Bacterial Assessment of Ready to Eat Sweet (*Burfi*) Sold in Different Sweet Houses in Narayangadh, Chitwan: A Pilot Study

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ABSTRACT

As a sweet product, burfi is highly esteemed by Nepalese consumer and kept in high priority from the time immemorial. However, the milk and milk products borne outbreaks account for 2 to 6 % of bacterial foodborne outbreaks in several countries. Hence, with an objective to determine the bacterial load of the commercial sweet (burfi) sold in Bharatpur metropolitan city 1, Narayangadh, Chitwan, a cross-sectional study was conducted. Ten sample of ready to eat sweet (Burfi) along with the packaging material were collected purposively from different sweet shops of Bharatpur metropolitan on January 2019. The preparation of samples was done as per Food Microbiology Protocols (2001) and the aerobic colony count (ACC) was determined by spread plate technique using plate count agar. It was found that the aerobic plate count of burfi sample ranges from 9.1×10^9 to 1.5×10^{10} CFU/g with an average of 1.2×10^{10} CFU/g, which is higher than the permissible Standard Plate Count according to Indian Standards Institution (ISI) specification. In conclusion, the high bacterial count in Burfi samples from different sweet shops indicates insufficient hygienic condition duration handling and unhygienicconditions of storage. This may give rise to public health hazard.

Keywords: Bacterial load, Bharatpur

INTRODUCTION

Milk based traditional sweet products such as lalmohan, gundpak, khoa, pedha, burfi, tar, sikarni, pustakari, and kalakand contribute the dominant share in the food market of Nepal (Acharya, Kharel, and Chetana, 2015).Khoa is used for different types of sweet making like, pedha, burfi, gulab jam and other sweets (Vaidya, Dr. Ghugare, and Dr.Kutty, 2015). Khoa can serve as a favorable medium for the growth of a variety of microorganisms due to its high moisture content and good nutritive value (Microbiological Quality and Safety Aspects of Traditional Dairy Products, 2012). Burfi is a dense milk based sweet from the Indian subcontinent, a type of mithai (Wikipedia, 2019). Burfi is prepared by the addition of khoa, sugar and other additives like-aromatic spices, nuts, chocolate, shredded coconut, etc. which are mixed well and heated over low fire until it assumes a consistency capable of forming a hard flat surface on spreading, the hard mass is collected in a tray and after setting, cut down into desired shape (Yadav, 2002). As a sweet product, burfi is highly esteemed by Nepalese consumer and kept in high priority from the time immemorial.The milk borne and milk products borne outbreaks account for 2 to 6 % of bacterial foodborne outbreaks in several countries (Pal and Jadhav, 2013). An outbreak of food poisoning due to the consumption of pedha and burfi has been reported by Mandokhot and Chandiramani (1983).

The objective of the present study is to find out the microbiological quality of the commercial burfi sold in Bharatpur metropolitan city 1, Narayangadh, Chitwan.

MATERIALS AND METHODS

Sample Collection

A total of ten purposive samples of ready to eat burfi were collected in sterilized glass petri plates from the different sweet houses located at Bharatpur metropolitan city 1, Narayangard, Chitwan during January 2019. Samples were collected in same packaging material which is normally given to customers.

Transportation

Collected samples were transported to Veterinary Microbiology Laboratory of Agriculture and Forestry University, Rampur, within an hour of collection in thermo cool box by placing ice packs in between and placed in refrigerator at 4 ^{o}C until further preparation was done.

Sample Preparation

Ten gram of the sample was homogenized with 90 ml sterilized distilled water bymincing in sterilized mortar and pestle for 2 minutes. Tenfold serial dilution of the homogenate was done in sterilized distill water up to 10^{-7} folds.

Inoculation of Sample

Immediately after homogenization, 0.1 ml of diluted sample from each dilution were plated at plate count agar plates prepared 24 hours before inoculation. Samples were inoculated evenly over the surface of the plates using spread plate method with the help of sterile glass spreader. Each dilution was plated in duplicate. All the plates were incubated at 32 ^{o}C for 48 hours.

Counting of Colony

Two plates corresponding to one dilution and showing between 30 to 300 colonies per plate were computed. The average of two count was recoded as final colony forming unit (CFU) count.
CFU per gram was calculated by using formula,

$$CFU/g = CFU/plate \times dilution\ factor \times 1/aliquot$$

RESULT

The result of microbiological count of burfi is shown in the Table 1. The aerobic plate count of burfi sample ranges from 9.1×10^{9} to 1.5×10^{10} CFU/g with an average of 1.2×10^{10} CFU/g. This is higher than the permissible Standard Plate Count according to Indian Standards Institution (ISI) specification which is 30,000 CFU/g (IS1 1970) (Bandekar, Kamat, and Thomas, 1998). Food Safety and Standard Act, 2006 India (FSSAI) (Government of India, Ministry of Health and Family Welfare., 2011) has given microbial standard for khoa where the acceptable level of Total Plate Count is set at 50,000 CFU/g.

Table 1: Microbial Quality of Burfi

Sample Id	CFU/g	Sample Id	CFU/g
A	1.05×10^{10}	F	1.2×10^{10}
B	1.2×10^{10}	G	1.3×10^{10}
C	1.0×10^{10}	H	1.5×10^{10}
D	1.4×10^{10}	I	1.1×10^{10}
E	1.3×10^{10}	J	9.1×10^{9}

DISCUSSION

The average aerobic plate count of burfi sample is found to be 1.2×10^{10} CFU/g which is higher than the findings by Motina and Shekllar (2007) in India where the mean bacterial count in burfi was 4.5×10^{5} CFU/g. Suryawanshi (1991) found the average total bacterial counts of burfi samples in Parbhani, India to be 4,580,000 CFU/g and the range of bacterial count was 126,000 and 26,700,000 CFU/g. Standard plate count (SPC) in market samples of burfi ranged from 2 x 10^3 to 6 x 10^5 CFU/g (Ghodekar *et.al*., 1974), 2.16 x 10^6/g (Singh *et.al*., 1975), from 4 x 10^2 to 5.2 x 10^2 CFU/g (Dwarkanath and Srikanta, 1977), from 5.3 x 10^2 to 7.4 x 10^4 CFU/g (Gary, S.R., 1981) and from 5.0 x 10^2 to 4.4 x 10^5 CFU/g (Misra and Kuila, 1988).

CONCLUSION

The high standard plate countsas observed in the present investigation clearly indicatedthat the conditions of product preparation were unsatisfactory. Since, quite high temperature of preparation is normallyemployed, the high bacterial counts are suggestive of post preparation contamination of the products and unhygienicconditions of storage.This may give rise to public health hazard.

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