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Enhancement of Organoleptic Qualities of Shrikhand by Using Fruit Pulp

Manoj Gupta, M.P.S. Yadav and Anoop Singh Chauhan*

Deptt. of Animal Husbandry & Dairying

C.S. Azad University of Agriculture & Technology Kanpur, U.P. India – 208002

*Corresponding Author E-mail: aschauhan7569@gmail.com

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ABSTRACT

This study was conducted to evaluate the effect of fruit pulp on organoleptic and sensory quality shrikhand and also enhancing keeping quality, flavor, lowering cost of production. There were three types of fruit Mango, Banana and Papaya with four different levels of fruit pulp as 0%, 20%, 40% and 60%. These combinations were stored at five various storage periods viz. 0 days, 7 days, 14 days, 21 days and 28 days at 5 ^{0}C temperatures. This process was replicated three times. It was concluded that the organoleptic quality shrikhand was enhanced by using of Banana pulp at the level of 20 percent against the control. This combination was highly accepted at 0 days and it was accepted up to 21 days of storage period at 5^{0}C of refrigeration temperature.

Key words: *Shrikhand, Fruit, Organoleptic Quality and Storage Periods.*

INTRODUCTION

Shrikhand is an indigenous, semi-solid, sweetish-sour fermented milk product, prepared from dahi (curd). Whey is drained off from dahi to yield chakka. Sugar, flavours and colours are thoroughly mixed into chakka to form a soft homogeneous mass. Typically shrikhand contributes 39.0% moisture and 61.0% of total solids of which 10.0% is fat, 11.5% protein, 78.0% carbohydrates and 0.5% ash, on a dry matter basis with a pH of about 4.2-4.4[6,1]. Shrikhand is very much popular in western parts of the country due to its high nutritive, characteristics flavour, taste, palatable nature and possible therapeutic value. It is very refreshing, particularly during summer months. It can be recommended as health food for specific patients suffering from obesity and cardiovascular disease due to its low fat and sugar contents. It has the nutritive goodness of fermented milk products.

Mango fruit is an excellent source of Vitamin-A and flavonoids like *beta-carotene*, *alpha-carotene* and *beta-cryptoxanthin*. Fresh mango is a good source of potassium. 100 g fruit provides 156 mg of potassium while just 2 mg of sodium. Banana pulp is composed of soft, easily digestible flesh with simple sugars like fructose and sucrose that when eaten replenishes energy and revitalizes the body instantly. Fresh bananas provide adequate levels of minerals like copper, magnesium, and manganese.

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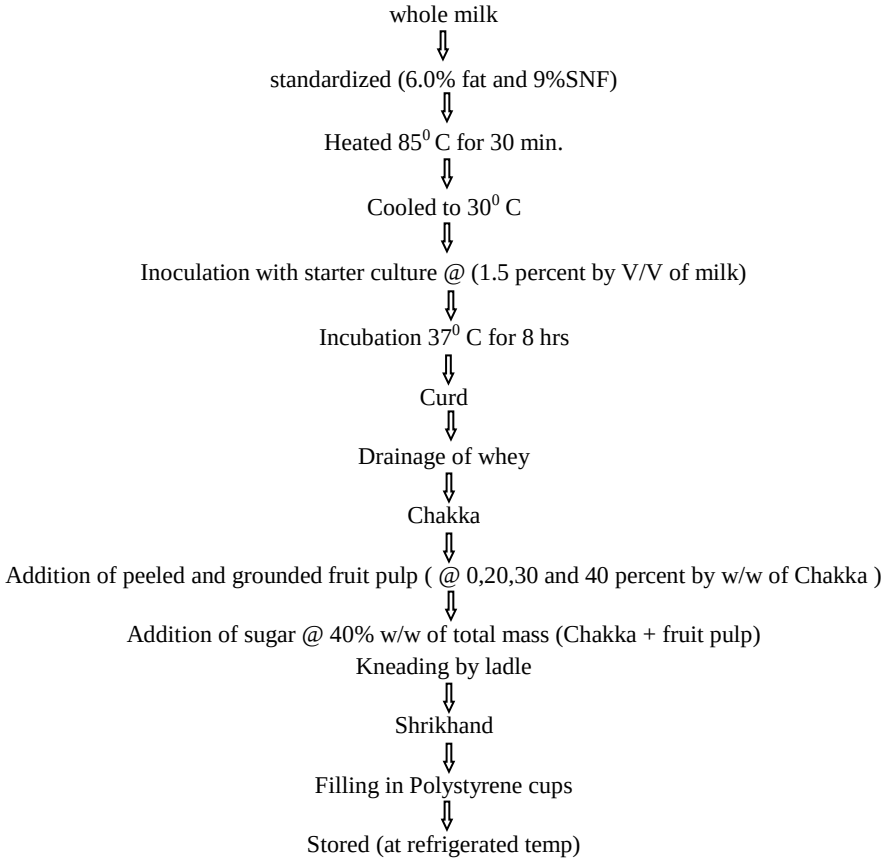
Papaya (*Carica papaya* L.) is a climacteric fruit with a soft and sweet pulp that contain a wide range of health promoting phytochemicals and natural fiber and essential minerals. Papayas also contain enzymes like arginine and carpain. The highest concentration of Vitamin C and Vitamin Papaya is low in calories and high in nutritive value, hence it is an excellent food for those on a diet.

So the product may have longer keeping quality, in addition to enhancing flavour and also lowering cost of production. Therefore, it is expected that, there may be greater demand and consumer's appeal to the newly formulated product. But there is very low information and research work available on this product regarding technological and chemical aspects. There are neither any guideline available about neither the desired composition nor any regulatory checks on the composition of the product and therefore, it is felt that fruit pulp added shrikhand should receive due attention in respect of its technology and composition.

MATERIAL AND METHODS

Fresh buffalo milk having 6.0 percent milk fat and 9.0 percent SNF was used for this research project. Fruits of the three types were used in this study, which are the under. Ripe mangoes (*Mangifera indica* ver. Dashahari) were obtained from local market. Ripen papaya (*Carica papaya* var. Pusa delicious) was obtained from local market. Ripen banana (*Musa Paradisica* var. Dwarf carendish) obtained from local market. White ground cane sugar of commercial grade was used as a sweetening agent, which obtained from theopen market of Kanpur city. It was ensured that the sugar was free from dust, dirt and other foreign impurities. Pure active culture of *lactococcus lactis* subsp. *lactis* obtained from Dairy Microbiology Division, National Dairy Research Institute, Karnal. Bacterial culture was propagated in sterilized skim milk to prevent strain compatibility. Polystyrene cups of 100g capacity were used for packing of shrikhand.

Flow diagram for shrikhand preparation



There were three types of fruits, Mango (A1), Banana (A2) and Papaya (A3) with four different levels of fruits pulp as 0% (B1) control level, 20% (B2), 40% (B3) and 60% (B4). These combinations were stored at five various storage periods viz. 0 days (C1), 7 days (C2), 14 days (C3), 21 days (C4) and 28 days (C5) at 5 ^{0}C temperatures. This process was replicated three times. The sensory evaluation of various attributes like flavour, colour and appearance, sweetness body and texture and overall acceptability was done by a panel of five expert judges, selected from the Department of Animal Husbandry and Dairying, Chandra Shekhar Azad University of Agriculture and Technology Kanpur, U.P., using nine points "Hedonic scale" for food and dairy products. The data on sensory evaluation, obtaining during the study were subjected for analysis of variance (ANOVA) as described by Snedecor and Cochran[7].

RESULTS AND DISCUSSIONS

Flavour

The flavour of fruit shrikhand has been considered the most important quality attribute. A pleasant sweet and sour taste should be maintained for long storage periods. The mild acidic taste and curdling are not desirable characteristics of Shrikhand. It should be free from foreign material, bitterness, saltiness and any other flavour. According to the findings, it was observed that the maximum flavour score of shrikhand was noticed with banana fruit pulp (A2) fallowed by mango (A1) and papaya (A3), respectively. 20 percent (B2) fruit pulp found to be superior over 40 percent (B3) and 60 percent (B4) in respect of control level (0%) (B1). At 0 days (C1) shrikhand obtained high organoleptic acceptance rather than 7, 14, 21 and 28 days. The overall combination of A2xB2xC1 got the maximum score (8.00) whereas the least score (5.000) found in A3xB4xC5 combination against the control combination. The highly accepted combination contained banana fruit with 20% pulp at 0 days. These findings are similar to the findings of Nigam *et al.*[3], who reported that 20% papaya pulp was superior over all other treatment combinations with other pulps up to 14 days. Narayan *et al.*[4], reported that 20% banana pulp containing maximum flavor score up to 14 days.

Colour and appearance

The colour and appearance of fruit pulp based shrikhand should be pleasing, attractive and uniform without showing any sign of visible matter. It was observed that the combination of A2xB2xC1 got the maximum score (7.80) whereas the least score (4.900) found in A3xB4xC5 combination against the control combination. The most acceptable combination was banana fruit with 20% pulp at 0 day. These findings are similar with the findings of Nigam *et al.* [3],who reported that 20% papaya pulp was superior over all other treatment combinations with other pulps up to 14 days. Narayan *et al.* [4],reported that 20% banana pulp containing maximum flavor score up to 14 days. From the analysis of variance, fruit pulp based shrikhand, it was observed that the main effect of A, B and C was recorded to be significant at 0.01% level of significance. The first order interactions and second order interaction were recorded to be non-significant.

Body and texture

The body and texture of fruit pulp based shrikhand should be pleasing, attractive and uniform without showing any sign of visible matter. It was observed that the combination of A2xB2xC1 got maximum score (7.700) whereas the least score (4.700) found in A3xB4xC5 combination in respect of the control combination. These findings are similar with the findings of Nigam *et al.*[3],who reported that 20% papaya pulp was superior over all other treatment combinations with other pulps up to 14 days. Narayan et al[4]. reported that 20% banana pulp containing maximum flavor score up to 14 days. From the analysis of variance, shrikhand, it was observed that the main effect of A, B and C was recorded to be significant at 0.01% level of significance. The first order interactions and second order interaction were recorded to be non-significant.

Sweetness

The sweetness of fruit pulp based shrikhand contained sugar than other dairy foods. The excessive sweetness should be avoided. It was observed that the combination of A2xB2xC1 got maximum score (7.600) whereas the least score (4.500) found in A3xB4xC5 combination against the control combination. These findings are similar with the findings of Nigam *et al.*[3], who reported that 20% papaya pulp was superior over all other treatment combinations with other pulps up to 14 days. Narayan *et al.* [4],reported that 20% banana pulp containing maximum flavor score up to 14 days. Chavan *et al.*[5], reported that 30-40% sucrose found to be better over all other combinations. From the analysis of variance, it was observed that the main effect of A, B and C was recorded to be significant at 0.01% level of significance. The first order interactions and second order interaction were recorded to be non-significant.

Overall acceptability

The overall acceptability of shrikhand, It was observed that the combination of A2xB1xC1 got maximum score (7.800) whereas the least score (4.800) found in A3xB4xC5 combination against the control combination. The highest acceptability recorded in the combination that contains banana fruit with 20% pulp at 0 day and least acceptability was in papaya fruit with 60% pulp at 30 day. These findings are dissimilar with the findings of Nigam *et al.*[3], who reported that 20% papaya pulp was superior over all other treatment combinations with other pulps up to 14 days. Narayan *et al.*[4],reported that 20% banana pulp containing maximum flavor score up to 14 days. From the analysis of variance, it was observed that the main effect of A, B and C was recorded to be significant at 0.01% level of significance. The first order interactions and second order interaction were recorded to be non-significant.

Table: findings of srikhand -

Combinations	Flavour	Body & texture	Colour & appearance	sweetness	Overall acceptability
A1B1C1	**8.0**	**7.7**	**7.9**	**7.8**	7.9
A1B1C2	7.5	7.2	7.3	7.4	7.4
A1B1C3	7.0	6.7	6.8	6.8	6.8
A1B1C4	6.5	6.2	6.3	6.4	6.4
A1B1C5	5.9	5.6	5.8	5.8	5.8
A1B2C1	**7.8**	**7.5**	**7.6**	**7.4**	7.6
A1B2C2	7.3	7.1	7.2	7.0	7.2
A1B2C3	6.8	6.6	6.7	6.5	6.7
A1B2C4	6.3	6.0	6.2	6.0	6.1
A1B2C5	5.8	5.4	5.6	5.5	5.6
A1B3C1	**7.5**	**7.1**	**7.3**	**7.2**	7.3
A1B3C2	7.0	6.5	6.7	6.7	6.7
A1B3C3	6.5	6.0	6.2	6.2	6.2
A1B3C4	6.0	5.5	5.7	5.8	5.8
A1B3C5	5.5	5.0	5.2	5.2	5.2
A1B4C1	**7.0**	**6.9**	**7.0**	**6.8**	6.9
A1B4C2	6.6	6.4	6.5	6.3	6.5
A1B4C3	6.1	5.9	6.0	5.9	6.0
A1B4C4	5.7	5.4	5.5	5.2	5.5
A1B4C5	5.3	4.9	5.0	4.8	5.0
A2B1C1	**8.2**	**7.9**	**8.1**	**8.0**	**8.1**
A2B1C2	7.7	7.4	7.5	7.6	7.6
A2B1C3	7.2	6.9	7.0	7.0	7.0
A2B1C4	6.7	6.4	6.5	6.6	6.6
A2B1C5	6.1	5.8	6.0	6.0	6.0
A2B2C1	**8.0**	**7.7**	**7.8**	**7.6**	**7.8**
A2B2C2	7.5	7.3	7.4	7.2	7.4

A2B2C3	7.0	6.8	6.9	6.7	6.9
A2B2C4	6.5	6.2	6.4	6.2	6.3
A2B2C5	6.0	5.6	5.8	5.7	5.8
A2B3C1	7.7	7.3	7.5	7.4	7.5
A2B3C2	7.2	6.7	6.9	6.9	6.9
A2B3C3	6.7	6.2	6.4	6.4	6.4
A2B3C4	6.2	5.7	5.9	6.0	6.0
A2B3C5	5.7	5.2	5.4	5.4	5.4
A2B4C1	7.2	7.1	7.2	7.0	7.1
A2B4C2	6.8	6.6	6.7	6.5	6.7
A2B4C3	6.3	6.1	6.2	6.1	6.2
A2B4C4	5.9	5.6	5.7	5.4	5.7
A2B4C5	5.5	5.1	5.2	5.0	5.2
A3B1C1	**7.7**	**7.7**	**7.6**	**7.5**	**7.6**
A3B1C2	7.2	7.2	7.0	7.1	7.1
A3B1C3	6.7	6.7	6.5	6.5	6.6
A3B1C4	6.2	6.2	6.0	6.1	6.1
A3B1C5	5.6	5.6	5.5	5.5	5.6
A3B2C1	7.5	7.5	7.3	7.1	7.4
A3B2C2	7.0	7.1	6.9	6.7	6.9
A3B2C3	6.5	6.6	6.4	6.2	6.4
A3B2C4	6.0	6.0	5.9	5.7	5.9
A3B2C5	5.5	5.4	5.3	5.2	5.4
A3B3C1	7.2	7.1	7.0	6.9	7.1
A3B3C2	6.7	6.5	6.4	6.4	6.5
A3B3C3	6.2	6.0	5.9	5.9	6.0
A3B3C4	5.7	5.5	5.4	5.5	5.5
A3B3C5	5.2	5.0	4.9	4.9	5.0
A3B4C1	6.7	6.9	6.7	6.5	6.7
A3B4C2	6.3	6.4	6.2	6.0	6.2
A3B4C3	5.8	5.9	5.7	5.6	5.8
A3B4C4	5.4	5.4	5.2	4.9	5.2
A3B4C5	5.0	4.9	4.7	4.5	4.8

Analysis of variance:

factarors	**flavour**	**Body & texture**	**Colour & appearance**	**sweetness**	**Overall acceptability**
A	0.072	0.072	0.072	0.072	0.072
B	0.083	0.083	0.083	0.083	0.083
AxB	NS	NS	NS	NS	NS
C	0.093	0.093	0.093	0.093	0.093
AxC	NS	NS	NS	NS	NS
BxC	NS	NS	NS	NS	NS
AxBxC	NS	NS	NS	NS	NS

CONCLUSION

The study of this investigation revealed that the organoleptic quality shrikhand was enhanced by using of Banana pulp at the level of 20 percent. This combination was highly accepted at 0 day and it was accepted up to 21 days of storage period at 5^0C of refrigeration temperature.

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