

Effect of Orange Pulp and Chiku Pulp in Combination (1:1) on the Quality Characteristics of Shrikhand

¹Parveez Ahmad Para, ²Raheeqa Razvi and ³Nisar Ahmad Nisar

¹Department of Livestock Products Technology Arawali Veterinary College,
Bajor- 332001Rajasthan University of Veterinary and Animal Sciences,
Bikaner (Rajasthan) India

²Division of Veterinary Anatomy, DGCN, COVAS, Palampur, HP

³Division of Veterinary Pharmacology and Toxicology,
Arawali Veterinary College Sikar, Rajasthan

Abstract: A study was undertaken to evaluate the effect of orange pulp and chiku pulp in combination (1:1) on the quality attributes of Shrikhand. The pulp combination was incorporated at 0%, 7%, 14% and 21% level (replacing chakka) into the formulation of shrikhand. The proximate composition, physico-chemical and sensory properties of chicken nuggets were analyzed. Amongst the different physico-chemical parameters, a significant decrease ($p < 0.05$) in the protein, fat and ash percent of the Shrikhand was observed whereas moisture content and acidity increased significantly ($p < 0.05$) with increasing level of pulp combination. On the basis of various sensory parameters, Shrikhand containing 14% pulp combination was selected as optimum. The pulp combination had a significant ($p < 0.05$) influence on colour and appearance, flavour, body and texture, sweetness and overall acceptability of the Shrikhand. Orange pulp and chiku pulp in combination (1:1) can be successfully incorporated in the preparation of *Shrikhand* without adversely affecting the quality of the product.

Key words: Acidity · Chiku Pulp · Orange Pulp · Physicochemical Parameters · Shrikhand · Sensory Attributes

INTRODUCTION

Shrikhand is a traditional indigenous fermented semi soft, sweetened whole milk product prepared using Chakka (strained dahi). There is a continuous demand for traditional, high quality dairy products, despite increasing competition from non-dairy based products [1]. From last few decades the demand for yogurt has increased considerably [2], especially in the United Kingdom [3] and United States [4] (Sivak, 2000), due to yogurt's nutritional and therapeutic benefits [5]. Yogurt has become a popular vehicle for the incorporation of probiotic cultures such as *Bifidobacterium bifidum* and *Lactobacillus acidophilus* for improved health and nutrition [6]. Consumers, especially children, demand novel formulations more than traditional ones like plain

Shrikhand. Introduction of various fruit-flavoured milk products can significantly improve the consumption. People who don't drink milk because they cannot digest lactose; consume yoghurt which contains less lactose [7,8]. Fruits may be added to Shrikhand formulae as single or blends in the form of refrigerated, frozen, canned fruit, juice or syrup. Incorporation of fruits endorses the healthy image of milk products.

MATERIAL AND METHODS

Preparation of Shrikhand: Fresh cow milk was procured from ILFC Arawali Veterinary College Sikar, Rajasthan and standardized at 4% fat and 8.5% SNF (Solid not fat). Dahi was procured from local market and used as culture. Milk was boiled and then cooled down at 28°C and inoculated

by the previous day dahi at the rate of 1.5% and incubated at 25-28°C for 12-14 h until a firm coagulum was formed. Coagulum was then crushed and was transferred to a double muslin cloth and hung for expulsion of whey for 8-10 h in refrigerated conditions (4±1°C). The semi solid chakka obtained after drainage of whey was used as the base for Shrikhand. Based on the various preliminary trials the level of sugar was adjusted at 35%. The sugar was converted to powder in mixer-grinder before use and the mixture was well kneaded for uniform mixing. Shrikhand was prepared by using different levels of chiku pulp and orange pulp in combination (50:50) viz. 7, 14 and 21% replacing chakka in the formulation. Shrikhand prepared without chiku pulp and orange pulp combination (50:50) served as control and was compared with other treatments.

Fruit Pulp: Chiku and orange were obtained from local market of Sikar, peeled properly, cut into smaller pieces and ground in a mixer to make paste. The paste of chiku pulp and orange pulp was mixed in 1:1 ratio concentration. The mixture was thereafter incorporated at 0, 7, 14 and 21% replacing chakka in the formulation.

Sensory Evaluation: Sensory evaluation of fresh samples was done by a panel of seven semi trained members, based on a 8-point hedonic scale, wherein 8 denoted extremely desirable and 1 denoted extremely undesirable [9].

Water was provided for oral rinsing between the samples.

Analytical Procedures: The moisture, fat, protein, ash contents and acidity (%) were examined according to the method of Association of Official Analytical Chemists [10].

Statistical Analysis: The results were analyzed statistically for analysis of variance and least significant difference tests using the software of Statistical Package for Social Sciences (SPSS 16.0) and Snedecor and Cochran [11].

RESULTS AND DISCUSSION

Proximate Composition and Acidity (Presented in Table No.1): Mean moisture values of Shrikhand increased significantly ($p < 0.05$) with increasing level of pulp combination. This may be due to the high moisture content of pulp in comparison to the chakka. Similar findings were reported in Shrikhand prepared by apple

Table 1: Effect of pulp combination on the proximate composition and acidity of Shrikhand. (Mean ± SE)^a

Parameters	Levels of Incorporation (%)			
	0	7	14	21
Moisture (%)	53.16 ± 0.10 ^c	55.08 ± 0.27 ^b	56.83 ± 0.40 ^c	58.25 ± 0.28 ^d
Protein (%)	7.27 ± 0.28 ^e	6.11 ± 0.28 ^b	5.44 ± 0.15 ^b	4.34 ± 0.16 ^a
Fat (%)	12.07 ± 0.26 ^c	11.44 ± 0.13 ^c	10.34 ± 0.20 ^b	9.10 ± 0.27 ^a
Ash (%)	0.82 ± 0.02 ^d	0.64 ± 0.02 ^c	0.50 ± 0.01 ^b	0.40 ± 0.01 ^a
Acidity (%)	0.83 ± 0.02	0.90 ± 0.02	1.00 ± 0.25	1.15 ± 0.04

^aMean ± SE with different superscripts in a row differs significantly ($p < 0.05$), n = 6 for each treatment.

Table 2: Effect of pulp combination on sensory attributes of Shrikhand. (Mean ± SE)^a

Sensory Attributes	Levels of Incorporation (%)			
	0	7	14	21
Colour and appearance	7.50 ± 0.10 ^c	7.00 ± 0.17 ^b	6.95 ± 0.10 ^b	6.46 ± 0.10 ^a
Flavour	7.00 ± 0.06 ^c	7.02 ± 0.07 ^a	7.18 ± 0.04 ^a	7.37 ± 0.06 ^b
Body and texture	7.37 ± 0.06 ^c	7.00 ± 0.06 ^b	6.46 ± 0.10 ^a	6.25 ± 0.07 ^a
Sweetness	6.95 ± 0.10 ^a	7.04 ± 0.07 ^a	7.37 ± 0.03 ^b	7.49 ± 0.10 ^b
Overall acceptability	7.07 ± 0.07 ^b	7.00 ± 0.06 ^b	7.40 ± 0.04 ^c	6.49 ± 0.10 ^a

^aMean ± SE with different superscripts in a row differs significantly ($p < 0.05$). Mean values are scores on 8 point descriptive scale where 1- extremely poor and 8- extremely desirable. n = 21 for each treatment.

pulp incorporation [12]. A significantly ($p < 0.05$) decreasing trend was observed in the protein, fat and ash content of *Shrikhand* with increasing level of the pulp combination. The probable reason may be due to the lower protein, fat and ash content of the pulp combination in comparison to the chakka. Similar results were obtained Kumar *et al.* [12] in Shrikhand prepared by using apple pulp. Similar observations were also reported in papaya pulp incorporated Shrikhand [13]. Average acidity of the treatments showed a linear non significant ($p < 0.05$) decreasing trend with increasing levels of pulp combination incorporation.

Sensory Attributes (Presented in Table 2): The pulp combination had a significant ($p < 0.05$) influence on colour and appearance, flavour, body and texture, sweetness and overall acceptability of the Shrikhand. The colour and appearance scores showed significant ($p < 0.05$) decreasing trend with increase in pulp combination. Flavour and sweetness of Shrikhand showed a similar pattern. The scores were significantly ($p < 0.05$) higher in the treatments incorporated with 21% pulp combination as compared to rest of the treatments. Similar results were obtained in Shrikhand prepared by using apple pulp [12]. The mean body and texture scores decreased significantly ($p > 0.05$) with increasing levels of pulp combination. The mean body and texture score of control samples was significantly higher than other treatments. Similar results were obtained in Shrikhand

prepared by using apple pulp [12]. The mean overall acceptability was significantly ($p >0.05$) higher in Shrikhand incorporated with 14% pulp combination. Similar decline in the sensory attributes of the product with the increasing level of incorporation of papaya pulp in the manufacture of Shrikhand were reported [13].

CONCLUSION

Amongst the different physico-chemical parameters, a significant decrease ($p <0.05$) in the protein, fat and ash percent of the Shrikhand was observed whereas moisture content and acidity increased significantly ($p <0.05$) with increasing level of pulp combination. On the basis of various sensory parameters, Shrikhand containing 14% pulp combination was selected as optimum. The pulp combination had a significant ($p <0.05$) influence on colour and appearance, flavour, body and texture, sweetness and overall acceptability of the Shrikhand. Orange pulp and chiku pulp in combination (1:1) can be successfully incorporated in the preparation of *Shrikhand* without adversely affecting the quality of the product.

REFERENCES

1. Rathore, R., S. Middha and V. Dunkwal, 2007. Microbial safety while handling milk products. Proceedings of the Souvenir, International Conference on Traditional Dairy Products November 14-17, 2007, NDRI, Karnal, India, pp: 90-95.
2. Saavedra, J.M., A. Abi-Hanna, N. Moore and R.H. Yolken, 2004. Long-term consumption of infant formulas containing live probiotic bacteria: Tolerance and safety. *Am. J. Clin. Nutr.*, 79: 261-267.
3. Kowalska, A.A., Z. Jachnowicz and A. Babuchowski, 2000. Yogurt market in the United Kingdom. *Nat. Sci.*, 6: 131-141.
4. Sivak, C., 2000. Growth culture. *Dairy Field*. 183: 24-33.
5. Sarkar, S. and A.K. Misra, 2002. Yogurt: Nutritional and therapeutic significance. *Ind. J. Microbiol.*, 42: 275-287.
6. Sarkar, S., 2008. Innovations in Indian fermented milk products: A Review, *Food Biotechnology*. 22(1): 78-97.
7. Khalifa, M.E.A., A.E. Elgasim, A.H. Zaghoul and M.B. Mahfouz, 2011. Applications of inulin and mucilage as stabilizers in yoghurt production. *Am. J. Food Technol.*, 6: 31-39.
8. Sanful, R.E., 2009. The use of Tiger-nut (*Cyperus esculentus*), cow milk and their composite as substrates for yoghurt production. *Pak. J. Nutr.*, 8: 755-758.
9. Seman, D.L., W.G. Moody, J.D. Fox and N. Gay, 1987. Influence of Hot and Cold Boning on the Palatability, Textural and Economic Traits of Restructured Beef Steaks *J. Food Sci.*, 52: 879-882.
10. AOAC., 2000. Milk and milk products. In: *Official Methods of Analysis*. AOAC International, Gaithersburg, Maryland, USA.
11. Snedecor, G.W. and W.G. Cochran, 1997. In: *Statistical Methods*. 8th Edition. Oxford and IBH Publishing Co. Calcutta.
12. Kumar, S., Z.F. Bhat and P. Kumar, 2011. Effect of apple pulp and *Celosia argentea* on the quality characteristics of Shrikhand. *Am. J. Food Technol.* 6(9): 1-8.
13. Nigam, N., R. Singh and P.K. Upadhyay, 2009. Incorporation of Chakka by Papaya pulp in the manufacture of Shrikhand. *J. Dairyng. Foods & H.S.* 28(2): 115-118.