TOTAL AEROBIC BACTERIAL PLATE COUNTS (APC) OF RAW MILK, COTTAGE CHEESE AND CURD SAMPLES

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ABSTRACT

Total 150 samples comprising of 50 raw milk, 50 cottage cheese and 50 curd samples were collected and the aerobic plate count (APC) of each sample was determined. The average APC of milk samples was 19 x 10^4 cfu/ml, followed by 21 x 10^4 cfu/g of curd samples and 21.5 x 10^4 cfu/g of cottage cheese samples. The APC value of total 150 milk and milk product samples ranged from 11 x 10^4 cfu/ml/g to 29 x 10^4 cfu/ml/g with an average of 20 x 10^4 cfu/ml/g and the $\log_{10}$ cfu/ml/g value of APC is 6.9734.

KEY WORDS: APC, Curd, Milk, Cottage cheese/paneer.

INTRODUCTION

There is growing market for the food industry all over the globe and also in India. Milk and milk products constitute an important and vital dietary component in view of their high nutritive value and health attributes. However, along with their prime position in human diet, milk and milk products are extremely vulnerable to microbial contamination during the course of their production and processing (Nehra *et al*., 2003). The present study was carried out to estimate total aerobic bacterial plate count (APC) of curd, milk and cottage cheese samples.

MATERIALS AND METHODS

A total of 150 samples comprising 50 samples each of raw milk, curd and cottage cheese were collected from various organized (branded) and unorganized (unbranded) sectors supplying milk and milk products to consumers at Mhow, Indore and surrounding areas under aseptic conditions.

Total aerobic bacterial plate count (APC) of each sample was determined by spread plate technique according to the method described by ICMSF (1978) with minor modifications using plate count agar medium. For enumeration purpose ten-fold serial dilutions of each sample was prepared in sterile NSS up to 10^{-6}. For calculation of colony forming units, the plates with 30-300 colonies were considered and the counts were further multiplied with the reciprocal of dilution factor (Agarawal *et al*., 2003). The result was expressed in cfu/ml or cfu/gm of samples.

RESULTS AND DISCUSSION

Milk and milk products appear to be particularly susceptible to bacterial contamination (Griffiths, 1989). Further, raw milk must be considered to be a potential source of plant contamination, which can affect the entire production chain.

The APC of total 50 raw milk samples ranged from 11 x 10^4 cfu/ml to 27 x 10^4 cfu/ml with an average of 19 x 10^4 cfu/ml. The $\log_{10}$ cfu/ml value of APC ranged from 6.0414 to 6.4624 with an average of 6.2883.

In contrast an average minimum count of 7.05 x 10^4 cfu/ml and a maximum count of 3.5 x 10^5 cfu/ml in raw milk samples were reported by Hamida *et al*. (2009). Lingalhurai and Vellathurai (2010)

found the total plate count for psychotrophs and thermophiles to be 5 x 10^3 cfu/ml to 6.85 x 10^3 cfu/ml, respectively in raw cow milk. The results of present study are higher than these findings. The reasons may be the poor sanitary conditions, poor handling and contamination from external sources.

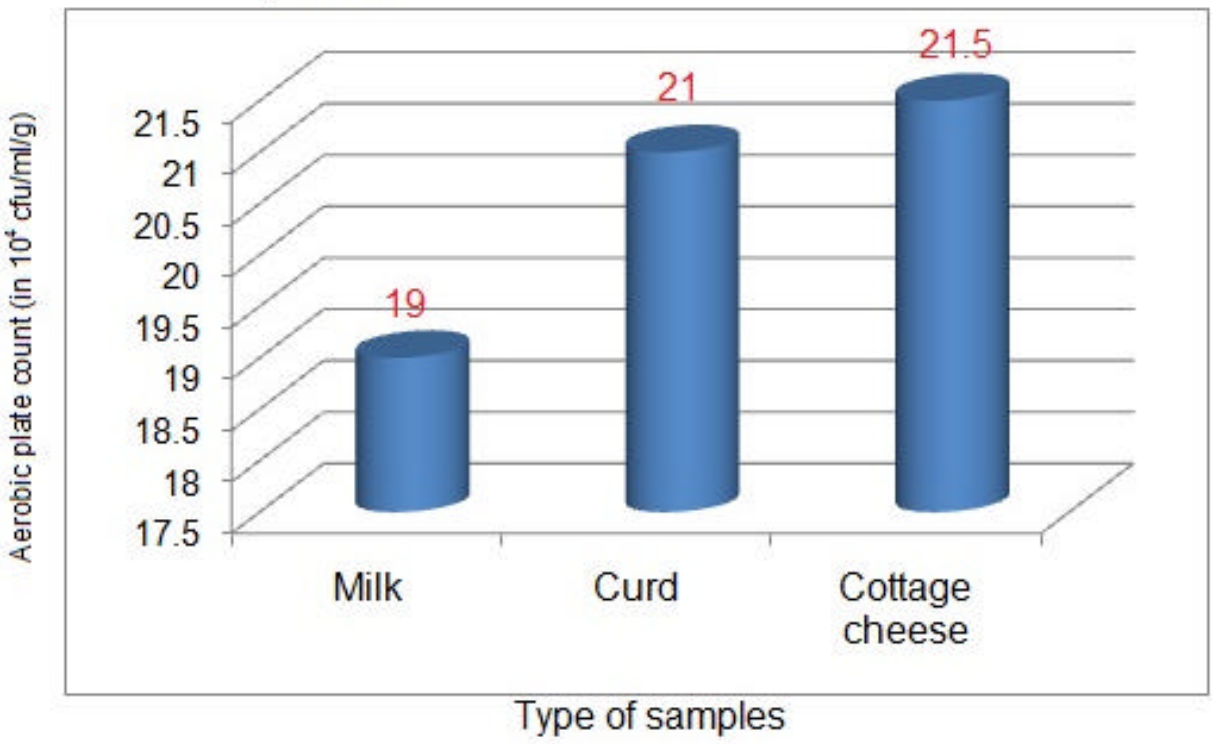
The APC of total 50 cottage cheese samples ranged from 15 x 10^4 cfu/g to 28 x 10^4 cfu/g with an average of 21.5 x 10^4 cfu/g. The $\log_{10}$ cfu/g value of APC ranged from 7.1139 to 7.4472 with an average of 7.3063. The counts obtained in the present study are in the close correspondence with the findings of Lindblad *et al*. (2007) who reported APC of cottage cheese to be 7.48 $\log_{10}$ cfu/g and Vaishnavi *et al.* (2001) who obtained the total viable bacterial counts ranging from 3×10^2 to $9.7x10^{10}$ cfu/g in Indian cheese samples (Paneer).

The aerobic plate count of 50 curd samples ranged from 13 x 10^4 cfu/g to 29 x 10^4 cfu/g with an average of 21 x 10^4. The $\log_{10}$ cfu/g value of APC ranged from 7.1461 – 7.4472 $\log_{10}$ cfu/g with an average of 7.3257. Contradictory to the present study Younus *et al.* (2002) and Chowdhury *et al.* (2011) reported higher bacterial count of 7.34 x 10^7 cfu/g and 7.30 x 10^7 cfu/g, respectively.

Out of three types of samples, the highest APC value was found in cottage cheese, followed by curd and milk (Graph 1). Further, the APC value of total 150 milk and milk product samples ranged from 11 x 10^4 cfu/ml/g to 29 x 10^4 cfu/ml/g with an average of 20 x 10^4 cfu/ml and the $\log_{10}$ cfu/g value of APC is 6.9734.

Variations in the APC range recorded in the present study and in the earlier reports cited in the literature may be attributed to differences in sampling methods, sampling sites, handling, processing and modes of evaluation, hygienic standards and geoclimatic conditions.

Graph: 1. Total aerobic bacterial plate counts of milk and milk products



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