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Studies on Sensory Evaluation of Whey Protein Enriched Dietetic Kulfi.

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ABSTRACT

Kulfi is a very popular frozen dairy dessert from the Indian subcontinent. Although quite similar to ice-cream, it is denser and creamier. It is available in a variety of flavors and relished by people of all age groups. The basic ingredients of Kulfi consist of ice, milk, water and sugars. In the new millennium we are witnessing the upward trend in nutritional and health awareness which has increased the consumer demand for functional foods. The present investigation was made with an attempt to develop a whey protein enriched dietetic Kulfi by addition of different levels of whey protein concentrate powder @ 0.5%, 1%, 1.5%, and evaluate the effect on nutritional quality. The Kulfi samples of different treatments were analyzed for organoleptic quality (colour and appearance, Body and texture, flavour and taste, melting resistance). The product acceptability as per judge's opinion (using 9 point hedonic scale) was rated as $T_0 > T_1 > T_2 > T_3$. The study shows no significant effect of treatment i.e WPC on body and texture, flavour and taste of Dietetic WPC Kulfi, but significant effect of treatment was found on colour and appearance and Melting resistance. The WPC enriched dietetic Kulfi has a wider scope in the market as per as health and nutritional quality is concerned. Therefore, it may be suggested that the product was as good as control.

Keywords: Dietetic WPC Kulfi, organoleptic quality, Melting resistance.

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INTRODUCTION

Kulfi is a frozen dairy product, which closely resembles ice cream in composition. In recent years, the consumption of ice cream in India has increased considerably in big cities and town. Every north Indian city is selling frozen product to quench scorching heat of summer season [2]. In India about 0.7% of the total milk produced is converted into frozen desserts like ice-cream and kulfi [3]. Whey protein is one of the major proteins found in cow milk comprising about 20% of total milk protein. It has the highest biological value and protein efficiency as compared to other protein, which makes it suitable for wide range of nutraceutical and functional food system. The best known effect of whey protein are its ability to increase lean muscle mass and to boost the immune system (info@dairyCouncilofa.org). WPC also gives a boost for soft body, smooth texture, and pleasant taste in Kulfi. Kulfi is a frozen dairy product made by suitable blending and processing of Skim milk powder and other milk products, together with sugar and flavour, with or without stabilizers or colour and with the incorporation of air during the freezing process. A typical compositional range for the components used in kulfi mix is milk fat 10-16%, milk solids not fat 9-12%, Sucrose 9-12%, Corn syrup solids 4-6%, Stabilizers/Emulsifiers 0-0.5%, total solids 36-45% and water 55-64% [4]. Therefore, the present investigation was planned to incorporate whey protein concentrate (WPC - 70) in milk for preparation of Kulfi as per the technique given by Salooja *et.al.*, [7].

MATERIALS AND METHODS

Ingredients used for manufacturing dietetic kulfi were milk, sugar ,stabilizer ,emulsifiers, nuts and whey protein concentrate (WPC -70). First of all, 1kg of whole milk with 6% fat and 9% MNSF was placed in a steel pan with a wooden plunger and heated by placing the pan in a water container (double jacketed vat arrangement) over direct fire. The milk was condensed to (2:1) ratio. Calculated amount of liquid ingredients like condensed milk and dry ingredients like sugar, stabilizer and emulsifier were added as per the requirement in treatments T₁ (0.5%WPC), T₂ (1.0%WPC) and T₃ (1.5%WPC). Then mix was held at 68°C for 30 minutes to fulfill the PFA requirement of Pasteurization and cooled to 42°C. Then the mix is further chilled at 5°C and other ingredients such as cashew nuts were added. The mix then subsequently frozen in a batch freezer and transferred into Kulfi moulds and hardened at -20°C overnight. The Kulfi samples were analyzed for physiochemical, microbial and organoleptic qualities as per procedure laid down by Indian Standard (IS:1960) and Indian Standard (IS:1964) [5,6].

T₀ = Whole milk Kulfi

T₁ = Kulfi with Whole milk + 0.5%WPC

T₂ = Kulfi with Whole milk + 1.0%WPC

T₃ = Kulfi with Whole milk +1.5%WPC

The data collected on different aspects as per plan were tabulated and statistically analyzed as per Chandel [1],

RESULT AND DISCUSSION

Organoleptic attributes of control and dietetic WPC Kulfi

Table 1: Organoleptic attributes of control and dietetic WPC Kulfi

Parameters	Acceptability score				F Value	C.D.
	T ₀	T ₁	T ₂	T ₃		
Colour and Appearance	8.20	7.96	7.80	7.76	28.950*	0.254
Body and Texture	7.84	7.64	7.56	7.60	0.794**	0.428
Flavour and Taste	7.96	7.80	7.84	7.72	1.92**	0.221

* Significant at 5 % level

** Non-significant at 5 % level

Table-1 shows organoleptic attributes of control and dietetic WPC Kulfi.

Colour and Appearance

The highest mean value in dietetic Kulfi for colour and appearance was found in T₀ (8.2), followed by T₁ (7.96), T₂ (7.80) and T₃ (7.76). There were significant differences found among the treatments which may be attributed to the addition of WPC. F Value was 28.950, indicating significant effect of treatment on colour and appearance.

Body and Texture

The highest mean value for body and texture was found in T₀= 7.84, followed by T₃ (7.60), T₁ (7.64) and T₂ (7.56). There were no significant differences found among the treatments. F Value was 0.794, indicating no significant effect of treatment on body and texture. Therefore, it may be suggested that the product was as good as control.

Flavour and Taste

The highest mean value for flavour and taste in dietetic Kulfi was found in T₀ (7.96), followed by T₂ (7.84), T₁ (7.80) and T₃ (7.72). The treatments did not differ significantly, F Value was 1.92, indicating no significant effect of treatment on flavour and taste. Therefore, it may be suggested that the product was as good as control.

Melting resistance of control and WPC Kulfi

Table-1 shows Melting resistance of control and dietetic WPC Kulfi .The highest mean value for melting resistance was found in T₀(7.68), followed by T₁(7.32), T₂(7.16) and T₃(7.04). The treatments differ significantly.

Table 2: Melting resistance of control and dietetic WPC Kulfi

Parameters Replication	Treatments				F Value	C.D.
	T ₀	T ₁	T ₂	T ₃		
R ₁	7.0	7.0	7.2	6.6	3.509*	0.455
R ₂	8.0	7.4	7.8	7.4		
R ₃	7.8	7.2	6.8	7.6		
R ₄	7.8	7.6	7.4	7.7		
R ₅	7.8	7.4	6.6	6.6		
Mean	7.68	7.32	7.16	7.04		

* Significant at 5 % level.

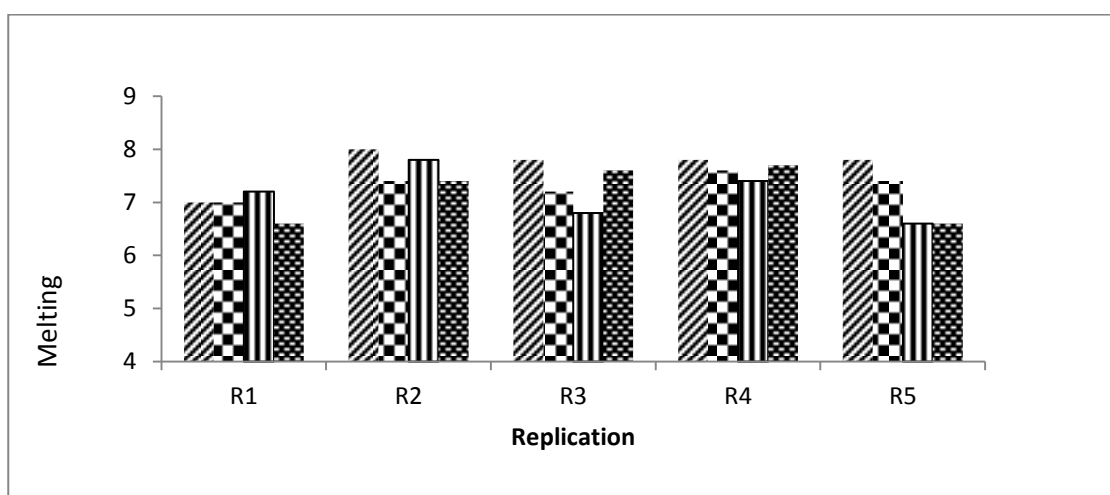


Figure 1: Average of melting resistance for dietetic WPC Kulfi



CONCLUSION

In view of the experimental results obtained during the investigation, it may be concluded that the WPC enriched dietetic Kulfi made from whole milk + 15% Sugar + WPC (0.5%, 1.0% & 1.5%) has a wider scope in the market as per as health and nutritional quality is concerned.

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