

(030)

Evaluation of Amoxicillin, Cloxacillin, Cefotaxime, Ciprofloxacin, and Erythromycin Resistance in *Escherichia coli* Isolated from the Transition Zone of the Kelani River Basin

Samarakkody, A.H.A.¹, Wijerathna, P.A.K.C.², Meddage, A.K.M.M.K.^{2,3}, Liyanage, G.Y.^{2,4}, Sadupama, P.M.^{2,5}, Manage, P.M.^{2*}

¹*Department of Biotechnology, Faculty of Life and Medical Sciences, BMS Campus, Colombo 06, Sri Lanka*

²*Centre for Water Quality and Algae Research, Department of Zoology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

³*Faculty of Graduate Studies, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

⁴*Department of Aquatic Bioresources, Faculty of Urban and Aquatic Bioresources, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

⁵*Teaching Hospital, Polonnaruwa, Sri Lanka*

*pathmalal@sjp.ac.lk

Abstract

Antimicrobial resistance (AMR) is a global health challenge, reducing the effectiveness of commonly used antibiotics and increasing the risk of untreatable infections. Although AMR is often studied in clinical settings, freshwater ecosystems are increasingly recognized as reservoirs for antibiotic-resistant bacteria. In Sri Lanka, the Kelani River serves as a critical water resource, with its transition zone particularly vulnerable to pollution from untreated wastewater, creating conditions conducive to the proliferation of faecal indicator bacteria such as *Escherichia coli*. This study evaluated the antibiotic resistance profiles of *E. coli* isolated from the Kelani River transition zone. Phenotypic resistance was assessed by determining the Minimum Inhibitory Concentration of amoxicillin (AMX), cloxacillin (CLOX), cefotaxime (CEF), ciprofloxacin (CIP), and erythromycin (ERY) using the agar dilution method at concentrations ranging from 60 to 360 ppm. The Multiple Antibiotic Resistance (MAR) index was also calculated. At the lowest tested concentration (60 ppm), all isolates exhibited resistance to CLOX and ERY (100%), while AMX, CIP, and CEF resistance was 94%, 84%, and 50%, respectively. At the highest concentration (360 ppm), resistance decreased, with most isolates showing partial susceptibility. MAR index analysis revealed that at 60 ppm, most isolates had MAR=1 (48%) or 0.8 (28%), whereas at 360 ppm, the majority exhibited MAR=0.6 (58%) or 0.4 (22%), reflecting partial susceptibility. These findings demonstrate that *E. coli* in the Kelani River transition zone is subjected to significant antibiotic pressure, highlighting the river's role as a reservoir for resistant bacteria. Continuous environmental monitoring, coupled with public awareness and improved wastewater management, is essential to mitigate the spread of AMR from aquatic environments to human populations.

Keywords: *Antibiotic resistance, Escherichia coli, Kelani river, Environmental monitoring, Multiple antibiotic resistance index*