

**ANTIBIOTIC RESISTANT COLIFORMS IN  
DRINKING WATER OF KATHMANDU VALLEY**

**A**

**Dissertation**

**Submitted to the Central Department of Microbiology  
Tribhuvan University**

**In Partial Fulfilment of the Requirements for the award of degree of  
Master of Science in Microbiology  
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**By**

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2012**

## RECOMMENDATION

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## ABSTRACT

Coliform in drinking water is of great importance due to its indicative value to faecal contamination. Antibiotic resistance and its dissemination in coliforms is a serious public health issue. The study was undertaken to describe drug resistant coliforms in the drinking water from different sources in Kathmandu valley.

This study was conducted at Environmental Microbiology Laboratory of Central Department of Microbiology, from January to August 2011. A total of 66 water samples consisting 28 tap water, 24 well water and 14 stone spouts water were randomly collected from different location of Kathmandu valley, and subjected to microbiological analysis. Modified Kirby-Bauer Disc diffusion method was followed for antibiotic susceptibility test of coliform isolates.

Temperature of all analysed water samples ranged from 10° C to 16 ° C and p<sup>H</sup> ranged from 6.5 to 8.5.

Higher number of stone spouts water samples 85% (n=12) were contaminated with coliforms followed by well water 79.2% (n=19) than tap water 60.7% (n=17). Similarly, the thermotolerant coliform growth was found in higher number of well water samples. 87.5% (n=21), followed by stone spouts water 71.4% (n=10) and tap water 67.9% (n=19). But no significant correlation was found between source and coliform (P>0.05), Thermotolerant coliform (P> 0.05). In this study 97 different isolates of organisms were identified as *Escherichia coli* 32% (n=31), *Citrobacter* spp 24.7% (n=24), *Enterobacter* spp 21.6% (n=21) and *Klebsiella* spp 18.6% (n=18) and *Salmonella* Typhi 3.1% (n=3).

Higher MDR isolates were *E. coli* 92.3% (n=28), *Citrobacter* 62.5% (n=15), *Klebsella* 72.2% (n=13), *Enterobacter* spp 47.6% (10) and *Salmonella* spp 100% (n=3). The most of MDR were attributed to resistance towards Tetracycline and Amoxicillin.

The water of different water sources were found polluted with total coliform and presence of MDR Gram negative bacteria were reported.

**Key words:** *Coliform, Multiple drug resistance (MDR), drinking water.*

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## ABBREVIATIONS

APHA	:	American Public Health Association
AR	:	Antibiotics Resistance
ATCC	:	American Type Culture Collection
BOD	:	Biological Oxygen Demand
CEDA	:	Centre for Economic Development and Administration
CFU	:	Colony Forming Unit
CLSI	:	Clinical Laboratory Standards Institute
DISVI	:	Disarmo e Sviluppo (Italian International Co-operation)
DoHS	:	Department of Health Services
EMB	:	Eosin Methylene Blue Agar
ENPHO	:	Environment and Public Health Organization
EPEC	:	Enteropathogenic Esherichia coli
JICA	:	Japan International Cooperation Agency
MAR	:	Multiple Antibiotic Resistance
MDR	:	Multi Drug Resistance
MF	:	Membrane Filter
MHA	:	Mullar Hinton Agar
MoH	:	Ministry of Health
NA	:	Nutrient Agar
NCCLS	:	National Committee for Clinical Laboratory Standards
NWSC	:	Nepal Water Supply Corporation
SIM	:	Sulphide Indole Motility medium
TC	:	Total Coliform
UNDP	:	United Nation Development Fund
UNEP	:	United Nations Environment Programmes
UNICEF	:	United Nations Children Emergency Fund
XLD	:	Xylose Lysine Deoxycholate Agar
WHO	:	World Health Organization
TCBS	:	Tetrathionate Citrate Bile Salt Agar