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Sensory quality of *Shrikhand* prepared by using cardamom and saffron

U.M. DANDILE, **B.K. PAWAR AND** D.M. CHOUDHARI

ABSTRACT : *Shrikhand* was prepared by adopting standard procedure. Freeze dried *Dahi* culture LF – 40, was used, which was obtained from NDRI Karnal. The product was served to a panel of semi trained judges to know its acceptability. The data so obtained was pooled and overall acceptability was worked out. The *Shrikhand* prepared by 0.020 per cent saffron and 0.50 per cent cardamom and 40 per cent sugar was superior in the colour and appearance, body and texture, flavour and overall acceptability of treatment T_4 secured maximum score than treatments T_0, T_1, T_2, T_3, respectively. But treatments T_2 which prepared by addition of 0.020 per cent saffron and 0.25 per cent cardamom which secured highest score for acidity and similar score for body and texture was 8.31 and 8.36, respectively.

KEY WORDS : Milk, *Chakka*, Saffron, Cardamom, Sensory, *Shrikhand*

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INTRODUCTION

Fermented milk products have better keeping quality and are easily digestible because of breaking down of proteins into peptides and free amino acids as a result of microbial action. They are highly nutritious because of increased vitamin content as a result of use of selective cultures. The *Shrikhand* is one of the leading indigenous fermented milk products in the Indian diet. The *Shrikhand* is produced commercially in western region of India particularly in the Maharashtra, Gujarat, Karnataka and some part of Northen India. The advantage of *Shrikhand* is that the shelf-life of *Shrikhand* is more than milk and *dahi*. It has its popularity because of its refreshing taste, pleasing aroma, smooth, homogeneous texture and firm consistency. It has a high calorific value and importance in nutrition due to high milk fat and protein content. It is palatable and people who dislike milk or are milk intolerant, consume it readily. It seems to exert a possible, therapeutic value during intestinal disorders.

Shrikhand is highly perishable dairy product with an average shelf-life of 1 or 2 days at room temperature under Indian conditions. *Shrikhand* is most susceptible to microbial spoilage due to unhygienic practices adopted during handling after the manufacture and storage, which is due to surface contamination. Therefore, the major spoilage of *Shrikhand* is due to microbial growth. Though chemically or artificially prepared preservatives given good results but raised a fear among the consumers, due to hazardous effects on health. Consumers are also demanding the food with long shelf-life and absence of risk of food borne diseases. This has put pressure on the food industry for progressive reduction or elimination of chemical preservatives and adoption of natural alternatives to achieve safely in food. This has naturally led to increasing search for new technologies for use in food preservation system.

Still little information is available on preservative and antimicrobial role of species in the preservation of microbial spoilage of foods (Arora and Kaur, 1999). Herbs and species provide such an example of additives that are naturally available and consume by us everyday. The dairy industry can use them effectively in products to replace synthetic

MEMBERS OF RESEARCH FORUM

Address for correspondence :
B.K. Pawar, Division of Animal Science and Dairy Science, College of Agriculture, PUNE (M.S.) INDIA
Email : balrajdairy_2007@rediffmail.com

Associated Authors' :
U.M. Dandile and D.M. Choudhari, Division of Animal Science and Dairy Science, College of Agriculture, PUNE (M.S.) INDIA

preservatives. These products are becoming famous in market as they have nutritional attributes as well as health benefits *viz.,* anticholesteromic, antihypertensive, anticarcinogenic, antimutagenic and immunomodulating (Dharmananda, 2005). Therefore, in the present investigation, efforts have been made to enhance the shelf-life of *Shrikhand* using herbal preservatives *viz.,* saffron and cardamom.

MATERIAL AND METHODS

Freeze dried culture of LF-40 (*Lactic fermenti*) obtained from the Division of Dairy Microbiology, National Dairy Research Institute, Karnal was used to set *dahi*, for all trials. Culture was propagated and maintained as per the directives given by National Dairy Research Institute, Karnal. In order to keep the culture active, it was propagated once in a week. It was stored at 5^0C in a refrigerator and at most care was taken to avoid contamination of culture. The saffron purchased from Pune, cardamom purchased from local market and crystalline cane sugar purchased from local market was used for preparation of *Shrikhand*.

Initially preliminary trials were conducted with 5 levels of saffron *viz.,* 0.005, 0.010, 0.015, 0.020, .025 per cent and cardamom levels *viz.,* 0.25, 0.50, 0.75, 1.00, 1.25 per cent using 40 per cent sugar by weight of *chakka*. It was observed that 0.005 per cent and 0.010 per cent level of saffron did not give noticeable change in flavour. The higher level 0.025 per cent of saffron and 0.75, 1.00, 1.25 per cent of cardamom gave much pronounced flavour. So the levels of saffron *viz.,* 0.005, 0.010, 0.025 per cent and levels of cardamom *viz.,* 0.75, 1.00, 1.25 per cent were deleted. Sugar level as fixed as 40 per cent by weight of *chakka*. Culture used for *Shrikhand* preparation was LF-40 which is a mild acid producer that is why through the sugar level lower than the normal (50 to 60 %), the product was accepted by all the judges without any objection.

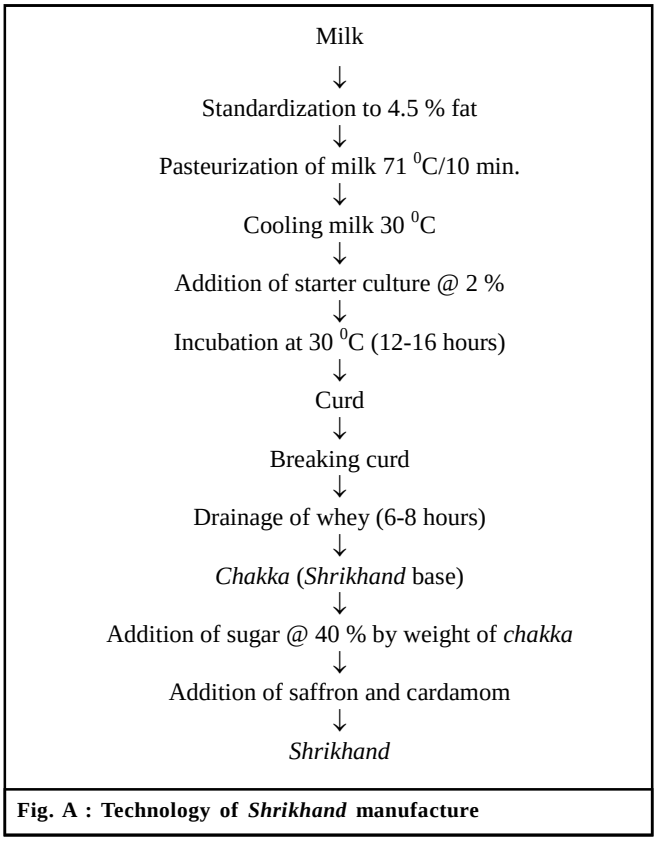

Fig. A : Technology of *Shrikhand* manufacture

Experimental trails:

In experimental trials two levels of saffron *viz.,* 0.015 and 0.020 per cent by weight of *chakka* and two level of cardamom *viz.,* 0.25 and 0.50 per cent by weight of *chakka* with constant level of sugar *i.e*. 40 per cent by weight of *chakka*. One control sample without addition of saffron and cardamom was also prepared for comparison. Thus, there were in all 5 treatments.

Details of treatment combination:

Saffron (S) = S_1: 0.015 per cent
S_2: 0.020 percent
Cardamom (C) = C_1: 0.25 per cent
C_2: 0.50.

Table A : Details of treatment combinations

Treatments	Saffron (%)	Cardamom (%)	Sugar (%)
T_0 : Control	-	-	40
T_1 : C_1S_1	0.015	0.25	40
T_2 : C_1S_2	0.020	0.25	40
T_3 : C_2S_1	0.015	0.50	40
T_4 : C_2S_2	0.020	0.50	40

The *Chakka* was divided into 5 portions and *Shrikhand* was prepared by adding sugar and saffron and cardamom as per the treatment details. It was mixed and kneaded to a smooth paste and store in refrigerator until taken for organoleptic and chemical analysis. Separate samples were drawn for respective analysis.

Samples of *Shrikhand* were examined for chemical constituents immediately after the organoleptic evaluation and based on organoleptic evaluation we were selected best combination during self-life study. *Shrikhand* was analyzed for moisture, fat, protein, total solid, total sugar, acidity and pH as per the standard procedure. Completely Randomized Design was used with 5 replications.

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Organoleptic quality of Shrikhand:

The panel of semi trained judges consisting of five members was given samples of fresh and refrigerated stored (for 24 days) from the five treatments for evaluation of their organoleptic qualities by using 9 point Hedonic scale developed by Gupta (1976). Each treatment was given code number which was changed during each replication so as to avoid its identity.

Colour and appearance:

The score for colour and appearance of *Shrikhand* are presented in Table 1, statistically significant. The colour and appearance score varied from 7.40 to 8.56 on fresh *Shrikhand* sample. A gradual increase in the colour and appearance score was noticed during 0 to 3 rd day of storage, but gradual decline was also observed in the colour and appearance score during storage after 3rd day of storage. Treatment T_0 became acceptable up to 15th day of storage and samples T_1, T_2, T_3 and T_4 acceptable up to 21st day of storage. T_4 had highest colour and appearance score as 8.70.

Body and texture:

The score on organoleptic evaluation of *Shrikhand* for body and texture attribute are presented in Table 2, statistically significant. The body and texture score of fresh samples ranged from 7.39 to 8.13 and on 9th day of storage ranged from 7.07 to 8.03 while sample T_1, T_2, T_3 and T_4 recorded score from 5.34 to 7.85, 5.48 to 8.36, 4.87 to 7.75 and 5.58 to 8.36, respectively during storage period. Control to became acceptable up to 15th day of storage and remaining samples T_1, T_2, T_3 and T_4 acceptable up to 21st day of storage. Treatment T_4 had highest body and texture score as 8.36 over other treatments.

Flavour:

The score on organoleptic evaluation of *Shrikhand* for flavor attribute are presented in Table 3, statistically significant. It is apparent from the data presented in Table 3 that flavour values increased up to 3rd day and slowly decreased continuously during storage period. The flavour, a most important component of sensory quality did not show significant difference among the treatments but in storage study indicated that highly significant effect on days. A gradual deterioration was observed in the flavour score during storage. To became acceptable up to 15th day of storage and remaining samples T_1, T_2, T_3 and T_4 acceptable up to 21st day of storage. Treatment T_4 had highest flavour score as 8.28 over other treatment.

Table 1 : Effect of saffron and cardamom on colour and appearance of *Shrikhand* during storage at 7 ±1^{0}C

Treatments	Storage period (days)								
	0	3	6	9	12	15	18	21	24
T_0	7.40	7.56	7.34	6.74	6.50	4.64	-	-	-
T_1	7.55	7.70	7.48	7.18	7.06	6.76	6.59	4.53	-
T_2	8.49	8.59	8.37	8.22	7.80	7.63	7.06	5.81	-
T_3	7.54	7.63	7.46	7.37	7.03	6.66	6.23	4.13	-
T_4	8.56	8.70	8.57	8.45	8.13	7.65	7.30	5.83	-
Mean	7.91	8.04	7.84	7.59	7.30	6.67	5.43	4.06	-
S.E.±	0.063	0.062	0.085	0.10	0.096	0.17	0.11	0.12	-
C.D. at 5%	0.20	0.19	0.26	0.31	0.30	0.56	0.36	0.40	-
	Significant								

Table 2: Effect of saffron and cardamom on body and texture of *Shrikhand* during storage at 7 ±1^{0}C

Treatments	Storage period (days)								
	0	3	6	9	12	15	18	21	24
T_0	7.39	7.55	7.33	7.07	6.94	5.32	-	-	-
T_1	7.68	7.85	7.60	7.54	7.34	7.24	7.10	5.34	-
T_2	8.01	8.36	8.06	7.95	7.64	7.54	7.17	5.48	-
T_3	7.65	7.75	7.59	7.51	7.28	7.08	6.96	4.87	-
T_4	8.13	8.36	8.17	8.03	7.67	7.51	7.20	5.58	-
Mean	7.77	7.97	7.75	7.62	7.37	6.94	5.69	4.25	-
S.E.±	0.073	0.10	0.062	0.074	0.075	0.095	0.042	0.12	-
C.D. at 5%	0.23	0.34	0.19	0.23	0.23	0.30	0.13	0.40	-
	Significant								

Acidity:

The score allotted for acidity as a sensory attribute of *Shrikhand* are presented in Table 4, showed statistically significant. The acidity score varied from 7.41 to 7.94 on the day of production. Acidity score increased up to 3rd day and after 3rd day decreased the acidity score. Treatment T_0 remain acceptable up to 15th day of storage. Treatment T_1, T_2, T_3 and T_4 became acceptable up to 21st day of storage when it were classed between "neither like nor dislike" during storage. Treatment T_2 had highest acidity score as 8.31 over other treatments.

Overall acceptability

The score for overall acceptability of *Shrikhand* are presented in Table 5 statistically significant. The overall acceptability score varied from 7.58 to 8.23 of fresh sample of *Shrikhand*. A gradual increased in the overall acceptability score was noticed during 0 to 3rd day of storage but decreased in the

Table 3: Effect of saffron and cardamom on flavor of *Shrikhand* during storage at 7 ±1^{0}C

Treatments	Storage period (days)								
	0	3	6	9	12	15	18	21	24
T_0	7.48	7.60	7.38	7.13	6.91	5.67	-	-	-
T_1	7.64	7.76	7.56	7.48	7.26	7.20	6.84	5.06	-
T_2	7.78	0.04	7.63	7.54	7.31	7.25	6.93	5.20	-
T_3	8.09	8.26	7.99	7.88	7.61	7.51	7.03	5.44	-
T_4	8.13	8.28	8.06	7.89	7.61	7.38	6.97	5.37	-
Mean	7.82	7.99	7.72	7.58	7.34	7.00	5.55	4.21	-
S.E.±	0.033	0.040	0.030	0.026	0.034	0.92	0.034	0.049	-
C.D. at 5%	0.10	0.12	0.095	0.082	0.11	0.29	0.10	0.15	-
	Significant								

Table 4: Effect of saffron and cardamom on acidity of *Shrikhand* during storage at 7 ±1^{0}C

Treatments	Storage period (days)								
	0	3	6	9	12	15	18	21	24
T_0	7.41	7.53	7.29	7.02	6.92	4.68	-	-	-
T_1	7.93	8.16	7.85	7.77	7.56	7.38	7.18	5.19	-
T_2	8.06	8.31	7.94	7.85	7.56	7.48	7.18	5.18	-
T_3	7.71	7.93	7.97	7.81	7.55	7.47	7.20	5.10	-
T_4	7.94	8.14	7.83	7.79	7.53	7.46	7.14	5.25	-
Mean	7.81	8.01	7.77	7.69	7.42	6.89	5.74	4.14	-
S.E.±	0.067	0.072	0.08	0.074	0.073	0.059	0.038	0.064	-
C.D. at 5%	0.21	0.22	0.26	0.23	0.23	0.18	0.12	0.20	-
	Significant								

Table 5 : Effect of saffron and cardamom on overall acceptability of *Shrikhand* during storage at 7 ±1^{0}C

Treatments	Storage period (days)								
	0	3	6	9	12	15	18	21	24
T_0	7.58	7.64	7.70	7.57	7.01	6.42	-	-	-
T_1	7.94	7.98	8.03	7.86	7.75	7.11	6.69	5.20	-
T_2	8.15	8.17	8.23	7.99	7.75	7.44	6.48	5.10	-
T_3	8.10	8.13	8.18	7.90	7.47	7.22	6.28	5.25	-
T_4	8.23	8.26	8.28	8.19	7.87	7.27	6.33	5.23	-
Mean	8.00	8.03	8.08	7.90	7.57	7.09	5.15	4.15	-
S.E.±	0.021	0.023	0.01	0.054	0.10	0.11	0.09	0.07	-
C.D. at 5%	0.068	0.07	0.062	0.17	0.32	0.36	0.28	0.22	-
	Significant								

overall acceptability score after 3rd day of storage. Treatment T_0 became acceptable up to 15th day of storage and samples T_1, T_2, T_3, and T_4 acceptable up to 21st day of storage. Treatment T_4 had highest overall acceptability score as 8.28 over other treatment. T_4 treatment was superior for overall acceptability of *Shrikhand*.

Similar trend was noticed for sensory quality *i.e.* colour and appearance, body and texture, flavour, acidity and overall acceptability of *Shrikhand* by Jain *et al.* (2003).

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