# Physico-Chemical and Textural Properties of Mango Burfi as Prepared By Natural Sweetener (Honey)

[1]Alakshendra Pratap Singh, [2]Dr. Vivek Kumar
[1]M. Tech (Food Technology) Student, Harcourt Butler Technical University Kanpur
[2]Assistant Professor of Department Food Technology, Harcourt Butler Technical University, Kanpur

***Abstract:*** Milk khoa based sweets like burfi, pedha, gulabjamun, rasgolla, etc are very much popular in almost all parts of the country. There exists a considerable scope for expanding market base and improving the quality of indigenous khoa based milk products by adopting improved production technology. Khoa burfi which is very popular, could be made more acceptable and nutritious by using natural fruit flavours like mango, papaya, dates figs etc. The burfi prepared with addition of mango pulp in sweetened khoa is popularly known as mango burfi and it has great commercial potential owing to its typical taste and nutritional property. The present research work was carried out with a view to design technological data which is requisite in product standardization and mechanization. The mango burfi was prepared by varying the rates of mango pulp addition and was tested for sensory and various textural properties such as hardness, cohesiveness, gumminess, chewiness, adhesiveness and springiness with TA-XT Texture Analyser using two bite compression. The hardness was found to have positive relation with proteins, fat and ash content while the moisture and level of mango pulp do not show significant effects. Similar trends were observed for springiness, gumminess, chewiness and cohesiveness.

***Index Terms***- Burfi, Mango, texture analyser.

## Introduction

About 7 per cent of the quantity of milk produced in India is converted to khoa and khoa based product. Burfi is such a khoa based product popular in India. It is prepared by boiling milk in an open pan so as to obtain a semi-solid product called khoa to which sugar is added in crystalline, powder or syrup. But due to excess of sugar consumption cause obesity, diabetes and various types of diseases and adulterants in milk and khoa in milk and khoa forced to consumer to switch from traditional product to bakery and confectionary product. Growing suspicion about a adulteration together with rise in preference for healthy and low–fat products has its demand for traditional sweet which has fallen by over 50 percent especially those made from milk-ASSOCHAM Mango burfi is a type of burfi evolved and popular in the northern India this burfi is prepared by blending khoa with mango pulp and honey. Addition of mango pulp imparts a typical refreshing taste to the product. It is well accepted that the knowledge of rheological and textural attributes is imperative for mechanization new product development equipment design and process improvement (Asghar et al 2009). Also, there is no literature available on the standardization and optimization of mango pulp content in mango burfi. Therefore, the objective of this study was to establish the physico-chemical quality and textural profile of mango burfi of varying mango pulp content and set up relations for predicting the textural properties from the consumption.

## Materials and methods

### Preparation of mango pulp

Fully-ripened mangoes from company bagh, Kanpur were procured, washed thoroughly, peeled, cut into pieces and seeds were removed manually. Then the cut pieces were crushed in the mixer to get mango pulp. The pulp, which was heated at 60°C for 3 min to reduce its microbial load (Shelke et al. 2008). The heat-treated pulp was cooled immediately and kept in the refrigerator for 2 hrs.

### Preparation of Mango burfi

Buffalo milk standardized to 6% fat and 15% total solids (TS) was concentrated in a stainless steel karahi (pan) by open pan boiling with continuous stirring and scraping until a semi –solid mass of paste-like consistency was obtained sugar@ process improvement (Asghar et al 2009). Also, there is no literature available on the standardization and optimization of mango pulp content in mango burfi. Therefore, the objective of this study was to establish the physico-chemical quality and textural profile of mango burfi of varying mango pulp content and set up relations for predicting the textural properties from the consumption.

35% of khoa was added to sweeten the product when the product showed a tendency to form compact mass, the temperature was lowered to 88-90°C and selected levels of mango pulp, honey and skimmed milk powder were added. Finally, this mixture was heated on a low fire with gentle stirring till the desired consistency of mango burfi was obtained. It was then spread uniformly in a tray and allowed to cool. After setting, mango burfi was cut into rectangular blocks of 25*25*25 mm. (shelke et al. 2008) used similar manufacturing process while studying mango burfi. These levels of mango pulp addition yielded various proportions of ingredients, which were considered as treatments as shown in a Table 1.

| Trial No. | Milk fat | Mango pulp | SMP | Honey |
|---|---|---|---|---|
| **1.** | 40 | 35 | 2 | 3 |
| **2.** | 40 | 40 | 4 | 6 |
| **3.** | 40 | 45 | 6 | 9 |
| **4.** | 40 | 50 | 8 | 12 |
| **5.** | 45 | 35 | 4 | 9 |
| **6.** | 45 | 40 | 2 | 12 |
| **7.** | 45 | 45 | 8 | 3 |
| **8.** | 45 | 50 | 6 | 6 |
| **9.** | 50 | 35 | 6 | 12 |
| **10.** | 50 | 40 | 8 | 9 |
| **11.** | 50 | 45 | 2 | 6 |
| **12.** | 50 | 50 | 4 | 3 |

The chemical composition of mango burfi such as protein, fat, ash and moisture contents were determined following standards described in Bureau of Indian Standards (ISI 1981). The fat content of the product was determined using Gerber method.

**Texture profile analysis (TPA)**

Textural properties of Santra burfi were evaluated using TAXT2i texture analyzer (Stable Micro Systems, Surrey, UK) equipped with 5 kgf load cell using two-

**Results and discussion**

The mean chemical composition of Mango burfi prepared with different concentrations of mango pulp is presented in Table 2. The moisture, protein, ash and fat contents of mango burfi ranged from……

One-way analysis of revealed that addition of mango pulp significantly affected the physico-chemical qualities. Ash and moisture content increased markedly with increase in mango pulp content in the product. Similarly, the effect of mango pulp) and those containing various concentrations of mango pulp. On the other hand, protein, fat and ash significantly decreased with increasing pulp content. However, the changes in protein, fat and ash contents were not as drastic as seen with moisture. The bite compression. The samples were cut with a cylindrical die to get uniform size of 10 mm diameter and 10 mm height. The P-75 compression platen having 75 mm diameter was used to compress the samples to 50 % of the original height. The pre-test speed was 2 mm/s while the test and post-test speeds were 0.5 mm/s. Values of hardness, cohesiveness, gumminess, chewiness, adhesiveness and springiness were obtained from the typical textural profile curve as described by Bourne(1978). pulp on moisture content of the product was highly significant. Moisture content increased (nearly 100 %) in burfi because after addition of mango pulp during processing heat desiccation was done only for a short time, which allowed the moisture in the mango pulp to be retained in the product. Above 40 % pulp content, the moisture content in the product was high enough to cause an unacceptable level of stickiness. Pairwise comparisons revealed that there was significant difference between the moisture content of control sample (0 % reduction in protein, fat and ash contents was due to the replacement of milk solids by mango pulp. The values of various texture profile descriptors of

mango buefi containing different concentration of mango pulp are summarized in Table 3.

**Table 3 Texture profile parameters of Mango Burfi**

| Parameters treatments | Khoa | Mango pulp | SMP | Honey | Hardness, N | Cohesiveness | Adhesiveness, N | Springiness | Gumminess, N | Chewiness, N mm | Overall acceptability |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 40 | 35 | 2 | 3 | 2.728 | 0.235 | 0.000 | 0.305 | 0.642 | 0.196 | 0.8212 |
| T2 | 40 | 40 | 4 | 6 | 3.600 | 0.166 | 0.000 | 0.194 | 0.596 | 0.116 | 0.9344 |
| T3 | 40 | 45 | 6 | 9 | 2.946 | 0.182 | 0.000 | 0.200 | 0.536 | 0.107 | 0.7942 |
| T4 | 40 | 50 | 8 | 12 | 3.382 | 0.148 | 0.000 | 0.177 | 0.540 | 0.112 | 0.8718 |
| T5 | 45 | 35 | 4 | 9 | 3.055 | 0.225 | 0.000 | 0.265 | 0.686 | 0.182 | 0.8826 |
| T6 | 45 | 40 | 2 | 12 | 2.837 | 0.215 | 0.000 | 0.190 | 0.609 | 0.116 | 0.7934 |
| T7 | 45 | 45 | 8 | 3 | 2.946 | 0.225 | 0.000 | 0.309 | 0.664 | 0.205 | 0.8758 |
| T8 | 45 | 50 | 6 | 6 | 2.837 | 0.261 | 0.000 | 0.245 | 0.739 | 0.181 | 0.8526 |
| T9 | 50 | 35 | 6 | 12 | 2.182 | 0.095 | 0.000 | 0.354 | 0.207 | 0.073 | 0.5822 |
| T10 | 50 | 40 | 8 | 9 | 3.055 | 0.208 | 0.000 | 0.193 | 0.634 | 0.122 | 0.8424 |
| T11 | 50 | 45 | 2 | 6 | 3.273 | 0.190 | 0.000 | 0.198 | 0.622 | 0.123 | 0.8812 |
| T12 | 50 | 50 | 4 | 3 | 2.619 | 0.237 | 0.000 | 0.246 | 0.619 | 0.152 | 0.7746 |

In general, the textural values of Santra burfi were remarkably less than those reported for khoa and gulabjamun (Adhikari et al. 1994). Mango pulp had a highly significant negative effect on hardness of the product. The hardness value decreased from 3.382 to 2.182 N as the mango pulp content increased. Even addition of 5 % pulp drastically reduced the hardness score. As discussed above, the reduction in hardness with orange pulp content could be attributed to the retention of higher moisture in the product during processing. Cohesiveness of mango burfi ranged from 0.235 to 0.095. Effect of mango pulp content on cohesiveness of burfi was significant. However, at higher pulp contents, the cohesiveness values of the product decreased and were comparable to that of control. Chewiness of mango burfi was also greatly influenced by its composition. It was observed that the variations in the chewiness followed similar trend as that for gumminess.

**Conclusions**

The textural attributes such as hardness, cohesiveness, adhesiveness, springiness, gumminess and chewiness of mango burfi, which are requisite for its commercial production, were determined. The hardness was found to be positively related with protein, fat and ash contents while it was negatively related with moisture and

mango pulp contents. Hardness, gumminess and chewiness of mango burfi could be adequately predicted from the chemical composition with substantial accuracy. Springiness, adhesiveness and cohesiveness do not indicate any significant relation with any of the individual compositional characteristics. The optimum content of mango pulp in mango burfi must be less than 15 %. These interrelations among the textural attributes can be studied further from future perspective of the field and view point of products' market potential.

**References**


1. Adhikari AK, Mathur ON, Patil GR (1994) Interrelationships among Instron textural parameters, composition and microstructure of khoa and gulabjamun made from buffalo milk. J Food Sci Technol 31(4):279–284 Asghar A, Anjum FM, Allen JC, Rasool G, SheikhMA(2009) Effect of modified whey protein concentrates on instrumental texture analysis of frozen dough. Pak J Nutr 8(2):189–193

2. ASSOCHAM, http://www.assocham.org/newsdetail.php?i d=5318

3. BIS (1970) Indian standard specifications of Burfi. IS: 5520–1970. Bureau of Indian Standards, New Delhi

4. Bourne MC (1978) Texture profile analysis. Food Technol 32(7):62–66, 72

5. Desai HK (1988) Rheological properties of heat-and-acid coagulated Indian milk products. Ph.D. thesis, Kurushetra University, Karnal Gupta SK, Karahadian C, Lindsay RC (1984) Effect of emulsifier salts on textural and flavour properties of processed cheeses. J Dairy Sci 67:764–778
6.
7. Gupta SK, Patil GR, Patel AA, Garg FC, Rajorhia GS (1990) Instron texture profile parameters of khoa as influenced by composition. J Food Sci Technol 27(4):209–213

8. ISI (1981) Handbook of analysis, SP 18 (Part VI) dairy products. Indian Standard Institution, New Delhi

9. Patil GR, Patel AA, Garg FC, Rajoorhia GS, Gupta SK (1990) Interrelationship between sensory and instrumental data on texture of khoa. J Food Sci Technol 27(3):167–170

10. Shelke CY, Baswade SV, Andhare BC, Mule RS, Adhangale SB (2008) Economics of preparation of mango burfi. J Dairy Foods Home Sci 27(3/4):196–198