MICROBIOLOGICAL QUALITY EVALUATION OF DAHI / YOGHURT OF KATHMANDU VALLEY

A

Dissertation

Submitted to the Central Department of Microbiology

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In Partial Fulfillment of the Requirements for the Award of the Degree of

Master of Science in Microbiology

(Environment and Public Health Microbiology)

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RECOMMENDATION

This is to certify that **Mr. Kashi Ram Ghimire** has completed this dissertation work entitled **"MICROBIOLOGICAL QUALITY EVALUATION OF DAHI / YOGHURT OF KATHMANDU VALLEY"** as a partial fulfillment of M. Sc. Degree in Microbiology under my supervision. To my knowledge this thesis work has not been submitted for any other degree.

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CERTIFICATE OF APPROVAL

On the recommendation of **Mr. Binod Lekhak** this dissertation work by **Kashi Ram Ghimire**, entitled **"MICROBIOLOGICAL QUALITY EVALUATION OF DAHI / YOGHURT OF KATHMANDU VALLEY"** has been approved for the examination and is submitted to the Tribhuvan University in partial fulfillment of the requirement for M. Sc. Degree in Microbiology.

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ABSTRACT

Dahi is similar to yoghurt and is a fermented milk product by the application of lactic acid bacteria like *Lactobacillus bulgaricus* and *Streptococcus thermophilus* in pasteurized or boiled milk and is the popular and prominent dairy product all over the world. With an aim to evaluate the microbiological quality of Dahi / yoghurt, this study was carried out from July 2007 to January 2008. Seventy-one (34 plastic cup, 19 open and 18 ceramic cup) Dahi samples were collected from three districts of Kathmandu valley and laboratory processing was done at Central Department of Microbiology Kritipur, Kathmandu. For microbiological quality evaluation starter *Streptococcus thermophilus,* common milk borne pathogens like *Staphylococcus* spp., *Bacillus cereus, Salmonella* spp., *Shigella* spp. and indicator organisms like coliform were enumerated in selective media and identified after isolation. Fungal study was done by enumeration of yeasts and molds and by identification of isolated molds. Serial dilution and pour and streak plate method were done for enumeration of organisms.

Streptococcus thermophilus was detected in 4.27% (3/71) of samples with mean count 2.57×10^5 cfu/ml and all isolates were found to be urease deficient. Coliforms were detected in 45.08% (32/71) samples and all coliform positive samples have greater than 10 cfu/ml. *Staphylococcus* spp. were detected in 92.95% (66/71) in which 87.87% (58/66) samples contained coagulase positive *Staphylococcus aureus*. *Bacillus cereus* was detected in 88.73% of samples with the highest and the lowest count were 29.9×10^5 and 0.04×10^5 cfu/ml respectively with mean count 5.51×10^5 cfu/ml. Fungi were found in 96.6% (70/71) samples with mean count 250×10^5 cfu/ml and are the most abundant among the studied organisms. *Salmonella typhimurium* was present in only one (1.45%) sample.

Among coliform, *E. coli* 96.87% (31/32) *Klebsiella pneumoniae* 46.87% (15/32), each *Citrobacter freundii* and *Enterobacter aerogenes* 6.25% (2/32) were present. *Geotricum* spp. 49.20% (31/61), *Aspergillus* spp. 44.44% (28/61), *Mucor* 42.85% (27/61), *Penicillium* spp. 31.74% (20/61), *Cladosporium* spp. 7.93% (5/61), *Fusarium* spp. 9.52% (6/61), and *Rhizopus* spp. 6.34% (4/61), was present among the fungi positive samples.

Almost all samples were found to be highly contaminated with harmful bacteria, yeasts and molds. Many did not meet the standard or safe guideline criteria given by DDC, PFA, and FAO. This indicates the potential of food borne diseases in Kathmandu. Therefore establishment of national standard guideline for Dahi and continuous monitoring for microbial quality is essential.

Key words: *Dahi*, yoghurt, Microbiological Quality, coliforms, *Bacillus cereus*

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LIST OF ABBREVIATIONS

^{0}C	Degree Celsius
AD	Anno Domini
B. C.	Before Christ
CFR	Code of Federal Regulation
CFU	Colony Forming Unit
DFTQC	Department of Food Technology and Quality Control
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
g	Gram
GHP	Good Hygienic Practice
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Point
ICMSF	International Commission on Microbiological Specification of food.
ISO	International Standardization Organization
Max.	Maximum
Min.	Minimum
ml	Milliliter
MSA	Mannitol Salt Agar
NA	Nutrient Agar
NDDB	Nepal Dairy Development Board
PDA	Potato Dextrose Agar
PFA	Prevention of Food Adulteration
SNF	Solid Not Fat
Spp.	Species
TPC	Total Plate Count
US	United State
VRBA	Violet Red Bile Agar
WHO	World Health Organization
Wt	Weight

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