IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 9, Issue 1 Ver. II (Jan. 2016), PP 53-56
www.iosrjournals.org

Studies on Storage Qualities of Singori (A Type of Sweet) of Kumaon Reagion

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Abstract: *To Know The Microbiological Quality Of Singori After Storage We Examined The Samples At 5 Days Intervals. The Hardness, Adhesiveness, Guminess, Chewiness And Cohesiveness Of Any Stored Singori Was Remained Significantly Unchanged Throughout The Study Period. However, The Colour, Flavor, Body Texture And Overall Acceptability Of Both Kind Of Stored Singori Significantly (P≤0.5) Changed On 10th Day Onwards. We Recorded The Totasl Solids, Moisture Content, Fat And Protein And Tyrocine, Of Singori Samples Significantly (P≤0.5) Different On 15th Day Onwards, But Ph, Acidity, Soluble Nitrogen Free Fatty Acid, Proteolitic Activity And Lipolytic Activity Of Singori Samples Significantly (P≤0.5) Changed On 10th Day Onwards. Microbiological Quality Of Singori As For As TVC As Well As Yeast And Mold Started Significantly (P≤0.5) Increasing On Day 10 Onwards In Room Temperature Stored Samples Both. The Coliforms Could Not Be Detected In Singori Samples Either Stored At Room Temperature Or Under Refrigeration*.

I. Introduction

Singori is a khoa based sweet of Uttarakhand originated in Almora. Singori has white color, sweet caramel flavor, slightly granular in texture and is rolled in malu leaves. It is prepared from khoa made by desiccation of cow or buffalo milk, addition of sugar, tartaric acid for granulation and flavourings. The traditional process of singori manufacture over the years has remained essentially confined to the unorganized sector and has invariably proved to be energy and labour intensive. Singori occupies an important place among indigenous milk products of Kumaon. However, no research has been done, therefore, scientific evidences from systemic research are likely to add new dimensions in the area of indigenous milk products technology specially singori. In view of the facts stated, the present investigation was envisaged to access the storage stability of singori, under different storage condition with a view to extend its shelf life.

II. Material and Methods

The packed singori was stored at room and refrigerated (5±1ºC) temperature and analyzed for the physio-chemical and microbiological attributes at 5 days intervals for 15 days. The hardness, adhesiveness, guminess, chewiness, cohesiveness, colour, flavor, body texture and overall acceptability was estimated using semi-trained panel comprising of 10 panelists drawn from faculty members and post graduate students of Department of livestock product technology of the college of veterinary and animal sciences, Pantnagar. The Total solids, moisture, protein, pH, acidity and proteolytic as well as lipolytic activity were determined by AOAC (1984) procedures. The soluble nitrogen, free fatty acids and tyrocine was estimated by Ramamurthy and Narayana (1974). The microbial analysis was conducted by methods of Sharma *et al.*, (1972).

III. Result and Discussion

Samples of singori then stored at room (30±2 ^{0}C) temperature and also at refrigeration (5±1 ^{0}C) for 15 days. Quality of singori was regularly examined at 5 days intervals for 15 days. For quality evaluation physico-chemical, microbiological and sensory attributes was carried out. The hardness, adhesiveness, guminess, chewiness and cohesiveness of any stored singori (table 1) was remained significantly unchanged throughout the study period in accordance with Kakkar (2004) on Balmithai. However, the colour, flavor, body texture and overall acceptability of both kind of stored singori significantly (P≤0.5) changed on 10th day onwards in both room temperature (6.65±0.12, 6.50±0.07, 6.98±0.04 and 6.71±0.04 respectively) and refrigerated (6.65±0.12, 6.50±0.07, 6.98±0.04 and 6.70±0.04 respectively) singori (table 2) Praneeta (2005) on Rasogolla made similar observations. We recorded the total solids, moisture fat and protein content of singori samples significantly (P≤0.5) different (Table 3) on 15th day onwards in room temperature (79.098±0.33, 21.230±0.19, 17.874±0.040 and 11.956±0.134 respectively) and well as refrigerated (79.10±0.34, 20.88±0.35, 17.87±0.04 and 11.96±0.13 respectively) samples significantly (P≤0.5) as also reported by Suresh and Jha (1994) in case of khoa.

Significant difference (P≤0.5) in pH (table 4) could be recorded from day 10, when pH of room temperature stored singori became 6.24±0.02 and refrigeration became 6.18±0.03. The significant (P≤0.5) increase in pH value occurred after 10 days of storage which remain up to 15th day of experimental period

ovservations in tune with Bhatel (1988). Similarly acidity of room temperature stored singori increased on day 10^{th} onwards significantly ($P \leq 0.5$) 0.580±0.005 and refrigeration became 0.48±0.01, that remained so increased till termination of study. The tyrocine value of stored at room temperature singori increased significantly ($P \leq 0.5$) on 15^{th} day (180.40±3.16) but in refrigerated (170.40±2.18) on 10^{th} day itself as also reported by Ghodekar *et. al.* (1980). The soluble nitrogen content of singori was started differing significantly ($P \leq 0.5$) as early as on day 10 of the storage. It was 0.704±0.005 in room temperature stored and 0.694±0.003 in refrigeration stored samples. At 15^{th} day (table 4) of storage the difference became too large and it was 0.842±0.033 in room temperature and 0.742±0.032 in fridge stored samples similer to the observation of Goyal and Srinivasan (1989).Similarly, the free fatty acid values of singori started increasing steadily fast in room temperature stored signori and differed significantly ($P \leq 0.5$) only from 10^{th} day onwards where the value of free fatty acid in room temperature stored sample was 1.860±0.25 and in refrigerated sample 1.760±0.26 on same day of experiment stored signori. The increasing trend was followed the experiment as also reported by Kumar and Srinivasan (1982) in khoa.

The microbiological quality of singori (table 5) started declining significantly ($P \leq 0.05$) on day 10^{th} onwards. Total viable count of singori started significant ($P \leq 0.5$) increasing trend in both kind of stored singori (82.20±4.28 and 62.20±3.38 respectively). Increase was remaining so till end of observation period. No proteolytic activity could be recorded in any freshly prepared singori and it remained so in refrigeration stored samples, but present in room temperature stored sample on day 10^{th} (66.40±1.63). It was there in both samples on day 15^{th}. The lipotytic count of singori stored at room temperature was 16.20±0.97 and in refrigerated sample 14.60±0.17 differing significantly ($P \leq 0.5$) and it remained significantly ($P \leq 0.5$) increased (17.80±1.50 and 16.70±0.93 respectively) till termination of study. Yeast and mold were found to be absent up to 5 days of both type of storage. But it could be detected on 10^{th} (20.80±0.86) and 15^{th} days (26.40±0.09) in room temperature stored singori samples but it could not be detected in samples kept under refrigeration. However, coliform count could not be detected in any day sample. Similar microbiological trends were observed by Praneeta (2005) on rasogolla.

IV. Conclusion

The average sensory scores for freshly prepared singori sample for colour and appearance, flavor and body and texture and overall acceptability were approximately 8.60±0.06, 8.37±0.06, 8.72±0.06, 7.85±0.22 and 8.37±0.06 respectively, but these attributes decreased significantly ($P \leq 0.5$) at a faster rate at room temperature as compared to refrigeration temperature. Microbiological quality of singori as for as TVC, Yeast and mold, proteolytic activity, lipotytic count and tyrosin started increasing on day 10 onwards in room temperature stored samples. The coliforms could not be detected in singori samples either stored at room temperature or under refrigeration. So looking into these parameters it seemed that singori could be stored at room temperature for less than 10 days and at refrigerated temperature less than 15^{th} days.

References

[1]. AOAC. 1984. Official methods of analysis. 14^{th} ed. Association of Official Analytical Chemisgs, Washington.
[2]. Bhatele, I. D. 1983. Studies on the production, packaging and preservation of burfi. Ph.D. Thesis, NDRI, Karnal, India.
[3]. Ghodekar, D.R.; Ranganathan, B. and Dudani, A.T. 1980. Yeast and molds in indigenous dairy products. Indian J. Dairy Sci., 33(3): 255-259.
[4]. Goyal, G.K. and Srinivasan, M. R. 1989. Effect of packaging on the chemical quality of khoa during storage. Indian Dairyman, 41(1): 165-170.
[5]. Kakkar, P. (2004) Studies on the preparation of Bal mithai: a traditional sweet of Uttaranchal. Submitted in G. B. Pant University of Agri. & Tech. Pantnagar. pp-3.
[6]. Kumar, G. and Srinivasan, M. R. 1982. Effect of packaging and storage on the sensory characteristic of khoa samples. Indian J. Dairy Sci., 35 (2): 132-137.
[7]. Praneeta (2005) Studies on effect of different storage temperature on physico-chemical, microbiological and sensory quality of Rasogolla. Submitted in G. B. Pant University of Agri. & Tech. Pantnagar. PP-3.
[8]. Ramaswamy, S. M. and Narayana M. R. (1974). Self life of chhena at different storage conditions. Asian J. Dairy Res. 18:191-193.
[9]. Sharma, G. R.; Saraswat, D. S. and Sharma, S. D. 1972. Studies on bacterial quality of khoa. Indian J. Dairy Sci. 25(1): 30-36.
[10]. Suresh, I and Jha, Y. K. 1994. Sensory, biochemical and microbiological qualities of kalakand. J. Food. Sci. Technol., 31(4): 330-332.

Table 1: Changes in hardness, adhesiveness, guminess, chewiness and cohesiveness of stored singori.

Storage days	Room temperature					Refrigerator temperature				
	Hardness	Adhesiveness	Guminess	Chewiness	Cohesiveness	Hardness	Adhesiveness	Guminess	Chewiness	Cohesiveness
0	176.0±0.71	21.6±0.51	73.60±1.03	90.20±0.58	0.620±0.011	176.0±0.71	21.6±0.51	73.60±1.03	90.20±0.58	0.620±0.011
5	178.0±0.81	21.6±0.51	73.00.±1.03	90.60±0.48	0.636±0.013	176.0±0.66	21.6±0.41	73.60±1.42	90.50±0.51	0.636±0.011
10	176.0±0.	21.6±0.51	73.60±1.	91.20±0.	0.636±0.0	177.0±0.	21.6±0.58	74.10±1.	91.70±0.	0.638±

	67		03	52	21	71		63	38	0.022
15	175.0±0.41	21.6±0.51	74.60±3.6	92.00±0.57	0.637±0.021	177.0±0.53	22.2±0.86	74.10±0.99	91.20±0.88	0.638±0.011

*Significant at 5% level ($p \leq 0.05$)

Table 2: Changes in colour, flavor, body texture and overall acceptability of stored singori.

Storage days	Room temperature				Refrigerator temperature			
	Colour	Flavour	Body text.	Overall accepta.	Colour	Flavour	Body text.	Overall accepta.
0	8.60±0.06	8.72±0.06	7.85±0.22	8.37±0.06	8.61±0.06	8.72±0.06	7.85±0.22	8.38±0.17
5	7.58±0.06	7.74±0.07	7.32±0.13	7.542±0.02	8.61±0.06	8.72±0.06	7.85±0.22	8.38±0.17
10	6.65±0.12*	6.50±0.07*	6.98±0.04*	6.71±0.04*	6.65±0.12*	6.50±0.07*	6.98±0.04*	6.70±0.04*
15	5.96±0.05*	6.06±0.08*	6.72±0.04*	6.24±0.047*	5.96±0.05*	6.06±0.08*	6.72±0.04*	6.24±0.05*

*Significant at 5% level ($p \leq 0.05$)

Table 3: Changes in total solids, moisture contents, fat and protein of stored singori.

Storage days	Room temperature				Refrigerator temperature			
	Total solids	Moisture contents	Fat	Protein	Total solids	Moisture contents	Fat	Protein Cohesiveness
0	80.208±0.37	19.392±0.42	19.874±0.309	14.228±0.328	80.21±0.37	19.39±0.42	19.87±0.31	14.23±0.33
5	80.582±0.41	19.418±0.41	19.494±0.162	13.028±0.017	80.18±0.36	17.82±1.70	19.87±0.31	14.23±0.33
10	80.550±0.16	19.450±0.16	18.658±0.185	12.598±0.076	80.55±0.16	19.45±0.16	18.66±0.19	12.60±0.08
15	79.098±0.33*	21.230±0.19*	17.874±0.040*	11.956±0.134*	79.10±0.34*	20.88±0.35*	17.87±0.04*	11.96±0.13*

*Significant at 5% level ($p \leq 0.05$)

Table 4: Changes in pH, acidity, tyrocine, soluble nitrogen and free fatty acids of stored singori.

Storage days	Room temperature					Refrigerator temperature				
	pH (Mean ±SEM)	Acidity (Mean ±SEM) %	Tyrosine (%)	Sol. N (%)	FFA	pH (Mean ±SEM)	Acidity (Mean ±SEM)%	Tyrosine (%)	Sol. N (%)	FFA
0	5.44±0.16	0.454±0.024	159..00±1.18	0.256±0.004	0.112±0.005	5.44±0.16	0.45±0.02	159.00±1.18	0.256±0.004	0.112±0.005
5	5.60±0.03	0.466±0.007	164.80±0.37	0.464±0.006	0.950±0.023	6.00±0.03	0.47±0.01	164.80±0.37	0.474±0.004	0.860±0.02
10	6.24±0.02*	0.580±0.005*	170.40±2.18	0.704±0.005*	1.860±0.245*	6.18±0.03*	0.48±0.01*	170.40±2.18*	0.694±0.003*	1.760±0.26*
15	6.34±0.02*	0.596±0.019*	180.40±3.16*	0.842±0.033*	2.930±0.025*	6.04±0.02*	0.52±0.02*	180.40±3.61*	0.742±0.032*	2.830±0.01*

*Significant at 5% level ($p \leq 0.05$)

Table 5: Changes in TVC, Proteolytic activity, lipolylitic, activity, yeast as well as mold and coli form of count stored singori.

Storage days	Room temperature					Refrigerator temperature				
	TVC	Proteolytic activity	Lipolytic activity	Yeast & Mould	COLI	TVC	Proteolytic activity	Lipolytic activity	Yeast & Mould	COLI
0	48.60±1.83	0.00±0.00	0.00±0.00	0.00±0.00	0.00	48.60±1.83	0.00±0.00	0.00±0.00	0.00±0.00	0.00
5	82.20±4.28*	0.00±0.00	0.00±0.00	0.00±0.00	0.00	62.20±3.38*	0.00±0.00	0.00±0.00	0.00±0.00	0.00
10	102.80±4.39*	66.40±1.63*	16.20±0.97*	20.80±0.86*	0.00	92.80±3.33*	66.40±1.63*	14.60±0.17*	0.00±0.00	0.00
15	183.00±13.92*	76.00±5.10*	17.80±1.50*	26.40±0.09*	0.00	123.00±13.93*	81.80±7.23*	16.70±0.93*	0.00±0.00	0.00

*Significant at 5% level ($p \leq 0.05$)