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Technology for Carbonated Lemon whey Beverage

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Abstract:Whey isthe largestand extremely alimentary byp roductobtained throughout producing of cheese, chhanna and paneer. For alimental and economic utilization of whey, technology for carbonated lemon beverage was developed by optimizing the speed of addition of juice i.e. 4.0 %, 4.5 %, 5.0 % and 5.5 % try to sugar levels i.e. 8 %, 10% and12%. Thecommon totalsolids(%), macromolecule (%),ash(%), antioxidant (mg/100g) and total soluble solids (%) content in whey liquid varied from 14.47 to 18.45, 0.46 to 0.49, 1.03 to 1.09, 7.19 to 14.68 and 15.00 to 18.83 severally. the very best mean several 8.25, 8.16, 8.21, 8.20and 8.29 certain consistency, flawed and sweetness/ tartnesbalanceandoverall acceptableness wereobtainedwit hinteraction result of L2 × S2 (4.5 yellow granadilla juice and ten the troubles sugar). Most acceptable carbonated leman beverage had time period of forty-nine day sat cold temperature (7±10 ℃).

Keywords:-Paneer Whey, Lemon, Carbonation.

I. INTRODUCTION

Whey is one in every of the most important alimentary by-product obtained from the dairy farm business manufacturing cheese, chhana and paneer. Composition and characteristics of whey varies betting on the applied production technology and also the style of final result (Jelicic et al., 2008). Whey contains concerning five hundredth of the nutrientsoriginally gift inmilk,comprising disaccharide (lactos e), bodily fluid proteins (whey proteins), minerals, little quantity of fat and most of the water soluble minor nutrients from milk (vitamins) (Meera et al., 2014). Whey is a superb supply of high biological price macromolecule that may be a complete, top quality macromolecule with a fashionable organic compound profile. Whey contains several organic and inorganic parts which might replace a lot of of the loss of electrolytes, vitamins, amino acids and different organic parts (Deepa and Krishnaprabha, 2014). Conversion of whey into liquid is one in every of the foremost enticing avenues for utilizing whey for human consumption (Nupur and Gandhi, 2009; Sonali and Geeta, 2014).

Beverages give energy and water to digest food, regulate blood heat, stop dehydration, quench thirst and take away psychological tensions (Shaikh et al. 2001).Whey beverages are recognized as a real thirst quencher, light, refreshing, healthful and alimentary (Landge and Gaikwad, 2013). Process of whey to beverages began within the 1970, and one in every of the oldest whey beverages was 'Rivella' from European country. Then when numerous varieties of whey beverages has been developed, that ar made from native sweet or acid whey, deproteinized whey, recent diluted whey, soured whey or powdery whey (Jelicic et al., 2008).

Approximately seventy fifth of the world's population loses thisabilityatsome purpose, whereas others will digest milksuga r into adulthood. Milk sugar hydroxylation leads to production of aldohexose and brainsugar monosaccharides that are alotof solublethan milksugar, therefore successively offers higherswe etness, highersolubilityand higher absorption ability than milk sugar (Cotton, 1980).

A variety of whey beverages consisting of plain, carbonated, alcoholic, soy, and fruit are with successfully developed and marketed everywhere the globe as a result of they hold nice potential for substantive disposal of whey solids. The alimental price of lemon lies in its high contents of acidity, ascorbic acids minerals, flavanoids and phenolics. Its nutrients, vitamins and flavanoids facilitate to stop unwanted injury to cell membranes and different structures of the body by neutralizing free radicals (Sonali and Geeta, 2014). Lemon fruits was evaluated for the preparation of some new merchandise, viz juice concentrate, foam mat dried juice power, effervescent liquid, powdery course and drink (Sharma etal.,2001).

Ginger is effective within the treatment of cough and cold. it's been wontto treat viscus infections, particularlyconne cted with biological process issues (Adeshina et al., 2011). Pervasion augmented the palatableness of the whey drink and extended its shelf-life (Aysha et al., 2013).

Presently one in each of the foremost prospective trends in whey utilization is usage of milk sugar hydrolyzed whey in liquid manufacture. Whey based mostly liquid / drink are substantially helpful for medicine as a result of most

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Biological price and low calories. Utilization of whey in liquid production by mixing whey with drink has importance in our country to resolve the issues of whey disposal, improve the techno economic conditions furthermore as give biological process and refreshing liquid to the society.

II. MATERIALS AND METHODS

The paneer whey (0.2 % fat, 0.50 %protein, 4.8 % milk sugar, 0.43 % ash and 5.8 % total solids) was obtained from paneer by curdling of milk that was standardized (4.5 %fat) (Syed et al., 1992; Pal and Yadav, 1991). The milk was brought from Anubhav dairy of SMC college of Dairy Science, Anand. Accelerator Maxilact L 5000 (β-D-galactosidase) from yeast Kluyveromyces Marxian's power unit. lactic, equipped by DSM Food Specialties, Denmark. Fine crystalline sugar obtained from the native market was employed in the preparation of whey liquid. Lemons (kagzi variety) were provided by Bagayat farm of farming Department, AAU, Anand. recent ginger (Zingier officinal) was obtained from the native market was employed in the preparation of whey liquid. Tata salt obtained from the native market of Anand.

A. Preparation of Beverage

Thepreparationof liquid concerned completelydifferent p rocess steps(Figure1), whichincorporates filtration, separation, sterilization (72°C / fifteen sec) and cooling (37°C). For milk sugar reaction of whey, pH was adjusted to 6.6 by 1N KOH. Then reaction was applied by adding Maxi act L 5000 @ 0.3 ml/lit incubated at 37°C for four hours with intermediate stirring at an interval of thirty min (Rival, 2014). Whenincubationcompleted,inactivationof acceler ator was applied by heating it at 80°C / five min. When cooling the accelerator inactivated milk sugar hydrolyzed defatted whey, different ingredients were added i.e. ginger juice, juice, salt and sugar with continuous stirring. When addition of on top of ingredients it's change integrity at 72°C / fifteen sec andcooledat temperature. Oncemore it's filteredand hold on in cold temperature till temperature reaches to < 4°C. The liquid was stuffed in bottle (200 ml). Then pervasion of liquid was done by injecting gas at pressure of fifteen psi in glass bottles. The crown smashing of bottles wasdone straightawaythen transferredto icebox (7±1°C) till se nsory analysis. The recent liquid samples were analyzed for various physic-chemical and sensory properties.

B. Compositional and Physico-Chemical Analysis

Whey and beverages were analyzed for fat (ISI Handbook, 1982),totalsolidsby thequality procedure victimization Moonie Milk Tester, Model-D (Laboratory Manual, 1959), total chemical element make up my mind by semi-micro Kjeldahl technique (Jayaraman, 1981) Kjel-plus digestion system (Model-KPS 006L, Chennai) and Kjel-plus semi-automatic distillation system, antioxidant (BIS Handbook, BIS: half XI,1989) and ash(BIS,1989). The pH of recent whey and beverages were determined using digital pH meter (Systolic Digital pH meter, Model 335, India) and acidity (BIS Handbook,1989).

C. Sensory Evaluation

All liquid samples were subjected to sensory analysis by trained judges for flavor, color and look, consistency, sweetness/tartness balance and overall acceptableness. The experimental samples were served to the judges at 7°C. The panelists were tutored to rate every sample on nine purpose hedonic scale.

D. Microbiological Analysis

Lactose hydrolyzed carbonated lemon whey liquid samples were analyzed for traditional plate count (BIS IS: 5402- 1969), coli form count (BIS IS: 5401- 1969), yeast and mold count (BIS IS: 5403- 1969) throughout the storage amount at an interval of seven days.

E. Statistical Analysis

The mean values generated from the analysis of duplicate samples of whey liquid in 3 replications and 12treatments are subjectedto appliedmathematics analysis victimisation factoria l fully randomised style (FCRD) as per Steel and Terrie (1980).

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- Flow Chart

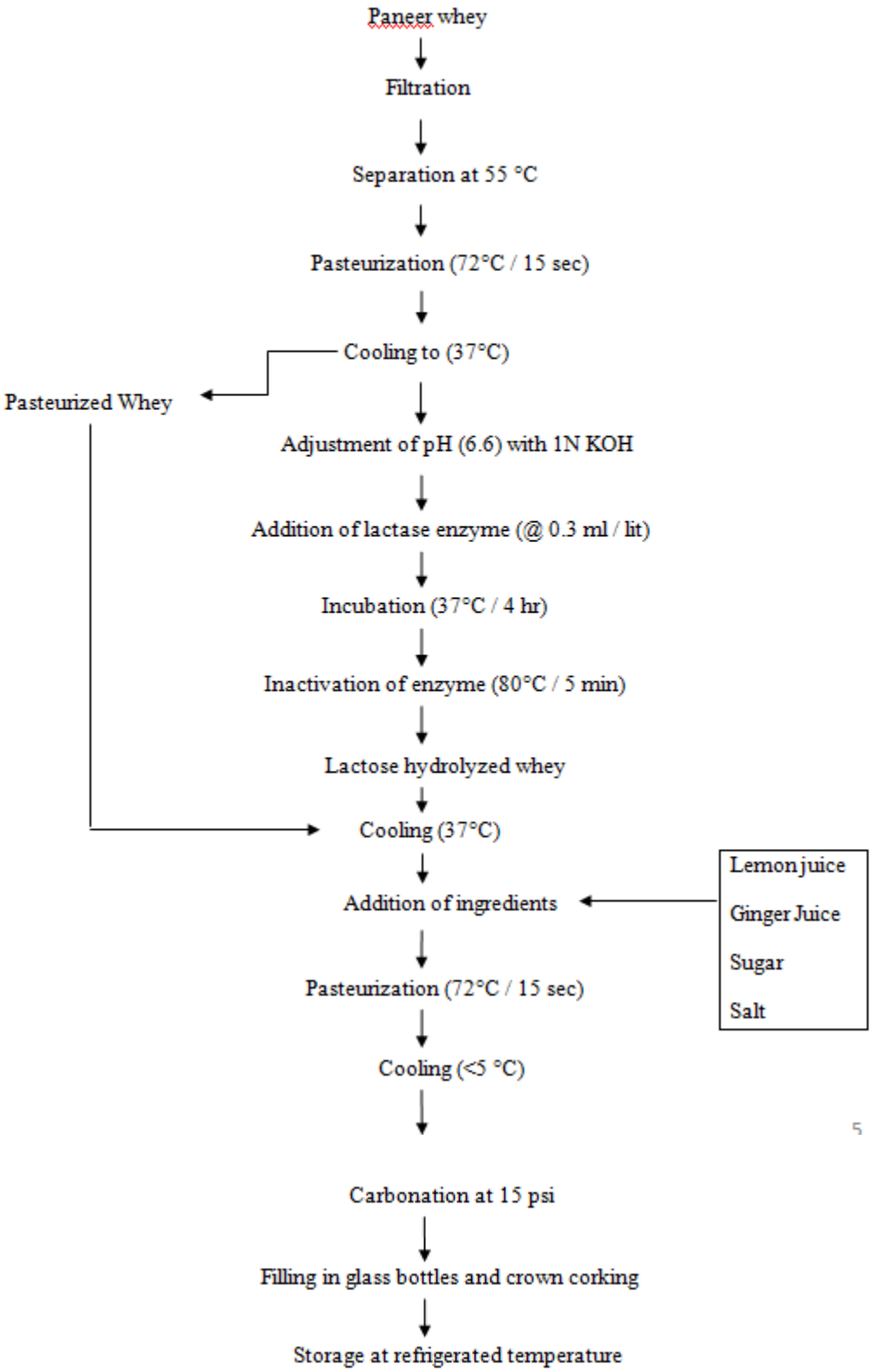

Figure 1 Flow Diagram for Preparation of Lactose Hydrolyzed Whey Beverage

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III. RESULTS AND DISCUSSION

A. Composition of Acid Whey

The acid whey (paneer whey) after filtration through muslin cloth was pasteurized at 72°C for 15 sec and cooled to 37°C. The average chemical composition of the whey which was used in the study is presented in Table 1.

Constituents	Value
Total solids (%)	5.60 ± 0.04
Fat (%)	0.05 ± 0.00
Protein (%)	0.47 ± 0.007
Lactose (%)	0.80 ± 0.06
Ash (%)	0.43 ± 0.005
pH	6.16 ± 0.06

Table 1 Composition of lactose hydrolyzed whey

B. Selection of Level of Lemon Juice (L) And Level of Sugar (S) for Carbonated Lemon Whey Beverage.

Based on preliminary trials, ginger juice @ 1 % and salt @ 0.6 % were added as a flavor enhancer in whey beverage. The lactose hydrolyzed whey was added with four different levels of lemon juice (L) i.e. 4.0 % (L1), 4.5 % (L2), 5.0 % (L3) and 5.5 % (L4) and three level of sugar (S) i.e. 8% (S1), 10% (S2) and 12% (S3) on the basis of final product. The all lots of carbonated lemon whey beverage were prepared and studied for their effect on compositional, physico-chemical and sensory characteristic of whey beverage.

a). Effect of Lemon Juice and Sugar on Composition of Carbonated Lemon Whey Beverage

The average total solids (%), protein (%), ash (%), ascorbic acid (mg/100g) and total soluble solids (%) content in whey beverage varied from 14.47 to 18.45, 0.46 to 0.49, 1.03 to 1.09, 7.19 to 14.68 and 15.00 to 18.83 respectively. The fat content in whey beverage was 0.05 in all treatments because separation of whey to remove fat was done. The pH and acidity (% C.A.) of whey beverage ranged from 3.99 to 4.25 and 0.66 to 0.83 respectively.

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	S1	S2	S3
	Total Solids (%)		
L1	14.52±0.13	16.60±0.22	18.42±0.37
L2	14.47±0.08	16.65±0.36	18.45±0.40
L3	14.49±0.12	16.58±0.30	18.20±0.46
L4	14.55±0.22	16.33±0.18	18.40±0.50
CD(0.05)	L = NS, S = 0.268, L × S = NS, CV% = 1.89		
	Protein (%)		
L1	0.48±0.008	0.49±0.012	0.48±0.009
L2	0.48±0.014	0.49±0.007	0.48±0.013
L3	0.49±0.019	0.49±0.005	0.46±0.032
L4	0.48±0.024	0.49±0.016	0.48±0.012
CD(0.05)	L = NS, S = NS, L × S = NS, CV% = 3.37		
	Ash (%)		
L1	1.07±0.057	1.03±0.041	1.03±0.022
L2	1.09±0.034	1.03±0.005	1.03±0.008
L3	1.07±0.083	1.03±0.025	1.04±0.055
L4	1.10±0.096	1.03±0.061	1.05±0.047
CD(0.05)	L = NS, S = 0.044, L × S = NS, CV% = 4.96		
	Ascorbic acid (mg/100gm)		
L1	07.44±0.101	8.20±0.050	7.19±0.076
L2	10.35±0.116	10.54±0.504	9.37±0.589
L3	11.11±0.233	11.20±0.275	10.64±0.358
L4	14.68±0.393	13.65±0.781	12.98±0.101
CD(0.05)	L = 0.363, S = 0.314, L × S = 0.628, CV% = 3.51		

Table 2 Effect of Lemon Juice and Sugar on Composition of whey Beverage.

Each observation is a mean ± SD of three replicate experiments (n = 3)

Addition of juice faded pH as a result of juice has pH of 2.62. Augmented level of juice showed increase in acidity of whey liquid. Antioxidant content was additionally found to increase considerably (P<0.05) because the level of juice will increase. There's no vital result on total solids, protein, fat and ash content of whey liquid. Sugar addition considerably (P<0.05) affects total solids, ash, antioxidant andacidityofwhey liquid whereas it's non vital result on macromolecule and pH ofwhey liquid.The interaction result of juice and sugar was found to be vital (P<0.05) just in case of antioxidant and acidity of carbonated lemon whey beverage. There was no vital result of interaction of juice and sugar on total solids, protein, ash, total soluble solids, pH and acidity of whey liquid.

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	S1	**S2**	**S3**
	pH		
L1	4.22±0.144	4.25±0.042	4.19±0.032
L2	4.13±0.143	4.19±0.031	4.12±0.032
L3	4.07±0.107	4.10±0.025	4.05±0.032
L4	4.00±0.098	4.00±0.085	3.99±0.032
CD(0.05)	L = 0.078, S = NS, L × S = NS, CV% = 1.95		
	Acidity		
L1	0.68±0.014	0.68±0.011	0.66±0.014
L2	0.71±0.011	0.72±0.008	0.70±0.014
L3	0.80±0.005	0.79±0.006	0.78±0.024
L4	0.83±0.011	0.82±0.008	0.81±0.018
CD(0.05)	L = 0.013, S = 0.011, L × S = NS, CV% = 1.73		

Table 3 Effect of Lemon Juice And Sugar on Physico-Chemical Properties of whey Beverage.

Each observation is a mean ± SD of three replicate experiments (n = 3)

b). Effect of Lemon Juice And Sugar Addition on Sensory Characteristics of Carbonated Lemon Whey Beverage

The average sensory score for color and look, consistency, flavor,sweetness/tartnessbalanceandoverall acceptableness sev eral experimental whey liquid ranged between seven.71 to 8.25, 7.78 to 8.16, 7.41 to 8.21, 7.43 to 8.20 and 7.48 to 8.29 severally.

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	S1	S2	S3
	Flavor		
L1	7.88±0.195	7.84±0.072	7.41±0.220
L2	7.99±0.235	8.21±0.110	8.03±0.188
L3	7.85±0.196	7.83±0.381	8.20±0.110
L4	7.65±0.284	7.52±0.137	7.68±0.306
CD(0.05)	L = 0.214, S = NS, L × S = 0.371, CV% = 2.81		
	Color and appearance		
L1	7.85±0.172	8.14±0.246	7.71±0.183
L2	7.96±0.238	8.25±0.221	8.17±0.142
L3	7.86±0.129	8.06±0.343	8.15±0.204
L4	7.82±0.132	7.88±0.408	8.10±0.09
CD(0.05)	L = NS, S = NS, L × S = NS, CV% = 2.84		
	Consistency		
L1	7.96±0.257	8.05±0.042	7.78±0.095
L2	8.15±0.081	8.16±0.076	8.08±0.217
L3	8.13±0.115	8.09±0.206	8.09±0.055
L4	8.02±0.171	7.99±0.107	8.10±0.091
CD(0.05)	L = 0.139, S = NS, L × S = NS, CV% = 1.77		
	Sweetness/tartness balance		
L1	7.69±0.072	7.80±0.108	7.43±0.289
L2	7.96±0.111	8.20±0.176	8.05±0.141
L3	7.77±0.293	7.80±0.091	7.95±0.137
L4	7.53±0.191	7.48±0.076	7.89±0.101
CD(0.05)	L = 0.161, S = NS, L × S = 0.297, CV% = 2.12		
	Overall acceptability		
L1	7.90±0.186	7.73±0.127	7.71±0.097
L2	8.11±0.085	8.29±0.095	8.07±0.178
L3	7.48±0.206	7.91±0.212	7.90±0.085
L4	7.51±0.125	7.80±0.143	7.84±0.060
CD(0.05)	L = 0.138, S = 0.120, L × S = 0.240, CV% = 1.81		

Table 4 Effect of Lemon Juice and Sugar Addition on Sensory Characteristics of Whey Beverage.

Each observation is a mean ± SD of three replicate experiments (n = 3)

There was no significant effect of addition of lemon juice on color and appearance score of whey beverage whereas significant effect ($P < 0.05$) was observed in case of consistency, flavor, sweetness/tartness balance and overall acceptability score. The addition of sugar had significant ($P < 0.05$) effect on overall acceptability score while non significant effect on color and appearance, consistency, flavor and sweetness/tartness balance score of whey beverage. The highest mean scores of 8.25, 8.16, 8.21, 8.20 and 8.29 in for consistency, flavor, sweetness/tartness balance and overall acceptability were obtained with interaction effect of L2 × S2 (4.5 % lemon juice and 10 % sugar).

C. Composition of Formulated Whey Beverage.

The carbonated lemon whey beverage was prepared by addition of 4.5 % lemon juice, 10 % sugar, 0.6 % salt and 1 % ginger juice. Carbonation was done at 15 psi for 15 sec. The whey beverage was manufactured as per flow chart given in figure 1 with compositional, physic-chemical and sensory parameter as given in Table 5, 6 and 7.

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Parameter	Value
Total solids (%)	16.65±0.361
Fat (%)	0.05±0.00
Protein (%)	0.49±0.007
Ash (%)	1.03±0.005
Ascorbic acid (mg/100g)	10.54±0.504
Total soluble solids (%)	16.67±0.289

Table 5 Compositional Properties of Carbonated Lemon whey Beverage.

Parameter	Value
pH	4.19±0.031
Acidity (% C. A.)	0.72±0.008

Table 6 Physico-Chemical Properties of Carbonated Lemon whey Beverage.

Sensory Attribute	Score
Color and appearance	8.25±0.221
Consistency	8.16±0.076
Flavor	8.21±0.110
Sweetness/tartness balance	8.20±0.176
Overall acceptability	8.29±0.095

Table 7 Sensory Score of Formulated Carbonated Lemon whey Beverage.

D. Storage Related Changes in Carbonated Lemon whey Beverage

The carbonated lemon whey beverage was subjected to storage studies under refrigerated conditions (7 ± 1^0C). The samples were monitored after every 7^{th} day for changes in pH, acidity, ascorbic acid, microbial load (SPC, coli form count and yeast and mould count) and for sensory attributes.

a). Changes in PH, Acidity and Ascorbic Acid

The fresh whey beverage had pH of 4.14. The pH of the beverages increases significantly ($P<0.05$) throughout the storage study at refrigerated temperature (7 ± 1^0C). The acidity of beverage was 0.776 (% C.A.) when fresh. The acidity of beverage decreases significantly ($P < 0.05$) during storage and reached a value of 0.560 (% C.A.) at the end of 56 days of storage at refrigerated temperature (7 ± 1^0C). Fresh whey beverage had the ascorbic acid content of 12.39 mg/100 g product which decreased significantly ($P < 0.05$) to8.47 mg/100 g on 56 days of storage at refrigerated temperature (7 ± 1^0C).

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Storage period (days) → Attributes	0	7	14	21	28	35	42	49	56	SEm	C.D. (0.05)	C.V (%)
pH	4.14± 0.02	4.25± 0.02	4.39± 0.02	4.51± 0.02	4.55±0 .01	4.60± 0.01	4.63± 0.02	4.67± 0.01	4.73± 0.03	0.010	0.030	0.39
Acidity (%CA)	0.776 ±0.01	0.741 ±0.00	0.720 ±0.01	0.680 ±0.01	0.670± 0.01	0.656 ±0.01	0.640 ±0.00	0.601 ±0.00	0.560 ±0.01	0.004	0.013	1.14
Ascorbic acid (mg/100g)	12.39 ±0.07	11.68 ±0.03	11.28 ±0.04	10.66 ±0.01	10.38± 0.07	9.72± 0.01	9.41± 0.15	8.84± 0.12	8.47± 0.07	0.045	0.134 12	0.76

Table 8:Changes Inphysico-Chemical Properties and Ascorbic Acid Content of Carbonated Lemon Whey Beverage During Storage.

Each observation is a mean ± SD of three replicate experiments (n=3)

b). Changes in Microbial Quality

There was no growth during first 21 days of storage. As the storage days increases from 21 days to 56 days the SPC increase to 1.21 log cfu/ml. As the storage period advanced, the SPC increased significantly after 21 days at each stage during storage ($P < 0.05$). On the production day and up to 14 days of storage, the whey beverage showed no growth of yeast and mold. During the period of storage the yeast and mould count of whey beverage increased significantly ($P < 0.05$) after 14 days and reached 2.67 cfu/ml on 56 days of storage. Whey beverage samples stored at refrigerated temperature were found to be free from coli form throughout the storage study.

Storage period (days) → Attributes	0	7	14	21	28	35	42	49	56	SEm	C.D. (0.05)	C.V. (%)
Standard Plate Count (log cfu/ml)	0.00± 0.00	0.00± 0.00	0.00± 0.00	0.00± 0.00	0.36± 0.10	0.56± 0.07	0.94± 0.06	1.11± 0.06	1.21± 0.08	0.032	0.095	11.98
Yeast and Mold Count (cfu/ml)	0.00± 0.00	0.00± 0.00	0.00± 0.00	1.00± 0.00	1.33± 0.58	2.00± 0.00	2.00± 0.00	2.00± 0.00	2.67± 0.00	0.157	0.467	22.27

Table 9 Changes in Microbial Qualities of Carbonated Lemon Whey Beverage During Storage.

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c). Changes in Sensory Attributes

The color and look, consistency, flavor, sweetness/tartness balance and overall acceptableness score of the whey liquid faded considerably (P<0.05) from 8.10, 8.10, 8.29, 8.43 and 8.40 at zero day to five.43, 5.40, 5.07, 5.00 and 4.83 severally at fifty six days of cold storage (7±1°C).The product was acceptable up to forty nine days of storage and have become unacceptable at fifty six days of storage cold storage(7±1°C).

Storage period → (days) Attributes	**0**	**7**	**14**	**21**	**28**	**35**	**42**	**49**	**56**	**SEm**	**C.D.**	**C.V. (%)**
Colour and appearance	8.10± 0.10	7.97± 0.06	7.87±0 .12	7.85±0 .13	7.70± 0.00	7.37± 0.12	7.00± 0.00	6.63± 0.12	5.43± 0.06	0.052	0.156	1.24
Consistency	8.10± 0.10	7.93± 0.06	7.67±0 .12	7.53±0 .06	7.43± 0.06	7.07± 0.12	6.77± 0.25	6.43± 0.12	5.40± 0.00	0.068	0.201	1.64
Flavour	8.29± 0.01	8.03± 0.06	7.77±0 .06	7.57±0 .08	7.50± 0.00	7.30± 0.17	7.00± 0.00	6.67± 0.15	5.07± 0.12	0.054	0.161	1.30
Sweetness/ tartness balance	8.43± 0.12	8.13± 0.12	7.80±0 .00	7.68±0 .08	7.38± 0.13	7.08± 0.14	7.00± 0.00b	6.50± 0.00	5.00± 0.00	0.051	0.150	1.22
Overall acceptability	8.40± 0.10	8.13± 0.06	7.77±0 .06	7.57±0 .06	7.37± 0.06	7.17± 0.14	6.83± 0.29	6.50± 0.00	4.83± 0.29	0.088	0.265	2.13

Table 10 Changes in Sensory Attributes of Carbonated Lemon Whey Beverage During Storage.

Each observation is a mean ± SD of three replicate experiments (n=3)

E. Consumer Acceptance Trial

The consumer survey showed extremely acceptance of liquid to completely different age teams i.e. >50 year, 36-50 year, 21-35 year and 15-20 year. The weighted average for various cohort was calculated and from that average was calculated for every attribute that score 7.97, 8.08, 8.34, 8.20 and 8.38 for color and look, consistency, flavor, sweetness/ tartness balance and overall acceptableness severally.

F. Comparative Study with Commercial whey Beverage

The comparative study was additionally applied and experimental liquid was compared with a commercially on the market sample and each the samples were served to panel of judges. The sensory score for commercially on the market whey liquid and developed whey liquid were seven.50 and 7.92 for color and look, 6.68 and 8.25 for consistency, 5.68 and 8.64 for flavor, 5.89 and 8.53 for sweetness/tartness balance and 5.53 and 8.58 for overall acceptability. Comparative to commercially available whey beverage,

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experimental whey beverage showed much higher acceptability on sensory score.

G. Costing of Carbonated Lemon Whey Beverage

The raw materials required for production of 1000 kg whey beverage were whey (7840.00 kg), sugar (100.00 kg), maxi act L 5000 enzyme (0.252 lit), lemon (120.00 kg), ginger (27.00 kg) and salt (6.00 kg). Thus, the total production cost of 1000 kg of whey beverage found to be 26672.60.

The raw material cost constitutes 53.13 % of production cost i.e. whey (12.59 %), sugar (12.75 %), enzyme (5.48 %), lemon (17.99 %), ginger (4.05 %) and salt (0.27 %). Packaging material and processing cost constitutes 37.87 % and 9.00 % of production cost, respectively. If this whey beverage is packed in 200ml sized PET bottle, the final cost of production was found to be `5.33 per bottle.

IV. CONCLUSION

The carbonated lemon whey beverage (with lactose hydrolysis) with accept able quality can be prepared using lemon juice (4.5 %), sugar (10 %), ginger juice (1 %) and salt (0.6 %). The prepared whey beverage was acceptable up to 49 days at refrigerated temperature (7±1°C). The cost of whey beverage is ` 5.33 per 200 ml. The dairy industry, especially those engaged in the manufacture of cheese, casein, chhana and pannier can exploit this preparation as a value added product to minimize the waste disposal problems and generate income.

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