

Short Communication

## Designer paneer

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Received 23 July, 2014; Accepted 10 August, 2014

**Value added paneer was prepared to improve the fibre content in the otherwise fibre deficient paneer. Cereals like wheat and finger millet at 1% level was included in the preparation of paneer. Inclusion level of more than 1% caused pasty consistency. Sensory analysis was also carried out on the designed paneer. It was found that there was no significant difference in the flavour and overall acceptability between the designer paneer and control samples. Texture analysis was carried out for various attributes. It was found that wheat based paneer was equal to control samples in terms of adhesiveness which may be due to the pasty nature of the wheat flour. However, this designed paneer had an overall acceptability and could be used as a value added product.**

**Key words:** Paneer, millet based paneer, fibre enriched paneer.

### INTRODUCTION

Paneer is a type of soft, unaged, acid-set, non-melting curd cheese made by curdling heated milk with lemon juice, vinegar or any other food acid. It is native to India, although it is used in some parts of Middle East as well. It is one of the most common cheeses used in Indian cuisine, and it has a simple, fresh, versatile flavor which makes it highly useful in an assortment of recipes.

As it is made with whole milk, it is also very high in protein, making it a sound addition to a vegetarian diet. Paneer is marble white spongy in nature and has a sweetish nutty flavour (Agarwal, 2007). Paneer contains 53-55% moisture, 23-25% fat, 17-18% proteins, 2-2.5% lactose and 1.5-2.0% minerals (Arora et al., 1996). However, since milk is devoid of dietary fibre, paneer has no fibre content. In the present study, value addition of

paneer with millet or cereal as a source of dietary fibre was attempted.

Cereals are rich in complex carbohydrates that provide ample energy, proteins, fats, lipids, minerals, vitamins and enzymes. Finger millet (ragi) is also a rich source of calcium, iron, protein, fiber and other minerals. In the present study, paneer was designed to contain fibre. The paneer thus designed was subjected to sensory and texture analysis

A texture study was devised to augment human sensory evaluation as a tool to evaluate food texture. It can be regarded as a manifestation of the rheological properties of a food (Karadbhajne and Bhoyarkar, 2010). Characterization of food texture commonly falls into two main groups, based on sensory and instrumental

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**Table 1.** The textural calculation.

Textural variable	Description	Unit
Hardness	Height of the peak during the first compression	g
Cohesiveness	Ratio of positive area under second peak to that of the first peak	
Springiness	Distance that the sample covered during the time that elapsed between the first bite and the start of the second bite	mm
Gumminess	Product of hardness and cohesiveness	g
Chewiness	Product of gumminess and springiness	G x mm

**Table 2.** Comparison of sensory evaluation of control paneer and designer paneer 9 point Hedonic scale<sup>#</sup>.

Sensory parameter	C	W 1%	R 1%	F value
Colour and appearance	8.00 <sup>b</sup> ± 0.000	7.16 <sup>a</sup> ± 0.200	8.16 <sup>b</sup> ± 0.2 00	4.97*
Body and Texture	8.00 <sup>b</sup> ± 0.000	7.00 <sup>a</sup> ± 0.001	6.66 <sup>a</sup> ± 0.244	19.81**
Flavour	7.66± 0.024	7.50 ± 0.244	7.33 ± 0.244	NS
Overall acceptability	7.86± 0.200	7.20 ± 0.250	7.33 ± 0.350	NS

<sup>#</sup>Average of six trails. NS: Not significant; \*statistically significant ( $P \leq 0.05$ ); \*\*statistically highly significant ( $P \leq 0.01$ );  
<sup>a-b</sup>different superscripts in a row indicate significant differences.

methods of analysis. Sensory analysis includes use of the senses of smell, taste, sound and touch. Evaluation of food texture by touch includes the use of the fingers, as well as lips, tongue, palate and teeth in the mouth. As would be expected, sensory methods of analysis are subject to wide variability, though this variability can be reduced by using trained assessors.

It is sometimes preferable to use instrumental methods of assessing food texture rather than sensory analysis because they can be carried out under more strictly defined and controlled conditions (Peleg, 1983). In the present study, only sensory evaluation was conducted for acceptance of the product.

## MATERIALS AND METHODS

### Preparation of paneer

Paneer was prepared from cow milk (3.5% fat and 8.5% SNF) supplied to the dairy plant at the Department of Dairy Science, Madras Veterinary college, Chennai, India. Milk was boiled to 80°C and 2% solution of citric acid was added as a coagulant. The coagulum was then strained and pressed to obtain paneer.

### Preparation of designer paneer

Two lots of designer paneer was prepared by the incorporation of 1% wheat flour and 1% ragi flour to milk and boiled. 2% solution of citric acid was added as a coagulant. The coagulum was then strained and pressed to obtain designer paneer. This study evaluated only the sensory attributes and textural properties of value enhanced designer paneer.

### Sensory evaluation

These designer paneers were subjected to sensory evaluation using nine point hedonic scale. Sensory attributes were evaluated by a 10 trained panel of six replications for appearance, flavour, body and texture and over all acceptability.

### Texture analysis

Texture analysis was carried out using Texture Analyser from Stable Micro Systems, U.K. with Powder Flow Analyser Assembly fitted with 2 kg load cell and aluminium blunt compression probe. Control and the two designer paneer samples were cut using sampler and were placed centrally beneath the probe. A crosshead speed of 5.0 mm/s with a trigger force of 20 g was used to compress the cores to 80% of their original height. Each sample was compressed twice in a reciprocating motion to give a two-bite texture profile curve. The graphs obtained were analysed for hardness, springiness, cohesiveness, gumminess and chewiness using the Texture Expert Exceed software supplied along with the instrument. The textural calculation is represented in Table 1.

### Statistical analysis

The data obtained were analyzed statistically as per the procedure of Snedecor and Cochran (1980). Completely randomized design was used for comparing and studying the textural properties of the designer paneer

## RESULTS

The results of the sensory analysis using 9 point hedonic scale for appearance, flavour, body and texture and over all acceptability are presented in (Table 2).

**Table 3.** Textural analysis of designer paneer<sup>#</sup>.

Textural analysis	Control	Ragi 1%	Wheat 1%	F value
Hardness	3283.95 <sup>b</sup> ±760.078	1041.13 <sup>a</sup> ±45.702	597.50 <sup>a</sup> ±89.336	37.91**
Adhesiveness	-20.40 <sup>a</sup> ±2.950	-44.09 <sup>b</sup> ±18.156	-16.13 <sup>a</sup> ±3.770	4.51*
Springiness	0.8438 <sup>b</sup> ±0.011	0.5806 <sup>a</sup> ±0.009	0.5164 <sup>a</sup> ±0.039	75.32**
Cohesiveness	0.616 <sup>b</sup> ±0.047	0.399 <sup>a</sup> ±0.027	0.488 <sup>a</sup> ±0.086	4.40*
Gumminess	2098.29 <sup>b</sup> ±626.466	414.25 <sup>a</sup> ±24.728	274.66 <sup>a</sup> ±20.986	20.01**
Chewiness	1759.139 <sup>b</sup> ±512.351	240.73 <sup>a</sup> ±14.230	143.66 <sup>a</sup> ±20.862	21.93**
Resilience	0.2790 <sup>b</sup> ±0.037	0.1056 <sup>a</sup> ±0.010	0.1590 <sup>a</sup> ±0.054	33.89**

<sup>#</sup>Average of six trails. NS: Not significant; \*statistically significant ( $P \leq 0.05$ ); \*\*statistically highly significant ( $P \leq 0.01$ );  
<sup>a-b</sup>different superscripts in a row indicate significant differences.

The scores for colour and appearance were higher for control samples and ragi paneer. The scores for body and texture was more for control samples than for either of the designer paneer. The flavour attribute showed no significant difference between any of the paneer. Overall, there was no significant difference in the sensory attributes between either of the paneer.

In the texture scores, control paneer samples had higher scores for hardness, springiness, cohesiveness, gumminess, chewiness and resilience (Table 3). The cereal and millet based paneer did not have similar characteristics as that of control samples. The adhesiveness nature of wheat based paneer and control were similar. However, an attempt was made in the preparation of cereal and millet based paneer which had adequate flavour and overall acceptability scores.

## DISCUSSION

The scores for colour and appearance were higher for control samples and ragi paneer. This could be due to the mottling appearance of paneer with ragi flour which was more appealing than the color for wheat paneer which appeared to look doughy. The scores for body and texture was more for control samples than for either of the designer paneer as they were more pasty in consistency. The yield of control paneer was 17% whereas for both designer paneer, the yield was 18%.

The flavour attribute showed no significant difference between any of the paneer. Flavour is one of the important attribute for consumer acceptance. Hence, this designer paneer could be used as a means of improved fibre content in the otherwise deficient milk paneer. Overall, it showed no significant difference in the sensory attributes between either of the paneer.

Control paneer samples had higher scores for hardness, springiness, cohesiveness, gumminess, chewiness and resilience which are characteristics of an ideal paneer or soft cheese. However, the adhesiveness

nature of wheat based paneer and control were similar and this might be due to the pastiness of the cereal based paneer. However, due to the improved adhesiveness nature, wheat based paneer can also be considered as a value added paneer. In the sensory analysis, the flavour scores and overall acceptability of of ragi based paneer was on par with control samples and hence these two varieties of value added designer paneer can be used in cuisine as an innovative culinary attempt.

## Conflict of Interests

The authors did not declare any conflict of interests.

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