TEXTURAL AND SENSORY CHARACTERISTICS OF MARKET SAMPLES OF PEDA MANUFACTURED IN VARANASI CITY OF INDIA

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ABSTRACT

Three types of Peda samples (white, yellow and brown) were collected from four major markets of Varanasi city. The samples were evaluated for their textural and sensory qualities. The sensory attributes for yellow and lal peda obtained from the market varied significantly in their colour and appearance scores, ranging for 6.57 – 7.64 and 6.92 – 7.64, respectively (p<0.05). Significant difference was observed in body and texture scores for yellow peda, which ranged from 6.78 – 7.78 (p<0.05). Textural properties such as chewiness and gumminess showed wide variation among all types of peda from different markets. The gumminess for white peda ranged from 247.18 to 2037.98, while chewiness ranged from 104.32 to 596.48. Springiness (0.993) and cohesiveness (0.918) were positively correlated, whereas gumminess (-0.937) and chewiness (-0.945) negatively correlated with moisture content of peda.

Key words: Sensory evaluation, Textural properties, Type of Peda.

INTRODUCTION

India produces about 117 million tons of milk annually, out of which about 50% is converted into various traditional dairy products (Bhasin, 2010). Khoa is the major product produced by heat desiccation of milk. It is made of either dried or whole milk thickened by heating it in an open iron pan (Londhe and Pal, 2007). Khoa is used as a base material for production of peda, burfi and gulabjamun.

Peda is an indigenous, khoa based, heat desiccated milk sweet prepared from either cow milk, buffalo milk or the combination of both. Mahadevan (1991) reported that the quantity of peda produced in India exceeds any other indigenous milk based sweet. Peda has been known by different synonyms like peda, penda, pera etc. in different parts of the country. Types of peda include white peda, yellow peda, brown peda and kesar peda. Also regional variants of peda are produced throughout the country namely, Mathura peda, kunthalgiri peda, Dharwad peda, lal peda and bal mithai (Uttarakhand, caramelized and sugar Hobules coated) Peda is offered at religious places as “Prasad” and as an item of menu at many ceremonial functions in Indian society. A large amount of peda is offered at temples in Varanasi daily. However, no investigation has been carried out to evaluate the textural and sensory quality of peda sold in Varanasi markets. The present study was thus carried out to evaluate the textural and sensory qualities of white, yellow and lal peda samples collected from Varanasi city.

MATERIALS AND METHODS

Collection of Samples: Peda samples of white, yellow and lal variants were collected from four different locations of Varanasi city. The samples were collected periodically from four pre-identified shops within two to three hours of their preparations and packed in cardboard boxes of rectangular shape (10 x 12 cm²). The cardboard boxes were packed and sealed in polyethylene bags to prevent gain or loss of moisture during transport. The samples were tempered to room temperature before analysis of different quality parameters.

Sensory Evaluation: The sensory evaluation of peda samples was conducted by a panel of seven semi-trained judges from the

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Centre of Food Science and Technology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. The panellists were acquainted with the quality attributes and the defects of peda under study. Samples were evaluated for flavour, colour and appearance, body and texture sweetness and overall acceptability on the basis of nine point hedonic scale.

**Texture Profile Analysis (TPA):** The Texture Analyser (model TAXT, Stable Micro Systems Ltd., Surrey, UK), equipped with a 50-kg load cell was used with a 75 mm compression platen under 50-kg load cell. The samples were subjected to compression force by probe up to a distance of 5.00 mm two times. The conditions set in the texture analyser for measuring textural properties were as follows: pretest speed- 1mm/sec; test speed- 1mm/sec; post-test speed- 5mm/sec; count- 2; test distance- 5.0 mm; trigger type- auto; trigger force- 5 g; probe- 75 mm compression platen.

**Analysis of Experimental Data:** Correlation analysis was conducted for moisture and textural parameters. The sensory data of all types of peda analysed using randomized block design.

**RESULTS AND DISCUSSION**

**Sensory Quality of Market Peda:** The sensory scores for market peda samples are represented graphically in Fig. 1, 2 and 3, respectively.

**Colour and Appearance:** The mean score for colour and appearance of white peda samples are graphically presented in Fig. 1. The scores obtained from different market samples did not vary significantly (p<0.05). The average score for colour and appearance of yellow peda (Fig. 2) and lal peda (Fig. 3) varied significantly (p<0.05). Ray *et al.* (2002) found that peda made from buffalo milk was superior to peda made from cow milk, because of yellowish colour of cow milk, making it less acceptable compared to white peda made from buffalo milk.

**Flavour and Sweetness:** The values obtained from the samples from different markets did not vary significantly. Desale *et al.* (2007) studied the effect of compositional variables on the quality of peda. Their findings suggest that maximum sensory scores were obtained for the peda containing 30% sugar, 15% moisture and 25% fat. In current findings acceptable sensory quality for sweetness was obtained for all types of peda.

**Body and Texture:** The average score for body and texture of white and lal peda obtained from different markets did not vary significantly. A significant difference (p<0.05) was observed for body and texture score between samples of yellow peda from different markets (Fig. 2).

**Overall Acceptability:** The mean score for overall acceptability of white, yellow and brown peda samples obtained from different markets did not vary significantly for all types of peda under study.

**Textural Properties of Market Peda:** The textural values for white peda, lal peda and yellow peda samples are shown in Table 1, 2 and 3, respectively. The white peda samples showed wide variations in their texture profile among the markets. The values derived from the study showed adhesiveness ranging from 1.92 to 26.55 g.sec, cohesiveness 0.29 to 0.38, gumminess 247.18 to 2037.98 and chewiness 104.32 to 596.48, springiness 0.29 to 0.42 and resilience 0.10 to 0.12 (Table 1). Patel *et al.*

**TABLE 1:** Textural characteristics of market samples of white peda.

<table>
<thead>
<tr>
<th>Character</th>
<th>Markets</th>
<th>CD (Critical Difference)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Market 1</td>
<td>Market 2</td>
</tr>
<tr>
<td>Adhesiveness*</td>
<td>7.21 ± 5.55</td>
<td>26.55 ± 2.47</td>
</tr>
<tr>
<td>Springiness</td>
<td>0.29 ± 0.01</td>
<td>0.36 ± 0.01</td>
</tr>
<tr>
<td>Cohesiveness*</td>
<td>0.29 ± 0.01</td>
<td>0.32 ± 0.007</td>
</tr>
<tr>
<td>Gumminess*</td>
<td>2037.98 ± 564.83</td>
<td>652.79 ± 53.08</td>
</tr>
<tr>
<td>Chewiness*</td>
<td>596.48 ± 164.44</td>
<td>236.12 ± 26.89</td>
</tr>
<tr>
<td>Resilience*</td>
<td>0.10 ± 0.007</td>
<td>0.10 ± 0.004</td>
</tr>
</tbody>
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* Mean from triplicate experiments ± Standard deviation. Values with similar abbreviations are non significant.
FIG 1: Average scores obtained for different sensory attributes of white peda samples. The values for all attributes for sensory evaluation do not differ significantly (p<0.05).

(2006) reported very high gumminess in white peda which is in accordance with current findings.

The yellow peda samples differed significantly in their textural properties. The values derived from the study showed adhesiveness ranging from 0.301 to 60.007 g.sec, gumminess 792.24 to 1027.91, chewiness 195.33 to 426.83, springiness 0.18 to 0.50, cohesiveness
FIG 2: Average scores obtained for different sensory attributes of yellow peda samples. The value for colour and body & texture differ significantly (p<0.05), whereas values for other attributes do not differ significantly.

FIG 3: Average scores obtained for different sensory attributes of lal peda samples. The values for colour and appearance differ significantly, whereas values for other attributes do not vary significantly (p<0.05).

0.214 to 0.44 and resilience 0.07 to 0.144 (Table 3). The findings show wide degree of variations in all the textural properties of all types of peda collected from market.

The brown peda samples also showed wide variations among samples procured from different markets. Londhe and Pal (2008) found wide variations in chewiness values of brown peda collected from different markets, which was also observed in all the three types of peda under present study. The variations may be due to variation in moisture content of peda. The moisture content of white peda ranged from 21.37 to 31.53 %, lal peda 15.95-19.38 % and yellow peda 14.34–17.67 %. Ray et al. (2002) reported similar levels of moisture content in peda.
Correlation analysis of moisture content and textural properties of peda samples show that springiness (0.993) and cohesiveness (0.918) are positively correlated, whereas gumminess (-0.937) and chewiness (-0.945) are negatively correlated with moisture content of peda.

**CONCLUSIONS**

The different types of peda samples collected from four different markets of Varanasi, showed wide variation in their textural and sensory profile. This may be due to the variation in their method of preparation and varying levels of sugar and moisture content. The correlation study indicated that, there is a direct relation between moisture levels and textural variations, which affects the sensory acceptability of the peda samples.

**REFERENCES**


