

Technology of Stuffed Parwal Sweet Production

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Abstract: A method was standardized for the production of Parwal sweet, since large variations in the chemical composition and sensory properties were observed in market samples. Parwal (Pointed gourd) belonging to Cucurbit family was used in the preparation of traditional sweet using three kind of khoa made from cow milk (K1), buffalo milk (K2) and mixed milk (K3). The average yield of Parwal sweet was recorded to be 43.74, 45.80, and 44.67 per cent in K1, K2 and K3 respectively. The yield of Parwal sweet increased significantly with the levels of added sugar in the khoa used for filling. There was no significant difference noticed in the flavour scores of aforesaid three types of khoa. A positive and highly significant correlation values were obtained for body & texture, general appearance and colour of Parwal sweet ($P < 0.01$).

Keywords: Khoa, Parwal, Traditional Khoa Sweet.

1. INTRODUCTION

Parwal (*Trichosanthes dioica Roxb*) is known as pointed Gourd, which belongs to the family *Cucurbitaceae* with chromosome number $2n = 22$. Parwal is cultivated in Bihar, Bengal, Madhya Pradesh, Orissa, and eastern region of Uttar Pradesh. Immature fruits of this plant were used in the preparation of vegetable curry. The chemical composition of Parwal is 2 per cent protein, 0.3 per cent fat, 2.2 per cent carbohydrates, 153 I.U. vitamin A and 29 mg. of vitamin C/100 g (Misra, et. al. (1994)).

About 50 per cent of the milk produced in the country is converted into various indigenous dairy products in which the share of khoa is prepared about 7 per cent of milk (Rajorhia, 2002). Though the investment of capital in the profit margin of Indian dairy products is side, as compared with the western type dairy products viz. milk powder, butter, butter oil, cream and cheese, etc., the technology for region specific, traditional Indian milk sweets like that of Parwal sweet is not yet standardized, because, the production and marketing had largely been in the hands of small Halwais and their skilled labours who are generally not trained, usually small scale primitive type of traditional technology is applied for manufacturing of these dairy sweets.

The research and development efforts in this area are, therefore, directed towards scaling up and modernization of technology for selected traditional products. "Parwal Sweet" is one of the value additions into the evaporated and concentrated dairy products category like Khoa, gaining popularity amongst the consumers, in and around Varanasi.

No published information is available on the technology and quality of "Parwal sweet" sold in the market. The present investigation was, therefore, undertaken with a view to standardize the technology for this upcoming product mix.

2. MATERIALS AND METHODS

The samples of milk were taken from the Dairy Farm of Banaras Hindu University, Varanasi and analyzed for fat, specific gravity, acidity, total solids (TS) and solid -not-fat (SNF) as per I.S.: 1479 (Part II) – 1961, I.S.: 2785 (Part-I0) 1964 and IS: 1224, 1977 specifications. Thereafter, the khoa was prepared from these milk samples and used for preparation of Parawal Sweet along with the sugar.

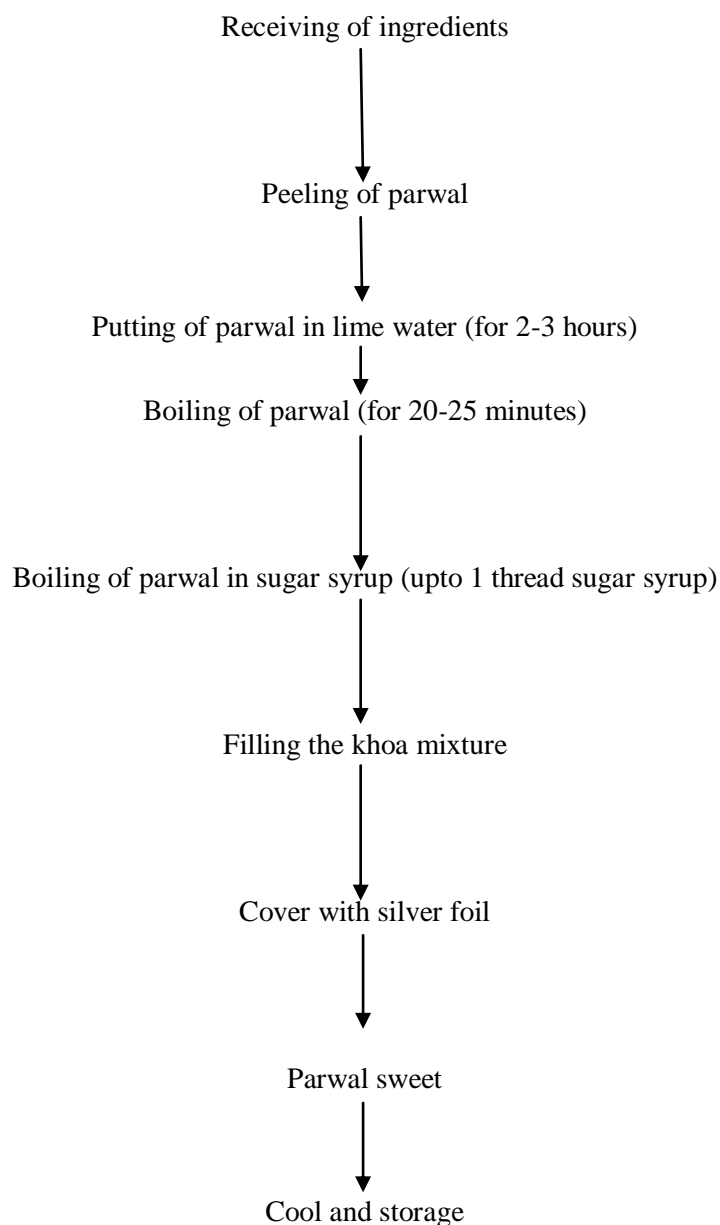
Peeled parwal carefully and made lengthwise slit/cut from top to bottom and then put into lime water for 2 to 3 hours for hardening and removal of off (vegetable) flavour of parawal. After completing hardening process parwals taken out from lime water and thoroughly washed with

clean tap water. Thereafter put the processed parawals in boiling water, and simmer up to 20-25 minutes. While boiling completed, drain the water and remove carefully the parawals and squeezed out the extra water from it and keep aside safely. Now the sugar syrup was prepared by taking one fourth a kilogram of sugar into half a liter of water and heated it till the proper syrup, one thread texture obtained.

Thereafter poured all the parwal pieces into the boiling sugar syrup and simmer till the sugar syrup is just 1 thread consistency. Taken out all the parwal pieces from the sugar syrup and allowed to cool it for 15 minutes.

To fill up inside the aforesaid ready parwals, the gravy was prepared. The gravy mix was prepared by roasting khoa and continuously stirring till light pink color and crumbly appearance comes. At this stage fine sugar at desired amount was added and continued the stirring of mix till properly gravy was prepared. Takeout the mix from the hot plate and cool it for 10 minutes. While the gravy was allowed to cool stirring process continued to avoid the clump formation. At the last the flavouring agent as green cardamom powder or saffron strands as per preference be added. To prepare the flavouring agent, the green cardamom powder or saffron strands in the desired amount was taken and mix with a little sugar and then grinded together very fine, so that it should be mixed homogenously into the gravy. Finally, fill gravy/ snuff (khoa mixture) as already prepared above into each parwal and cool and cover with silver foils for ready to consume.

Flow diagram of preparation of Stuffed Parwal Sweet



2.1. Yield of Parwal Sweet

The yield of final products - Parwal Sweet prepared from khoa, obtained from cow, buffalo and combined (cow and buffalo) milk and from different sugar levels in khoa (gravy) was recorded just after preparation of the product.

The average yield of parwal sweet obtained from cow milk khoa gravy (K₁) with 5 (S₁), 10 (S₂) and 15 (S₃) per cent sugar levels were estimated as 43.63, 43.75 and 43.85 per cent respectively, of the total raw materials. Similarly, for buffalo milk khoa gravy (K₂) in 5 (S₁), 10 (S₂) and 15 (S₃) levels of treatments were estimated as 45.71, 45.82 and 45.88 per cent respectively. The mean yield for combined (cow and buffalo) milk khoa gravy (K₃) at 5 (S₁), 10 (S₂) and 15 (S₃) per cent level of sugar were estimated as 44.75, 44.70 and 44.75 per cent respectively (Table-1).

Table 1. *The average yield of Parwal sweet prepared from different levels of khoa and sugar mix gravy:*

Khoa levels	Sugar levels			Overall average (%)
	S ₁	S ₂	S ₁₃	
K ₁	43.63	43.75	43.85	43.74
K ₂	45.71	45.82	45.88	45.80
K ₃	44.57	44.70	44.75	44.67
Overall average	44.63	44.75	44.82	44.73

The analysis of variance regarding the yield obtained from different levels of sugar and different types of khoa gravy obtained from different types of milk clearly exhibited that there is highly significant difference in the yield of Parwal sweet obtained from different types of milk khoa cow (K₁), buffalo (K₂) and combined milk (K₃) were used to prepare the Parwal sweet (P<0.01).

It means that, both the factors K₁ & S₁ (factor K₁, K₂ K₁ and S₁ S₂ and S₃) contribute significantly in the final yield of the product.

The overall acceptability was judged through the mean flavour scores of Parwal sweet prepared from three levels of khoa and sugar gravy and the values were 34.79, 34.80 and 35.33 at, 10 and 15 per cent of sugar, respectively. It is interesting to note that flavour score increased significantly as the level of khoa gravy increases in the sample. The differences in the flavour score recorded in different types of khoa group 36.70 in K₁, 33.95 in K₂ and 34.27 in K₃ did not show any significant statistical difference. The highest score was noted with interaction group S₃K₁ (33.70) and the lowest with S₃K₂ (33.63), that means people liked very much the treatment combinations with 15 percent sugar and cow's milk khoa with saffron flavour.

2.2. Sensory Quality of Parwal Sweet

Sensory evaluation of Parwal sweet samples prepared from different levels of sugar and different types of khoa were carried out in respect to its flavour, body and texture, general appearance and colour. The numerical values with the help of nine point hedonic scale were summarized and presented table 1, 2 and 3.

2.2.1. Flavour

Average flavour score of Parwal sweet prepared from different levels of sugar types of khoa gravy was estimated and the overall average of flavour score of Parwal sweet irrespective of levels of sugar and different types of khoa was found to be 34.97 with range a value of 34.86 to 35.08 out of maximum score 40. The average flavour score due to different types of khoa gravy was estimated and it was minimum (33.95) in case of Parwal sweet sample prepared from buffalo milk khoa gravy and the maximum (36.70) being in case of cow milk khoa gravy. For combined milk khoa gravy the mean value was 34.27, all these values showed a highly significant differences (P<0.01). The finding indicates that the different type of milk khoa gravy has positive relationship on flavour score of Parwal sweet. It indicates that, khoa prepared from cow milk has highest positive effect (highest score) towards the flavour followed by combined milk khoa and minimum flavour score for buffalo milk khoa.

On other hand irrespective of different types of khoa gravy, the average score was estimated as 34.79, 34.80 and 35.33 when Parwal sweet prepared from 5 (S₁), 10 (S₂) and 15 (S₃) per cent sugar in khoa with an overall average score of 34.97. A very highly significant variations were

worked out ($P < 0.01$). These results indicate that when sugar level is increased the acceptability is also increased.

The average value in respect of interaction effects of different levels of sugar and types of khoa gravy on flavour score of Parwal sweet were estimated as 36.23 (S_1K_1), 33.65 (S_1K_2), 34.49 (S_1K_3), 36.10 (S_2K_1), 34.56 (S_2K_2), 33.73 (S_2K_3), 37.76 (S_3K_1), 33.63 (S_3K_2) and 34.60 (S_3K_3). These values clearly indicate that the flavour score apparently increased as sugar levels increased and similarly flavour increases in cow milk khoa gravy than buffalo and combined milk khoa gravy.

Table 1. Average flavour score of Parwal sweet prepared from different levels of sugar and different types of khoa

Sugar levels	Khoa levels			Overall average
	K ₁	K ₂	K ₁₃	
S ₁	36.23	33.65	34.49	34.79
S ₂	36.10	34.56	33.73	34.80
S ₃	37.76	33.63	34.60	35.33
Overall average	36.70	33.95	34.27	34.97±0.11

2.2.2. Body and Texture

The overall average of body and texture score of Parwal sweet irrespective of sugar levels and types of khoa gravy was found to be 35.47 with range value of 35.37 to 35.57 out of maximum score 40, which was minimum 34.70 in case of sample of buffalo milk khoa gravy and the maximum 36.85 being in case of cow milk khoa gravy and for combined milk khoa it was 34.85, which showed a highly statistically difference ($P < 0.01$). It indicates that, khoa prepared from cow milk has highest positive effect towards the body and texture also followed by combined milk khoa and buffalo milk khoa.

On other hand irrespective of different types of khoa, the average body and texture score was estimated as 34.91, 35.46 and 36.04 with an overall score of 35.47 using 5 (S_1), 10 (S_2) and 15 (S_3) per cent sugar in khoa gravy (Table 2).

The interaction effects of different levels of sugar and different types of khoa on body and texture score of Parwal sweet were estimated as 35.90 (S_1K_1), 34.22 (S_1K_2), 34.61 (S_1K_3), 37.00 (S_2K_1), 35.23 (S_2K_2), 34.16 (S_2K_3), 37.66 (S_3K_1), 34.66 (S_3K_2) and 35.80 (S_3K_3) respectively. These values clearly show that the body and texture score apparently increase as sugar levels increases and it also increase in cow's milk khoa than combined and buffalo milk.

Table 2. Average body and texture score of Parwal sweet prepared from different levels of sugar and different types of khoa

Sugar levels	Khoa levels			Overall average
	K ₁	K ₂	K ₁₃	
S ₁	35.90	34.22	34.61	34.91
S ₂	37.00	35.23	34.16	35.46
S ₃	37.66	34.66	35.80	36.04
Total	36.85	34.70	34.85	35.47

2.2.3. General Appearance and Color

The overall average of general appearance and colour score of Parwal sweet irrespective of sugar levels and different types of khoa was found to be 17.31 with range of 17.17 to 17.45 out of 20, it was minimum 16.57 in buffalo's milk khoa and maximum 18.45 in cow's milk khoa and 16.91 for combined milk shoeing a highly significant differences ($P < 0.01$).

General appearance score was calculated as 17.32, 16.43 and 17.68 for Parwal sweet prepared from 5 (S_1), 10 (S_2) and 15 per cent (S_3) with an overall mean of 17.31, sugar levels in khoa (Table 3)..

The interaction effects of different levels of sugar and types of khoa on general appearance and colour score of Parwal sweet were found to be 18.37 (S_1K_1), 16.69 (S_1K_2), 17.01 (S_1K_3), 17.96 (S_2K_1), 16.26 (S_2K_2), 16.56 (S_2K_3), 19.13 (S_3K_1), 16.76 (S_3K_2) and 17.16 (S_3K_3). A similar trend has been recorded in this case also.

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Table 3. Average general appearance and colour score of Parwal sweet prepared from different levels of sugar and different types of khoa:

Sugar levels	Khoa levels			Overall average
	K ₁	K ₂	K ₁₃	
S ₁	18.27	16.69	17.61	17.32
S ₂	17.96	16.26	16.56	16.93
S ₃	19.13	16.76	17.16	17.68
Total	18.45	16.57	16.91	17.31

3. CORRELATION STUDY

Correlation coefficient (r): The covariance indicates that the two related character (x being the 'cause' or independent variable) tend to vary together, i.e. they are correlated with each other. The intensity of this correlation between the cause and effect can be measured by correlation coefficient symbolized as r. Thus, r is a conventional statistics to determine the degree to which the two related variates can vary together.

In present experiment a positive and highly significant correlation values were obtained for body & texture, general appearance and color of Parwal sweet ($P < 0.01$), while flavor showed positive but non – significant value.

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