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Studies on the quality of Lassi collected from Kolkata and its suburbs

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Abstract

The storage studies on the lassi samples have shown that there is a sharp increase in the titratable acidity during storage at 30 ± 2 °C while the rate of increase of titratable acidity of lassi samples during storage at 5 ± 2 °C was rather slow. During storage at 30 ± 2 °C the maximum increase in acidity was noticed after 24 hrs of storage while increase in acidity during storage at 5 ± 2 °C was always steady. Yeast and mould in the products increased progressively during storage. A sharp increase in the yeast and mould population is noticeable during storage at 30 ± 2 °C while increase is relatively gradual during storage at 5 ± 2 °C. The rates of destruction of coliform organisms were higher at room temperature (30 ± 2 °C) than at refrigeration temperature (5 ± 2 °C). The overall relatively poor results obtained for all the samples in relation to their microbiological quality indicate that step should be taken to improve their quality.

Keywords: Market lassi, titratable acidity, coliform, yeast and mould

Introduction

Lassi is a traditional indigenous refreshing cultured milk drink. It is prepared by whipping dahi with or without addition of sugar or salt depending upon the choice of customer. As the dahi is used as the base material for the preparation of lassi, it is also very popular in eastern, northern as well as southern part of our country, especially in summer. Lassi contains appreciable amounts of milk proteins and phospholipids, and is an excellent beverage for quenching thirst by reason of its lactic acid.

Lassi is also a by-product obtained during the preparation of country butter from dahi by indigenous method, which is generally called as *Ghol* in our state. It is very popular in countryside and according to estimation by Yadav *et al.* (1992) ^[10], approximately 2,114 million-lit of lassi is produced in India annually. Being a fermented milk product as fermented by lactic culture, lassi has got some therapeutic value. It was extrapolated that high number of viable *Lactobacillus acidophilus* in gastrointestinal tract may reduce the potential for cancer initiation (Lee, 1989) ^[11]. Lassi is also a very much healthy drinks to the lactose intolerance people. Volatile acidity is better indicator of aroma and flavour of dahi. This aroma and flavour come into the lassi from the curd. The amount of volatile acid produce varies generally from organisms to organisms.

With the advent of genetic improvement in the starter culture technology together with programs for the improvement of this product, progress in technology and particularly the increased understanding of its beneficial effects on human nutrition and health, this product has become increasingly popular throughout the world. In the present investigation, the microbiological examinations will help in determining the quality of the product, the sanitary and hygienic conditions maintained and the effect of public health for the marketed product available in Kolkata and its suburbs.

Materials and Methods

Collection of samples

The samples (30 Samples) of Lassi were collected from Kolkata and its suburbs.

Analytical Methods: Methods relating to estimation of various microbial populations in the samples, the following microbiological examinations along with testing of titratable acidity were carried out:

- Yeast and mould count [IS: 5403; BIS 1969]
- Coliform count [Manual in Dairy Bacteriology by ICAR]
- Titratable acidity [IS: 1479 (Part. I) - 1960]

Storage studies: Storage studies were done at 30 ± 2 °C and 5 ± 2 °C till the quality remained good in term of titratable acidity, Yeast and mould count and Coliform count.

Results and Discussion

Effect of storage period on titratable acidity of Lassi

From Table-1 and Table-2 it is cleared that during storage at 30 ± 2 °C the titratable acidity of lassi samples increased at a faster rate while the rate of increase of titratable acidity of lassi samples during storage at 5 ± 2 °C was very slow. During storage at 30 ± 2 °C the maximum increase in acidity was noticed after 24 hrs of storage. But during storage at 5 ± 2 °C the rate of increase in acidity was always steady. The findings of this investigation were in tune with that of Mahanon *et al.* (1984) [5]. They reported that the temperature has a role in variation of titratable acidity of lassi. It may be due to the fact that at 30 ± 2 °C temperature the atmosphere for growth of lactic acid bacteria is very much favourable. On the other hand, the growth rate of lactic acid bacteria at 5 ± 2 °C temperature is very slow.

Effect of storage period on Yeast and mould count of Lassi: From Table-1 and Table-2 it is evident that the

number of yeast and mould in the products increased progressively during storage. A sharp increase in the yeast and mould population is noticeable during storage at 30 ± 2 °C while increase is relatively gradual during storage at 5 ± 2 °C. It is observed that the rate of growth of yeast and mould count is higher when sufficient acidity is produced to bring the pH down to around 5.0. It may be concluded that the chance of spoilage of lassi is higher during storage at room temperature (30 ± 2 °C) due to higher rate of growth of yeast and mould at room temperature.

Effect of storage period on Coliform count of Lassi

From Table-1 and Table-2 it is clear that during storage the rates of destruction of coliform organisms were higher at room temperature (30 ± 2 °C) than at refrigeration temperature (5 ± 2 °C). In regard to the effect of storage temperature it was observed that these organisms survived for longer period of time at refrigeration temperature (5 ± 2 °C) than that at room temperature (30 ± 2 °C). In this connection, it has been reported that viable counts of coliform decreased very rapidly with the fall of pH below 4.0 (Tiwari and Singh, 1966; Goel *et al.*, 1971) [19, 3]. The slow rate of destruction of the coliform is ascribed to gradual increase in acidity, which perhaps permits development of acid tolerant strains (Prasad *et al.*, 1984) [7]. In the light of the above report, it may be concluded that lassi stored at a lower temperature is of no value in preventing the destruction of coliform if the product is already contaminated. It is possible that lassi kept at room temperature during summer months is less likely to be a source of coliform than that samples of lassi stored at the temperature during winter months.

Table 1: Effect of storage at 30 ± 2 °C on the Titratable acidity, Yeast and mould count and Coliform count of Lassi samples collected from market

No. of samples	Storage periods (hrs.)	Acidity (% L. A.)	Yeast and mould count (c.f.u./ml)	Coliform count (c.f.u./ml)
L _{S1}	0	0.32	15×10^3	41×10^2
L _{S2}		0.43	43×10^3	Nil
L _{S3}		0.61	37×10^4	27×10^2
L _{S4}		0.66	60×10^4	13×10^2
L _{S5}		0.53	22×10^4	50×10^3
Average	24	0.51	24.96×10^4	19×10^3
L _{S1}		0.41	21×10^3	49×10^3
L _{S2}		0.63	44×10^3	Nil
L _{S3}		0.82	41×10^4	30×10^2
L _{S4}		0.89	64×10^4	11×10^2
L _{S5}	48	0.65	30×10^4	54×10^3
Average		0.68	28.3×10^4	21.42×10^3
L _{S1}		0.51	25×10^3	51×10^3
L _{S2}		0.75	49×10^3	Nil
L _{S3}		0.90	50×10^4	34×10^2
L _{S4}	72	1.00	70×10^4	9×10^2
L _{S5}		0.80	41×10^4	52×10^3
Average		0.792	33.68×10^4	21.46×10^3
L _{S1}		0.60	29×10^3	54×10^3
L _{S2}		0.87	61×10^3	Nil
L _{S3}	96	1.05	56×10^4	24×10^2
L _{S4}		1.15	81×10^4	41×10
L _{S5}		0.95	51×10^4	32×10^3
Average		0.924	39.4×10^4	17.76×10^3
L _{S1}		0.75	41×10^3	59×10^3
L _{S2}	120	0.98	72×10^3	Nil
L _{S3}		1.18	72×10^4	11×10^2
L _{S4}		1.25	92×10^4	290
L _{S5}		1.10	75×10^4	27×10^3
Average		1.052	50.06×10^4	17.47×10^3
L _{S1}		0.87	61×10^3	64×10^3
L _{S2}		1.10	85×10^3	Nil
L _{S3}		1.30	81×10^4	7×10^2
L _{S4}		1.35	96×10^4	140
L _{S5}		1.20	89×10^4	16×10^3
Average		1.164	56.12×10^4	16.16×10^3

Table 2: Effect of storage at 5 ± 2 °C on the Titratable acidity, Yeast and mould count and Coliform count of Lassi samples collected from market.

No. of samples	Storage periods (hrs.)	Acidity (% L. A.)	Yeast and mould count (c.f.u./ml)	Coliform count (c.f.u./ml)
LS1	0	0.32	15×10^3	41×10^2
LS2		0.43	43×10^3	Nil
LS3		0.61	37×10^4	27×10^2
LS4		0.66	60×10^4	13×10^2
LS5		0.53	22×10^4	50×10^3
Average	0.51	24.96×10^4	19×10^3	
LS1	24	0.36	9×10^2	49×10^2
LS2		0.47	33×10^2	Nil
LS3		0.65	6×10^2	28×10^3
LS4		0.68	30×10^3	13×10
LS5		0.59	20×10^3	7×10^2
Average		0.55	109.6×10^2	6746
LS1	48	0.38	14×10^2	54×10^2
LS2		0.50	37×10^2	Nil
LS3		0.66	9×10^2	35×10^3
LS4		0.70	36×10^3	20×10
LS5		0.62	24×10^3	34×10
Average		0.572	132×10^2	8188
LS1	72	0.40	21×10^2	56×10^2
LS2		0.53	45×10^2	Nil
LS3		0.68	13×10^2	40×10^3
LS4		0.73	42×10^3	14×10
LS5		0.65	28×10^3	20×10
Average		0.592	155.8×10^2	9188
LS1	96	0.43	26×10^2	53×10^2
LS2		0.55	53×10^2	Nil
LS3		0.70	18×10^2	38×10^3
LS4		0.75	50×10^3	91
LS5		0.68	33×10^3	14×10
Average		0.622	185.4×10^2	8706.2
LS1	120	0.45	32×10^2	30×10^2
LS2		0.58	65×10^2	Nil
LS3		0.72	23×10^2	17×10^3
LS4		0.78	56×10^3	65
LS5		0.70	39×10^3	93
Average		0.646	214×10^2	4031.6

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