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Studies on the quality of Misti Dahi collected from Kolkata and its suburbs

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Abstract

The storage studies on the *misti dahi* 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 *misti dahi* 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: Misti dahi, titratable acidity, yeast and mould, coliform

Introduction

Next to milk dahi is the most important dairy product prepared and utilized in various forms at most households in this country. *Misti dahi* is quite popular in the eastern parts of India, mainly West Bengal and partly in Assam, Bihar and Orissa. Cane sugar in varied proportions [6 to 25 per cent- Ray and Srinivasan (1972) ^[6]; 15.8 to 22 per cent- Mukhopadhyay and Singh (1973) ^[4]; 12.8 to 18.7 per cent-Ghosh and Rajorhia (1987)] ^[4, 1] is added to milk either before or at the time of inoculation for preparation of *misti dahi* in unorganized sector. Prolonged heating of sweetened milk at simmering temperature leads to partial concentration and browning. A characteristic cooked flavour and firm body develop after setting of the curd. Use of colour or sugar caramel or *gur* is also in vogue.

Dahi, a rich source of nutrients, is subject to microbial contamination at various stages of manufacture and during addition of ingredients. The handling by the operators who happen to be carriers of certain diseases may also contaminate the product with potential pathogenic organisms. Hence, to ensure the safety of the product, microbiological quality of *misti dahi* should be as high as possible and it must be free from any of the pathogens as the people largely consume the product.

In order to safeguard the consumer health, which is of primary concern, there is a need to impose firm control on the quality of *misti dahi*. 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 *misti dahi* were collected from Kolkata and its suburbs.

Analytical Methods

Methods relating to estimation of various microbial population in the samples, the following microbiological examination 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]

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c) Titratable acidity [IS: 1479 (Part. I) - 1960]

Storage studies

Storage studies were done at 30±20C and 5±20C till the quality remain good in term of titratable acidity, Yeast and mould count and Coliform count.

Results and Discussions**Effect of storage period on Titratable acidity of Misti dahi:**

From Table-1 and Table-2 it is clear that during storage at 30±20C the titratable acidity of misti dahi samples increased at a faster rate while the rate of increase of titratable acidity of misti dahi samples during storage at 5±20C was very slow. During storage at 30±20C the maximum increase in acidity was noticed after 24 hrs of storage. But during storage at 5±20C the rate of increase in acidity was always steady. The findings of this investigation were in tune with that of Mahanon *et al.* (1984) ^[1]. They reported that the temperature has a role in variation of titratable acidity of misti dahi. It may be due to the fact that at 30±20C 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±20C temperature is very slow.

Effect of storage period on Yeast and mould count of Mist dahi

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±20C while increase is relatively gradual during storage at 5±20C. It is observed that the rate of growth of yeast and mould count is higher when sufficient acidity is produce to bring the pH down to around 5.0. It may be concluded that the chance of spoilage of misti dahi is higher during storage at room temperature (30±20C) due to higher rate of growth of yeast and mould at room temperature.

Effect of storage period on Coliform count of Mist dahi

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±20C) than at refrigeration temperature (5±20C). In regard to the effect of storage temperature it was observed that these organisms survived for longer period of time at refrigeration temperature (5 ± 20C) than that at room temperature (30±20C). 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) ^[6, 7]. The slow rate of destruction of the coliform is ascribed to gradual increase in acidity, which perhaps permits development of acid tolerant strains (Prasad IN VI., 1984) ^[5]. In the light of the above report, it may be concluded that misti dahi 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 misti dahi kept at room temperature during summer months is less likely to be a source of coliform than that samples of misti dahi 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 *Misti dahi* 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)
D _{S1}	0	0.74	6 × 10 ²	Nil
D _{S2}		0.58	31 × 10 ²	43 × 10 ²
D _{S3}		0.44	4 × 10 ²	21 × 10 ³
D _{S4}		0.96	25 × 10 ³	71
D _{S5}		0.65	17 × 10 ³	5 × 10 ²
Average	24	0.662	92 × 10 ²	5174.2
D _{S1}		1.050	18 × 10 ²	Nil
D _{S2}		0.94	61 × 10 ²	20 × 10 ²
D _{S3}		0.85	17 × 10 ²	11 × 10 ³
D _{S4}		1.11	81 × 10 ³	31
D _{S5}	48	0.96	68 × 10 ³	38
Average		0.982	317 × 10 ²	2682.2
D _{S1}		1.26	74 × 10 ²	Nil
D _{S2}		1.20	24 × 10 ³	5 × 10 ²
D _{S3}		1.12	81 × 10 ²	37 × 10 ²
D _{S4}	72	1.38	24 × 10 ⁴	nil
D _{S5}		1.24	20 × 10 ⁴	84
Average		1.24	959 × 10 ²	856.8
D _{S1}		1.44	15 × 10 ³	Nil
D _{S2}		1.39	64 × 10 ³	180
D _{S3}	96	1.32	11 × 10 ³	170
D _{S4}		1.53	73 × 10 ⁴	nil
D _{S5}		1.44	80 × 10 ⁴	21
Average		1.424	324 × 10 ³	74.2
D _{S1}	120	1.59	61 × 10 ³	Nil
D _{S2}		1.51	18 × 10 ⁴	93
D _{S3}		1.46	84 × 10 ³	130
D _{S4}		1.66	11 × 10 ⁵	nil
D _{S5}		1.60	13 × 10 ⁵	nil
Average		1.564	545 × 10 ³	44.6
D _{S1}		1.70	15 × 10 ⁴	Nil
D _{S2}		1.64	63 × 10 ⁴	22
D _{S3}		1.62	25 × 10 ⁴	35
D _{S4}		1.77	64 × 10 ⁵	nil
D _{S5}		1.73	71 × 10 ⁵	nil
Average		1.692	29 × 10 ⁵	11.4

Table 2: Effect of storage at 5 ± 2 °C on the Titratable acidity, Yeast and mould count and Coliform count of *Misti dahi* 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)
DS ₁	0	0.74	6×10^2	Nil
DS ₂		0.58	31×10^2	43×10^2
DS ₃		0.44	4×10^2	21×10^3
DS ₄		0.90	25×10^3	71
DS ₅		0.65	17×10^3	5×10^2
Average		0.662	92×10^2	5174.2
DS ₁	24	0.78	9×10^2	Nil
DS ₂		0.66	33×10^2	49×10^2
DS ₃		0.54	6×10^2	28×10^3
DS ₄		0.93	30×10^3	13×10
DS ₅		0.71	20×10^3	7×10^2
Average		0.724	109.6×10^2	6746
DS ₁	48	0.81	14×10^2	Nil
DS ₂		0.74	37×10^2	54×10^2
DS ₃		0.60	9×10^2	35×10^3
DS ₄		0.95	36×10^3	20×10
DS ₅		0.76	24×10^3	34×10
Average		0.772	132×10^2	8188
DS ₁	72	0.87	21×10^2	Nil
DS ₂		0.81	45×10^2	56×10^2
DS ₃		0.67	13×10^2	40×10^3
DS ₄		1.00	42×10^3	14×10
DS ₅		0.80	28×10^3	20×10
Average		0.83	155.8×10^2	9188
DS ₁	96	0.90	26×10^2	Nil
DS ₂		0.85	53×10^2	53×10^2
DS ₃		0.73	18×10^2	38×10^3
DS ₄		1.06	50×10^3	91
DS ₅		0.86	33×10^3	14×10
Average		0.88	185.4×10^2	8706.2
DS ₁	120	0.95	32×10^2	Nil
DS ₂		0.89	65×10^2	30×10^2
DS ₃		0.79	23×10^2	17×10^3
DS ₄		1.09	56×10^3	65
DS ₅		0.91	39×10^3	93
Average		0.926	214×10^2	4031.6

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