



ISSN: 2456-2912

VET 2023; SP-8(5): 76-78

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Received: 20-04-2023

Accepted: 25-05-2023

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## Studies on sensory evaluation and microbiological quality of burfi sold in and around greater Hyderabad municipal corporation, Telangana State

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### Abstract

Nutritionists worldwide have acknowledged the milk as a comprehensive source of nourishment. It contains all the essential nutrients required for the growth and upkeep of a robust human body. Burfi stands as a prime example of an indigenous milk-based delicacy, rich in nutrition as it encompasses nearly all milk solids in a concentrated form, along with easily digestible carbohydrates and an array of other supplementary ingredients. The present study was taken up to analyze the various quality parameters of burfi that sold in and around greater Hyderabad Municipal Corporation. A total of 90 burfi samples, 30 each from co-operative dairies, private dairies and retail small vendors sold in and around the Greater Hyderabad Municipal Corporation were collected aseptically and were tested for sensory evaluation and microbiological quality. The sensory evaluation revealed that the overall sensory scores of  $94.5 \pm 0.285$ ,  $90 \pm 0.265$  and  $77 \pm 0.316$  for co-operative, private dairies and retail small vendors respectively. The results for microbiological quality parameters were obtained as the standard plate counts are  $8.5 \times 10^4$ ,  $3.86 \times 10^5$  and  $2.82 \times 10^7$ , Coliform counts are  $6.28 \times 10^3$ ,  $5.86 \times 10^4$  and  $6.86 \times 10^5$ , *staphylococcus* spp. counts are  $3.85 \times 10^3$ ,  $3.86 \times 10^4$  and  $3.86 \times 10^5$  and yeast and mould counts are 168.2, 278.5 and 896 from Cooperative dairies, private dairies and retail small vendors samples respectively.

**Keywords:** Burfi, sensory quality, microbiological quality, co-operative dairy, private dairy, retail small vendors

### 1. Introduction

Approximately 50 percent of milk is utilized for production of indigenous dairy product in India, which is popular in rural and urban areas. Among the Indian indigenous dairy products, khoa and khoa based milk sweets provide a good means of conserving and preserving surplus milk solids (Karthikeyan and Pandiyan, 2013) <sup>[11]</sup>.

Khan (2006) <sup>[12]</sup> reported that 90 percent of khoa preparation is coming from unorganized sector where unhygienic conditions prevail in the production unit, leading to contamination of products with various types of microorganisms, resulting low shelf life of the finished products. Most of the products were sold in the market without proper packaging and excessively exposing them to atmospheric contamination.

Even though the khoa and khoa based milk sweets are produced under strict hygienic conditions in organized sector, they are liable for microbial contamination. It may enter into food at any stage of processing from the farm to till the food is reached to the final consumer i.e., at the time of packing, transport and storage etc. so it becomes imperative not only to take all kinds of preventive measures and also to evaluate at every stage, which will subsequently influence the microbiological quality (Agarwal and Rachappa, 2006) <sup>[11]</sup>.

Khoa is manufactured at commercial level as well as at small scale. Two methods are commonly used for khoa production, one is traditional method by open pan evaporation process and another is steaming jacketed kettle for evaporation. The principle behind khoa preparation is to reduce moisture content and increase total solids, which increase shelf life of product. The unsanitary conditions followed during the production, storage and handling of burfi are the main cause of foodborne diseases (Kamat and Sulebele, 1974) <sup>[10]</sup>. Singh *et al.* (1975b) <sup>[19]</sup> surveyed on the microbiological quality of burfi and reported higher levels of microbial counts including public health significance organisms like salmonella,

staphylococci etc.

Various sweet shops both at large and street vendors are producing burfi in and around Greater Hyderabad Municipal Corporation. Much work has not reported so far about microbiological and sensory quality of burfi, therefore an attempt was made to study the microbiological and organoleptic quality of burfi prepared from retail small vendors, private dairies and co-operative dairies in and around Greater Hyderabad Municipal Corporation (GHMC), Telangana state.

### Materials and Methods

**Sample collection:** A total of 90 burfi samples, 30 each from organized dairies, private dairies and retail small vendors sold in and around GHMC were collected aseptically using sterile plastic bags, packed in ice box and transported to the laboratory of department of veterinary public health and epidemiology. The samples were stored at refrigerator temperature till analysis.

**Sample preparation:** 10 g of burfi sample was added in 90 ml sterile 0.85% physiological saline which makes 1:10 dilution and 1ml of this is transferred to 9ml and so on to get serial dilution of 1:100, 1:1000, 1:10000, 1: 100000 and 1:1000000. The dilution samples inoculated in various media for microbiological enumeration i.e. Nutrient agar for total viable count /standard plate count (TVC/SPC), Mac Conkey agar for Coliform count and potato dextrose agar for yeast and

mould following the methods described in IS: 2802 (1964)<sup>[7]</sup> and Vogel-Johnson agar for staphylococcal count as per USP XXI (1985)<sup>[21]</sup>.

The burfi was evaluated for flavor (45 points), body and texture (35 points) and color and appearance (20 points) by a panel consisting of five experienced judges, adopting modified score card of khoa given by Pal and Gupta (1985)<sup>[15]</sup> using 100-point scale.

### Results and Discussion

The organoleptic scores of burfi collected from different sources are presented in table.1. The flavor, body and texture and color and appearance were high for the samples collected from co-operative dairies, where the samples collected from Private dairies is moderate and least in Retail small vendors. These results are almost similar to the findings of Bindu kiranmayi *et al.* (2012)<sup>[2]</sup>. The flavor (41.5), body and texture (31.2) scores observed for the samples from branded private sector in the present study, were almost similar to the findings of Sakate *et al.* (2004)<sup>[17]</sup>, whereas color and appearance score (17.3) observed in present study was slightly less than their findings. The overall acceptability scores of 94.5, 90.0 and 77.0 observed for the samples from Co-operative dairies, private sector and retail small vendors respectively in present study, were almost coinciding with findings of Bindu kiranmayi *et al.* (2012)<sup>[2]</sup>. The overall acceptability score reported by Sakate *et al.* (2004)<sup>[17]</sup> were almost similar to that of private sector samples in the present study.

**Table 1:** Sensory evaluation (Organoleptic score) in burfi samples collected from different sources

Sl. No.	Character	Co-operative dairies	Private dairies	Retail small vendors
1.	Flavor (45)	43±0.338	41.5±0.224	35.8±0.224
2.	Body and texture (35)	33.8±0.342	31.2±0.291	28.5±0.312
3.	Color and appearance (20)	17.7±0.312	17.3±0.338	12.7±0.336
4.	Overall acceptability	94.5±0.285	90±0.265	77±0.316

Microbiological quality of burfi collected from different sources was presented in table 2. SPC counts in burfi were  $8.5 \times 10^4$ ,  $3.86 \times 10^5$  and  $2.82 \times 10^7$  cfu/g in the samples from Co-operative dairies, private sector and retail small vendors respectively. The SPC count was least in Cooperative dairies in the present study ( $8.5 \times 10^4$  cfu/gm), which was higher than the counts of  $1.39 \times 10^4$  cfu/g, and  $6.96 \times 10^3$  cfu/g reported by Bindu kiranmayi *et al.* (2012)<sup>[2]</sup> respectively and lower than the counts ( $148 \times 10^5$  cfu/gm) reported by Vaidya *et al.* (2015)<sup>[20]</sup>. Garg (1981)<sup>[5]</sup>, Bindu kiranmayi *et al.* (2012)<sup>[2]</sup>, Misra and Kuila (1988)<sup>[14]</sup> and Ghodekar *et al.* (1980)<sup>[6]</sup> reported SPC counts almost similar to the counts from organized dairies samples in present study, whereas reported lower counts than the present study. The SPC counts of burfi from

retail small vendors was similar to Bindu kiranmayi *et al.* (2012)<sup>[2]</sup> and Kakar and Udipi (1997)<sup>[9]</sup>, whereas low counts was reported by Karthikeyen and Pandiyan (2013)<sup>[22]</sup>.

The total Coliform counts in burfi samples were  $6.28 \times 10^3$ ,  $5.86 \times 10^4$  and  $6.86 \times 10^5$  cfu/g from Co-operative dairies, private dairies and retail small vendors respectively in the present study. Coliform counts were least in co-operative dairies, which was similar to the counts reported by Bindu kiranmayi *et al.*, (2012)<sup>[2]</sup> and Misra and Kuila (1988)<sup>[14]</sup> from cooperative sector. Total Coliform counts in burfi samples from private dairies and retail small vendors in present study was almost similar to counts reported by Bindu kiranmayi *et al.* (2012)<sup>[2]</sup>, whereas lower counts were reported by Karthikeyen and Pandiyan (2013)<sup>[22]</sup>.

**Table 2:** The results of microbiological quality parameters of burfi samples.

Sl. No.	Microbial count/gm	Co-operative dairies	Private dairies	Retail small vendors
1.	SPC	$8.5 \times 10^4 (1.3 \times 10^4 - 9.1 \times 10^4)$	$3.86 \times 10^5 (5.8 \times 10^4 - 1.2 \times 10^6)$	$2.82 \times 10^7 (5.8 \times 10^6 - 6.7 \times 10^8)$
2.	Coliform count	$6.28 \times 10^3 (8.9 \times 10^2 - 4.6 \times 10^4)$	$5.86 \times 10^4 (3.8 \times 10^3 - 2.1 \times 10^5)$	$6.86 \times 10^5 (3.8 \times 10^4 - 9.86 \times 10^5)$
3.	Yeast & mold count	168.2(58-208)	278.5(110-368)	896(660-1100)
4.	<i>Staphylococcus</i> spp. count	$3.85 \times 10^3 (6.8 \times 10^2 - 1.8 \times 10^4)$	$3.86 \times 10^4 (4.8 \times 10^3 - 1.2 \times 10^5)$	$3.86 \times 10^5 (2.8 \times 10^4 - 3.6 \times 10^6)$

Yeast and Mould counts in burfi samples were 168.2, 278.5 and 896/gm from Co-operative dairies, private dairies and retail small vendors respectively. Counts from Co-operative dairies (168.2/gm) in the present study were almost similar to the counts of reported by Bindu kiranmayi *et al.* (2012)<sup>[2]</sup>, Misra and Kuila (1988)<sup>[14]</sup> and Garg (1981)<sup>[5]</sup>, whereas higher counts were reported by Karthikeyen and Pandiyan

(2013)<sup>[22]</sup>. Yeast and Mould counts in burfi samples from private sector (270.5/gm) were similar to counts reported by Bindu kiranmayi *et al.* (2012)<sup>[2]</sup> and Singh *et al.* (1975a)<sup>[18]</sup>, whereas higher counts were reported by Karthikeyen and Pandiyan. (2013)<sup>[22]</sup>. Counts from retail small vendors in present study (896/gm) was almost similar to the counts reported by Bindu kiranmayi *et al.* (2012)<sup>[2]</sup> and Dwarakanth

and Srikanta (1977), whereas higher counts were observed by Karthikeyan and Pandiyan (2013) [22].

The *Staphylococcus* counts in burfi samples were  $3.85 \times 10^3$ ,  $3.86 \times 10^4$  and  $3.86 \times 10^5$  cfu/g from Co-operative dairies, private sector and retail small vendors respectively. Staphylococcal counts are least in co-operative dairies and high in retail small vendors in the present study which was almost similar to counts reported by Bindu kiranmayi *et al.* (2012) [2]. Staphylococcal counts in burfi sample from private dairies ( $3.86 \times 10^4$ ) were almost similar to the counts reported by Bindu kiranmayi *et al.* (2012) [2], Garg (1981) [5] and Kakar and Udipi (1997) [9]. *Staphylococcus* counts of  $6.01 \times 10^3$  cfu/g was reported by Vaidya *et al.* (2015) [20] from the shops without HACCP certification, which were slightly higher than the counts in the samples from cooperative dairies and less than the counts from private sector and retail vendors in the present study.

### Conclusion

The present study revealed that the sensory evaluation and analysis of microbiological quality parameters of burfi sold in and around greater Hyderabad Municipal Corporation was good in the samples collected from co-operative dairies and also from Retail small vender and fair from Private dairies.

### Acknowledgement

The authors express their sincere gratitude to PVNR Telangana Veterinary University for generously providing access to the laboratory facilities at the Department of Veterinary Public Health and Epidemiology, C.V.Sc., Rajendra Nagar for the completion of this research project.

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