highest score revealed samples of added 2% skim milk powder. The same table reveals that adding of skim milk powder at all levels decreased the flavour score compared with the control (T1) treatment. On the other hand, a highly increase was observed in all treatments by improving the storage period. In the light of data in the same table 2%SMP had the best sensory evaluation score for the fresh, 7, 14 and 21 days of storage period as compared with other SMP treatments. As conclusion, it is recommended to process Queso Blanco cheese from cows milk and if buffaloes milk was added, it should be at low percentage not exceed 30%. On the other hand if SMP was added, it should be exceed 1% with cows' milk.

Table (6): Organoleptic properties of cheese as affected by type of milk.

Organoleptic properties	Storage period (days)	Treatments							
		T1	T2	T3	T4	T5	T6	T7	T8
Appearance(15)	Fresh	12	14	14	13	13	11	12	11
Body&Texture (35)		29	18	22	25	20	26	27	24
Flavure (50)		38	25	30	35	28	30	32	30
Total (100)		78	57	66	73	61	67	71	65
Appearance(15)	7	11	13	13	12	12	11	12	10
Body& Texture (35)		30	20	25	27	23	27	28	26
Flavure (50)		40	28	33	37	31	34	36	32
Total (100)		81	61	71	76	66	72	76	68
Appearance(15)	14	10	12	12	11	11	10	11	10
Body& Texture (35)		33	23	27	29	26	28	29	27
Flavure (50)		43	30	35	39	33	36	39	33
Total (100)		86	65	74	79	70	74	79	70
Appearance(15)	21	9	12	11	11	10	10	10	9
Body& Texture (35)		34	27	31	30	28	28	30	27
Flavure (50)		45	34	38	41	36	40	43	37
Total (100)		88	73	80	82	74	78	83	73

Table (7) deals with enumeration of total bacterial count (TC) and Moulds& Yeasts for different cheese during 21 days of storage period. The total bacterial count found in cheese seams to be caused by recontamination

during processing and packing of the cheese. The storage led to a gradual increase in this bacteria at 4 ± 1 Cº. Abdel-Kader (1993) found that, direct acidification decreased the number of the starter bacteria. On the other hand the addition of SMP increased both, bacterial count and Moulds & Yeasts. This is may be due to the presence of such growth factors in SMP which be formed drying process. Hassan (1995) found more lactic acid bacteria in 12% reconstituted milk than fresh milk. Omar (2001) found great increase in total bacterial count and lactic acid bacteria in Kareith like-cheese when 2 % SMP were added to milk. Results also cleared that the (TC) and Moulds & Yeasts increased by increasing storage period. That increased found in Mould count may be due to the corresponded increase in cheese acidity along storage period (Omar, 2001).

Table (7): Effect of type of milk on the total microbial count (TC) and Moulds & Yeasts.

Microbiological properties	Storage period(days)	Treatments							
		T1	T2	T3	T4	T5	T6	T7	T8
T.C	Fresh	$5.59x10^4$	$7.99x10^4$	$8.60x10^4$	$6.21x10^4$	$6.92x10^4$	$6.09x10^4$	$9.87x10^4$	$12.25x10^4$
	7	$7.10x10^4$	$9.76x10^4$	$11.82x10^4$	$7.39x10^4$	$9.20x10^4$	$9.36x10^4$	$12.92x10^4$	$15.76x10^4$
	14	$11.98x10^4$	$11.08x10^4$	$13.91x10^4$	$12.11x10^4$	$13.67x10^4$	$13.19x10^4$	$15.11x10^4$	$17.34x10^4$
	21	$13.72x10^4$	$15.26x10^4$	$16.57x10^4$	$15.53x10^4$	$17.40x10^4$	$18.63x10^4$	$19.26x10^4$	$22.69x10^4$
Moulds& Yeasts	Fresh	ND	ND	ND	ND	ND	ND	ND	ND
	7	$2.15x10^2$	$4.93x10^2$	$3.62x10^2$	$3.13x10^2$	$4.00x10^2$	$2.40x10^2$	$4.34x10^2$	$5.90x10^2$
	14	$3.42x10^2$	$7.82x10^2$	$5.11x10^2$	$5.72x10^2$	$7.32x10^2$	$5.18x10^2$	$5.62x10^2$	$7.52x10^2$
	21	$5.11x10^2$	$9.20x10^2$	$6.36x10^2$	$7.67x10^2$	$8.53x10^2$	$6.63x10^2$	$9.23x10^2$	$10.34x10^2$

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دراسات تكنولوجية وكيماوية عل الجبن الأبيض (الكويزوبلانكو)
II- تأثير نوع اللبن على جودة الجبن الكويزوبلانكو

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يعتبر الجبن الكويزوبلانكو Queso Blanco من أشهر أنواع الجبن الأبيض التي تصنع في أمريكا اللاتينية وهي تصنع بطريقة التجبن الحمضي الحراري وهي عادة ما تصنع من اللبن البقري أو اللبن البقري الفرز ويتوقع رواج لهذا النوع من الجبن في مصر حيث ارتفاع الحمولة الميكروبية في الألبان المصرية فعند تحميض اللبن وتسخينه على درجة حرارة ٨٥ م° لمدة ٢٠ دقيقة كما في طريقة التصنيع لهذا النوع من الجبن تكون كافية للقضاء على جميع الميكروبات المرضية وإذا ما تم تصنيعها بدون ملح يمكن أن تستخدم في تجهيز كثير من المخبوزات والحلوى وغالبًا ما يستخدم هذا الجبن طازجًا ويتميز بمذاق كريمي ونكهة حامضية.

ويهدف هذا البحث إلى استخدام أنواع مختلفة من اللبن في تصنيع هذا النوع من الجبن وفي هذا البحث تم استخدام ثلاثة أنواع من اللبن وعمل خلطات منها هي: لبن بقري ٣% دهن (T1)، لبن جاموسي ٣% دهن (T2) مخلوط لبن بقري + جاموسي ١:١ (T3) ، لبن بقري + جاموسي ٣: ١(T4) ، لبن بقري + جاموسي ٣:١ (T5) كما استخدم ١، ٢، ٤ % لبن فرز جاف أضيفت إلى اللبن البقري ٣% دهن T6، T7، T٨ على التوالي وتم استخدام حامض اللاكتيك في التصنيع حتى pH (٤,٦- ٥,٢) وبعد تمام التجبن الحراري على ٨٥ م° تم إضافة ٣% ملح من وزن اللبن ثم حفظت الجبن في الثلاجة لمدة ثلاثة أسابيع وتم أخذ العينات طازجة، ٧، ١٤، ٢١ يوم وتم تحليلها كيماويًا وميكروبيولوجيا وحسيًا، ويمكن تلخيص النتائج فيما يلي:

الجوامد الكلية للشرش الناتج في اللبن البقري أعلى من مثيلاتها في اللبن الجاموسي وكذلك أعلى في الحموضة وأقل في رقم PH والدهن في الشرش الجاموسي أعلى من البقري أما اللاكتوز فكان أعلى في الشرش الناتج من لبن بقري مضاف إليه لبن فرز جاف. وكانت التصافي أعلى في جبن اللبن الجاموسي عن البقري وبالتالي الرطوبة في الجبن البقري أعلى منها في جبن اللبن الجاموسي وكذلك نسبة الدهن أعلى ولكن نسبة البروتين أعلى في جبن اللبن الجاموسي واللاكتوز كان أعلى في الجبن المصنع من لبن جاموسي وجبن اللبن البقري المضاف إليه لبن فرز جاف كما أدت إضافة اللبن الفرز الجاف إلى تقليل نسبة الدهن في الجبن الناتج.

دلائل التسوية النيتروجين الذائب (SN) والنيتروجين الفيربروتيني (NPN) والأحماض الدهنية الطيارة (TVFA) أعلى في الجبن البقري وجبن اللبن البقري المضاف إليه لبن فرز جاف.

ولوحظ تزايد في الأعداد الميكروبية مع التخزين ولم تظهر مستعمرات الفطريات والخمائر في الجبن الطازج وكانت الأعداد الميكروبية في جبن اللبن الجاموسي أعلى من جبن اللبن البقري وزادت الأعداد الميكروبية في الجبن البقري المضاف إليه اللبن الفرز الجاف.

حصل الجبن البقري على أعلى درجات التحكيم بينما الجبن الجاموسي حصل على أقل الدرجات في الجودة الحسية من حيث القوام والتركيب والمظهر والنكهة كما حصل الجبن البقري المضاف إليه لبن فرز جاف على درجات تحكيم أقل من جبن اللبن البقري وكان أفضلها عند إضافة ٢% لبن فرز جاف بينما أعطت الجبن البقري المضاف إليها ٤% لبن فرز جاف أقل جودة.