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Process standardization of WPC fortified baby Rasogolla

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Abstract

The present study was carried out with the objective of standardize the procedure for WPC fortified baby rasogolla. The chemical and sensory qualities of WPC incorporated rasogolla were assessed. The levels were selected as 09, 11, 13 and 15 per cent WPC for further study. The results obtained from organoleptic evaluation the treatment T₂ (11% WPC) was rated best among WPC fortified baby rasogolla and was comparable to control rasogolla. The chemical composition of treatment T₂ was 5.69, 12.57, 49.66, 50.25 and 0.24 per cent fat, protein, moisture, total solids and acidity, respectively.

Keywords: Channa, rasogolla, WPC, standardization, fortification

Introduction

Rasogolla is the most popular Indian sweetmeats that are valued for its characteristic texture. It is also a common milk product in India which is originated in Orissa, where it is also known by its original name, *Khiramohana*. Typically, a 100 gm serving of rasogolla contains 186 calories, out of which about 153 calories are in the form of carbohydrates. It also contains about 1.85gms of fat and 4gms of protein. Chhana contain 53.1% moisture, 24.8% fat, 17.8% protein.

Whey protein is an acceptable protein source for healthy pregnant women and children provided they are not allergic to dairy proteins. It is highly soluble and very easy to digest. This is one of the reasons it is commonly used in infant formula and protein supplements for medical use. It was found to inhibit the growth of tumors more effectively than other food proteins. (Kassem, 2015)^[13]. Whey protein has a biological value of 104, which is a higher score than casein, soya protein, beef and wheat gluten. WPC is rich in essential amino acids such as lysine, tryptophan, cystein and methionine. Whey proteins help to control the blood glucose levels and also provides additional beneficial for weight management which is a concern for type-2 diabetics (Shankar and Bansal, 2013)^[15]. Whey protein concentrate was added in different milk products and food products like ice cream, yoghurt, beverages, dairy drinks, cheese, cookies, etc.

Whey is separated during preparation of rasogolla at that time good quality proteins passed in whey. To have benefits of whey proteins or to utilize good quality whey proteins specially for Children, it is decided to incorporate whey protein concentrate (WPC) for preparation of baby rasogolla.

Methodology

The fresh cow milk was procured from Research Cum Development Programme (RCDP) on Cattle, MPKV, Rahuri Dist. Ahmednagar and standardized at 3 per cent fat.

Preparation of Channa and baby Rasogolla

Experimental Channa and Rasogolla was prepared by the method as shown in Fig. 1 which was modified from the methods as reported by various scientists while control Rasogolla was prepared in the same manner.

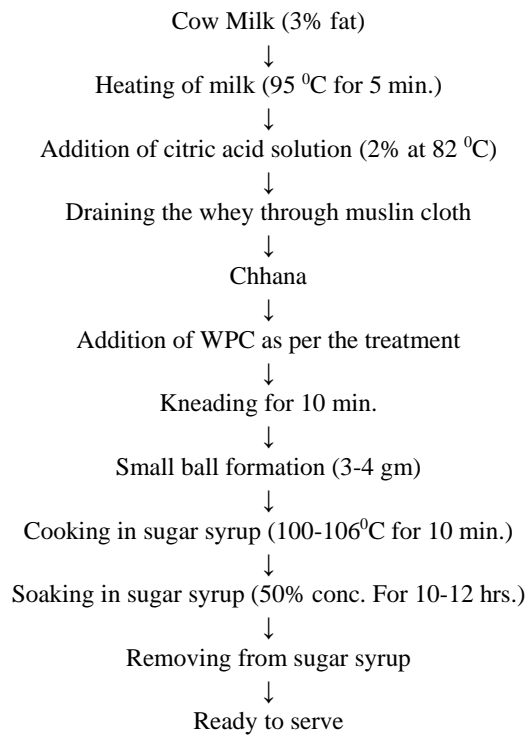


Fig 1: Flow diagram for manufacture of WPC incorporated baby Rasogolla

Treatment detail

On the basis of 100 gm Chhana, levels of WPC in the final experimental trials were as 0 g WPC (T₀), 9 g WPC (T₁), 11 g WPC (T₂), 13 g WPC (T₃), 15 g WPC (T₄). The experimental trials were subjected to sensory and chemical analysis.

Statistical analysis

The experiments were laid out in Completely Randomized Design (CRD) with four replications. (Snedecor and Cochran, 1994) [17].

Result and Discussion

Sensory evaluation

The samples of the 'WPC fortified baby Rasogolla' were subjected to sensory evaluation for colour and appearance, body and texture, flavor and overall acceptability by adopting 9 point Hedonic scale. The score given by the judges are tabulated in Table 1.

Colour and appearance

It was observed that the rasogolla with 9 and 11 per cent WPC showed slight yellowish colour with clear and clean appearance which was liked very much by the judges.

Body and texture

The highest score was obtained by the control rasogolla (8.58) followed by the rasogolla with 9 per cent WPC (8.40) and 11 per cent WPC (8.40) means the treatment T₁ and T₂ are at par with each other. It seems that WPC provided adhesive and binding action up to 13% level of its addition. There after its impact as binding material might have eroded. At 15% level of addition, it affected on ball formation which resulted in breaking of balls during cooking.

Flavour

The score obtained for the flavour was significant. The sensory score for the flavour ranged 7.68 to 8.48. The highest score obtained by the T₂ (8.48) and lowest by the Treatment T₄ (7.68).

Overall acceptability

Rasogolla prepared by using 11 per cent WPC (T₂) scored highest points (8.39) followed by treatment T₃ (8.21) i.e. 13 per cent WPC, T₁ (8.30) i.e. 9 per cent and T₀ (8.25) i.e. control. Lowest score was recorded for T₄ (7.86) i.e. rasogolla prepared with 15 per cent WPC. On the basis of results we can affirmatively state that amongst the different levels of WPC, T₂ (11% WPC) treatment was found to be more acceptable by the judges.

Table 1: Sensory evaluation of Quarg type cheese prepared by using cow and goat milk

Treatment	Colour & appearance	Body and Texture	Flavour	Overall acceptability
T ₀	8.18	8.58	8.00	8.25
T ₁	8.30	8.40	8.22	8.30
T ₂	8.30	8.40	8.48	8.39
T ₃	7.95	8.30	8.38	8.21
T ₄	7.73	8.18	7.68	7.86
Mean	8.09	8.37	8.15	8.20
S.E.±	0.14	0.02	0.02	0.02
C.D.@ 5%	-	0.06	0.07	0.06

Values with different superscript differ significantly ($P < 0.05$)

Chemical analysis

Fat

It was observed that fat content is varied between the range of 5.04 to 6.11 per cent. The WPC level in rasogolla had very little effect on its fat content. Addition of WPC increases, increase in the fat content of rasogolla.

Protein

It was revealed from the results that the influence of WPC on protein content of rasogolla was statistically significant. The mean values of protein content of treatment T₀, T₁, T₂, T₃ and T₄ were 5.16, 11.37, 12.57, 13.76 and 14.94 per cent, respectively. The protein content of rasogolla increased with

incorporation of WPC from treatment T₁ to T₄. The highest value was reported for treatment T₄ (14.94 per cent) which contain highest WPC. Lowest value observed for T₀ (5.16 per cent) which contain no WPC.

Moisture

The moisture content of rasogolla decreased with incorporation of WPC from treatment T₁ to T₄. The lowest value was reported for treatment T₄ (47.98 per cent) which contain highest WPC. highest value observed for T₀ (54.50 per cent) which contain no WPC. Majorly WPC 80 contain about 96.06 per cent total solids and remaining are moisture i.e. only 3-4 per cent means WPC is a dried byproduct and

because of that, as per increasing WPC levels in Chhana, the moisture content was decreasing in the final product.

Total solid

The total solid content of WPC fortified baby rasogolla ranges between 49.08 to 51.64 per cent and noted the significant difference between the treatments. The increasing trend in total solid of rasogolla was observed with increase in WPC

levels. This might be due to high total solid (96.06 per cent) content in WPC 80.

Acidity

The acidity of the experimental treatments was ranged between 0.21 to 0.26 per cent of lactic acid. The increasing trend in acidity of rasogolla was observed due to addition of WPC.

Table 2: Chemical analysis of baby Rasogolla

Treatment	Fat (%)	Protein (%)	Moisture (%)	T.S. (%)	Acidity (%. L.A.)
T ₀	5.04	5.16	54.50	45.33	0.21
T ₁	5.69	11.37	50.67	49.08	0.23
T ₂	5.83	12.57	49.66	50.25	0.24
T ₃	5.97	13.76	48.72	51.01	0.26
T ₄	6.11	14.94	47.98	51.64	0.26
Mean	5.8	11.56	50.30	49.46	0.24
S.E.±	0.01	0.01	0.11	0.125	0.004
C.D.@ 5%	0.02	0.05	0.32	0.372	0.012

Values with different superscript differ significantly ($P < 0.05$)

Conclusion

The WPC 80 could be used to prepare baby rasogolla. The present investigation demonstrated that WPC acts as binding force and helps in improving body and textural attributes of rasogolla only up to certain limit. Its addition beyond certain point may exert adverse effects. The optimum level for fortification of WPC in baby rasogolla was found to be 11 per cent.

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