

**ISOLATION AND IDENTIFICATION OF EXTENDED  
SPECTRUM BETA LACTAMASE PRODUCING MULTI DRUG  
RESISTANCE BACTERIA FROM SPUTUM SAMPLES OF  
SUSPECTED LRTI PATIENTS VISITING NEPAL PUBLIC  
HEALTH LABORATORY, NEPAL.**

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MASTER OF SCIENCE IN MICROBIOLOGY  
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This is to certify that Mr. Kedar Krishna Bhaila has completed this dissertation work entitled “**Isolation and Identification of ESBL Producing MDR Bacteria From Sputum Samples of LRTI Patients Visiting NPHL**”, Nepal as a partial fulfillment of Master of Science degree in Microbiology under our supervision. This dissertation work done by Mr. Bhaila is an original research and has not been submitted to any other institute/Universities to earn any other degree.

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## ABSTRACT

An eight month study was undertaken with an objective to study the isolation and identification of ESBL producing MDR bacteria from sputum samples of suspected LRTI patients visiting NPHL, Nepal. The laboratory work was conducted in National Public Health Laboratory Teku, Kathmandu.

Out of 250 sputum samples collected, 211 samples meeting the ASM criteria were accepted and further processed, of those 211 processed sample, only 82 (38.86%) were culture positive . Of 144 male suspected cases of LRTI, 49 (34.02%) were found to be culture positive and among 67 female suspected cases, 33 (49.2%) of them were found culture positive. Among different age groups LRTI was found most prevalent in 51-60 (11, 13.41%). Of 82 culture positive LRTI cases, 62.19% were Gram negative bacteria and 37.81% were Gram Positive Bacteria. Among the total isolates, *Klebsiella pneumoniae* (25.6%) was the commonest isolate followed by *Staphylococcus aureus* (24.39%), *Haemophilus influenzae* (15.85%), *Streptococcus pyogenes* (7.31%) and *Streptococcus pneumoniae* (6.09%). Other were *Pseudomonas aeruginosa* (6.09%), *Escherichia coli* (4.87%), *Citrobacter freundii* (2.43%), *Klebsiella oxytoca* (2.43%), *Proteus mirabilis* (2.43%), *Acinetobacter calcoaceticus* (1.21%) and *Moraxella catarrhalis* (1.21%). Of the total sputum samples screened for AFB, 18 different samples showed the positive cases. Male patients (11, 61.66%) were more affected than the female (7, 38.88%).

Gram negative bacteria showed high sensitivity towards Nitrofurantoin (57%), followed by Cotrimoxazole (55%), Ciprofloxacin (53%), Ceftriaxone (51%) and Amoxicillin (33%). Among the Gram positive bacteria, Azithromycin showed the highest sensitivity (62%) and least towards Cotrimoxazole (48%).The prevalence of MDR was 47.61% in *S aureus* and 20% in *S pneumoniae*. Among the GNB, all isolates of *P aeruginosa* (5), *Klebsiella oxytoca* (2), *M catarrhalis* (1) and *Acinetobacter calcoaceticus* (1) showed MDR in in-vitro experiment.

Three isolates of *Klebsiella pneumoniae* (14.28%) and one isolate of *Escherichia coli* (25%) were detected as Extended Spectrum of Beta Lactamase (ESBL) strain.

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## LIST OF ABBREVIATIONS

AFB	Acid Fast Bacillus
ARP	Aerobic Respiratory Pathogens
ARI	Acute Respiratory Infection
BA	Blood Agar
CA	Chocolate Agar
CAP	Community Acquired Pneumonia
CDC	Centre of Disease Control
COPD	Chronic Obstructive Pulmonary Syndrome
DALYs	Disability Adjusted Life Years
DOTS	Directly Observed Treatment Short-course
ESBL	Extended Spectrum of Beta Lactamase
GPB	Gram Positive Bacteria
GNB	Gram Negative Bacteria
HAP	Hospital Acquired Pneumonia
HIV/AIDS	Human Immunodeficiency Virus/Acquired immune Deficiency Syndrome
LRT	Lower Respiratory Tract
LRTI	Lower Respiratory Tract Infection
MA	MacConkey Agar
MHA	Mueller Hinton Agar
MDR	Multi Drug Resistance
MRSA	Methicillin Resistant <i>Staphylococcus aureus</i>
CLSI	Clinical Laboratory Standard Institute
NPHL	National Public Health Laboratory
NTC	National Tuberculosis Centre
NTP	National Tuberculosis Programme
PP	Pulmonary Pathogen
PTB	Pulmonary Tubercle Bacillus
RTI	Respiratory Tract Infection
WHO	World Health Organization

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