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Preparation of carrot lassi

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Abstract

Lassi is a popular and traditional fermented milk beverage of the Indian Subcontinent. Studies were carried out on the preparation of carrot lassi using standardized milk and carrot juice. The data collected on different aspects were tabulated and analyzed statistically using the methods of analysis of variance and critical difference. Carrot lassi was prepared by blending milk with 0, 10, 20 and 30 per cent carrot juice (replacing milk) before fermentation. In lassi samples of different treatments and control, the chemical analysis (fat, protein, carbohydrate, ash, total solids, acidity, pH, curd tension, curd syneresis and anti-oxidant) was done for estimating its nutritional content and also the organoleptic characteristic like (colour and appearance, body and texture, flavor and taste and overall acceptability) was evaluated by trained panelist using 9 point hedonic scale. On the basis of findings, it was concluded that T1 was found to be highly acceptable among the other combinations by sensory evaluation. Thus, as per acceptability of the product judged by organoleptic evaluation the treatment can be rated as T1>T2>T3>T0. The cost of one liter of lassi of treatment T0, T1, T2, T3 was Rs. 40.00, 41.85, 43.70 and 45.55 respectively.

Keywords: Standardized milk, Carrot juice, lassi, Organoleptic evaluation, Compositional analysis

Introduction

Lassi, one of the fermented milk products is ideal for serving with hot dishes as it helps the body to digest the spicy food. Lassi is a digestive aid for the afternoon meal; it settles the upset stomach and it is the perfect cooling agent (Anonymous, 2006) [1]. Along with all essential nutrients required for growth, development and tissue differentiation, fermented milk contain growth hormones-gastrin and insulin (Arora, 2006) [2]. In India, a great variation is reported in technology of lassi preparation as well as the basic ingredients used. Presently, the kinds of lassi available in different markets of India are plain lassi, Bhang lassi, Amritsari lassi, Soy lassi, Vanilla lassi, Saffron lassi, Makhaniya lassi and lassi prepared using pulp or juice of fruits like-Mango lassi, Mango-pineapple lassi, Mango-strawberry lassi, Banana lassi and Pineapple lassi, etc.

Observing the inclination of Lassi manufacturers towards preparing fruit Lassi, it seems necessary to study the effect of fruit additives on microbial status of Lassi as these micro floras play a crucial role in imparting pleasant flavour and therapeutic value to Lassi. The investigation will explore the possibility of incorporating carrot juice in Lassi.

Carrot (*Daucus carota* L.) is one of the more commonly used vegetables of human nutrition. It is rich in beta carotene, ascorbic acid, tocopherol and classified as vitaminized food (Hashimoto and Nagayama, 2004) [6]. Combination of Carrot juice and lassi produce a nutritionally balanced food. Carrots are good source of carbohydrate, calcium, phosphorous, iron, potassium, magnesium, copper, manganese and sulphur. It is an excellent source of vitamin A, B1, B2, C, E, thiamin, folic acid and riboflavin but lack in protein and fat. Lassi is rich in protein and fat but is deficient in iron and vitamin C. Blending of lassi with carrot juice would produce a nutritionally rich food.

The intake of carrot as potent antioxidants, appear to be associated with better health. It is not only preventing vitamin A deficiency but also cancer and other diet related human diseases. It has greater cytotoxic effect against cancer cell and reducing the enzymes that promote the conversation of precarcinogens to carcinogens. It may also enhance the immune system, protect against stroke, high blood pressure, Osteoporosis, cataracts, arthritis, heart disease, bronchial asthma and urinary tract infections (Beom *et al.*, 1998; Sun *et al.*, 2001; Seo and Yu, 2003) [4, 14, 13].

Materials and Methods

Preparation of carrot juice: Carrot roots were washed thoroughly, both ends were removed, peeled by sharp knife and cut longitudinally into halves. These halves were steam blanched for

five minutes to inactivate pectinase and peroxidase enzymes, in addition to tenderization the carrot tissues. The juice was obtained by blending in blender with sieves.

Lassi manufacture: Carrot lassi was prepared by obtaining standard milk from the herd. Standard milk was heated at 95 °C for 5 min. Then it was cooled at 40 °C. The carrot juice was added as per treatment. Starter culture was inoculated at the rate of 2 per cent. Dahi was incubated to settle at 42 °C for 6 hours. Coagulated dahi was broken and sugar was added as per treatment. It was then blended. After blending it was filled in container and stored at 5 °C (Fig. A).

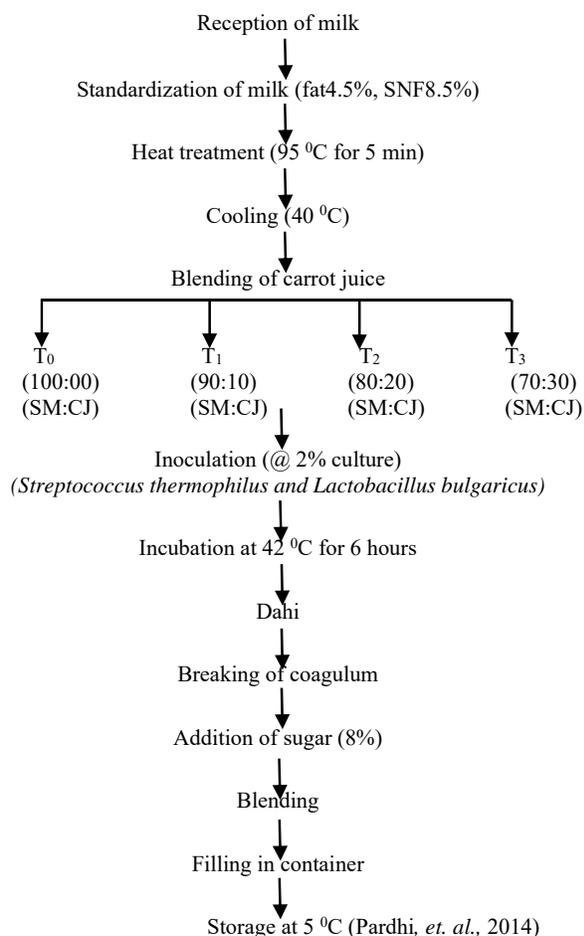


Fig. A: Flow chart for preparation of carrot Lassi

Treatment combination

- T₀ – Sample prepared from standardized milk (100:00)
- T₁ – Experimental sample prepared from carrot juice (90:10)
- T₂ - Experimental sample prepared from carrot juice (80:20)
- T₃ - Experimental sample prepared from carrot juice (70:30)
(Standardized Milk:Carrot Juice)

Sensory evaluation of Lassi

Lassi samples prepared under this study were evaluated sensorily by the panel of five trained judges adopting 9-point hedonic scale (Amerine *et al.*, 1965).

Chemical analysis of Lassi

The Lassi samples were analyzed for chemical parameters by

adopting standard procedure given below.

Fat was determined by Gerber method as described in IS: SP: 18, Part XI (1981) [11]. Protein was determined by Kjeldahl method as per AOAC (1995) [2]. Carbohydrate was estimated by Lane-Eynon’s method described in IS: 1479, Part II (1961) [9]. Ash was estimated by muffle furnace as described in Ranganna (1986) [11]. Total solids was determined by gravimetric method described in IS: SP: 18, Part XI (1981) [11]. PH of lassi was determined by digital pH meter. Titratable acidity of lassi (expressed as lactic acid) was determined by IS: 1479, Part I (1960) [8]. Curd tension and rate of curd syneresis were measured as described by EL-Shabrawy (1973) [5]. Antioxidant was determined by DPPH method described in Ranganna (1986) [11].

Microbial analysis of Lassi

In all treatment samples of Lassi and one control sample of Lassi were analyzed for different microbial parameters such as standard plate count, yeast and mould count and coliform count by adopting standard procedure as per manual of Dairy Bacteriology ICAR (1972) [7].

Statistical design

Data was analysed using Analysis of Variance (ANOVA) and Critical difference (C.D) in WASP software and excel software.

Cost estimation of manufacturing Lassi

The cost estimation (Rs./Liter) of the product was worked out by taking into account the prevailing market rates of the ingredients used for preparation of carrot Lassi.

Results and Discussion

The results of the present study as well as relevant discussions have been presented under following sub heads and Table 1 to 3.

Initial quality of standardized milk

The flavor, appearance and colour of the milk sample was normal. The mean values of fat, protein, lactose and ash for standardized milk were 4.5 per cent, 3.4 per cent, 4.4 per cent, and 0.7 per cent respectively (Table 1).

Initial quality of carrot juice

The fat (%), protein (%), carbohydrate (%) and ash (%) of carrot juice sample were 0.20, 0.90, 10.3 and 1.10 respectively (Table 1).

Table 1: Chemical composition of standardized milk and carrot juice (Mean)*.

Parameters	Fat (%)	Protein (%)	Carbohydrate (%)	Ash (%)
Standardized milk	4.5	3.4	4.4	0.7
Carrot juice	0.20	0.90	10.3	1.10

*Average of five trials.

Sensory evaluation of Lassi

The score of colour & appearance, body & texture, flavour & taste as well as the overall acceptability of different types of lassi were compiled in Table 2. The highest sensory evaluation shown for colour and appearance, body and texture, flavor and taste and overall acceptability is for Lassi prepared by using 10 per cent carrot juice with the score 8.30, 8.00, 8.36 and 8.20 respectively.

Table 2: Sensory evaluation score of lassi (Mean)*.

Parameters	Types of Lassi				S. Ed ±	C.D. at 5%	Result
	T ₀	T ₁	T ₂	T ₃			
Colour & Appearance	6.58	8.30	7.68	7.02	0.16	0.34	Significant
Body & Texture	6.61	8.00	7.68	7.42	0.27	0.58	Significant
Flavour & Taste	6.68	8.36	7.62	7.30	0.20	0.44	Significant
Overall Acceptability	6.61	8.20	7.63	7.18	0.19	0.41	Significant

*Average of five trials.

Chemical evaluation of Lassi

The total solids (%), fat (%), protein (%), carbohydrate (%), ash (%), pH, acidity (%), curd tension, curd syneresis and antioxidant of different types of lassi were compiled in Table 3. Fat content of carrot juice fortified Lassi ranges from 3.81 to 2.31 per cent. The higher fat content is observed in control treatment. The fat content of Lassi samples decreases as increase in the level of carrot juice. Protein content ranges from 3.53 to 2.82. Carbohydrate content ranges from 13.16 to

16.85. Carbohydrate content increases as increase in the level of carrot juice. The ash content ranges from 0.68 to 0.81. Total solid content observed to be 21.18, 21.73, 22.34 and 22.79 per cent. Acidity (% LA) ranges from 0.73 to 1.04 per cent. The pH values observed from 4.43 to 3.98. Curd tension (g) of curd ranges from 23.12 to 14.90. Curd syneresis (ml/100ml) of curd ranges from 4.70 to 10.55. Antioxidant ranges from 1.18 to 0.54.

Table 3: Chemical evaluation of Lassi (Mean)*.

Parameters	Types of Lassi				S.Ed. ±	C.D. at 5%	Result
	T ₀	T ₁	T ₂	T ₃			
Total Solids (%)	21.18	21.73	22.34	22.79	0.14	0.30	Significant
Fat (%)	3.81	3.31	2.91	2.31	0.03	0.06	Significant
Protein (%)	3.53	3.23	3.00	2.82	0.15	0.33	Significant
Carbohydrate (%)	13.16	14.48	15.68	16.85	0.15	0.33	Significant
Ash (%)	0.68	0.71	0.75	0.81	0.02	0.03	Significant
pH	4.43	4.28	4.14	3.98	0.02	0.03	Significant
Acidity (% Lactic acid)	0.73	0.86	0.96	1.04	0.02	0.05	Significant
Curd tension (g) of curd	23.12	18.75	17.24	14.90	0.18	0.39	Significant
Curd syneresis(ml/100ml) of curd	4.70	6.40	9.12	10.55	0.21	0.47	Significant
Anti-oxidant (%)	1.18	0.82	0.67	0.54	0.02	0.03	Significant

*Average of five trials.

Microbial evaluation of Lassi

The standard plate count ($\times 10^3$ cfu/ml), yeast and mould (cfu/ml) and coliform of different types of lassi were compiled in Table 4. SPC ranges from 19.00 to 15.80. Yeast

and mould ranges from 7.80 to 5.40. Coliforms were not detected in any of the Lassi samples, which is an indicative that the Lassi samples were free from coliforms and hence, safe for consumption.

Table 4: Microbial evaluation of lassi (Mean)*.

Parameters	Types of Lassi				S.Ed. ±	C.D. at 5%	Result
	T ₀	T ₁	T ₂	T ₃			
SPC ($\times 10^3$ cfu/ml)	19.00	17.60	16.60	15.80	1.03	2.24	Significant
Yeast & Mould (cfu/ml)	7.80	6.60	6.20	5.40	0.66	1.43	Significant
Coliform	Nil	Nil	Nil	Nil	-	-	-

*Average of five trials.

Cost structure of carrot Lassi

All the ingredients required for preparation of Lassi were rated as per prevailing market prices (2016-2017). The cost of one liter lassi of treatments T₀, T₁, T₂, T₃ was Rs. 40.00, 41.85, 43.70 and 45.55 respectively.

Conclusion

It may be concluded that good quality, nutritionally enriched and value added lassi with more acceptability can be prepared by addition of carrot juice. It is suitable among all groups of consumers.

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