

Microbial Composition and Antimicrobial Resistance Patterns in Beach Sand and Sea Water across Three Selected Beaches in the Colombo District, Sri Lanka

MAD Dias^{1#}, TA Devindi¹, PAPAN Perera¹, AAK Aishwarya¹, VA Bodhinayaka¹, and ODK Perera¹

¹Department of Biomedical Sciences, CINEC Campus, Sri Lanka

#ashanidias99@gmail.com

Numerous microorganisms, including potential pathogens, have been identified through marine water quality assessments by coastal management authorities globally. Sri Lanka, notably, faces substantial marine pollution issues, thus the present study was conducted to examine the microbial composition of both seawater and beach sand in three selected popular beaches in Colombo District, Sri Lanka. Seawater samples (n= 30) and sand samples (n= 30) were collected from three different locations. Samples were cultured in Potato Dextrose and Nutrient Agar media and isolations were identified via conventional standard biochemical key. Antibiotic susceptibility patterns were evaluated using antimicrobial susceptibility testing (ABST) and inhibition zone diameters (mm) were measured in accordance with CLSI guidelines. Analysis was obtained via SPSS V25 (95%, P = 0.05). Five pathogenic microorganisms namely *Pseudomonas spp.*, *Bacillus spp.*, *Staphylococcus spp.*, *Enterococcus spp.* and *Acinetobacter spp.* were identified from both seawater and sand in all three locations. The analysis revealed significant difference (p=0.03) of diversity of microorganisms in each three locations. Microorganisms from Galle Face beach was uniformly resistant to Ampicillin and Amoxicillin (100%) and 41.7% were sensitive to Gentamicin, with *Pseudomonas spp.*, *Bacillus spp.*, and *Staphylococcus spp.* All isolations of Mount Lavinia were sensitive to Cephalexin and Augmentin while Ciprofloxacin had 11.8% resistance in *Enterococcus* and *Staphylococcus* along Vancomycin showed 94.1% resistance. Wellawatte beach isolations were sensitive for Augmentin (100%) and all the microorganisms were resistant to Vancomycin while 33.3% were against Ciprofloxacin. Further compared to the Wellawatta beach isolations of Galle face beach shows the highest antibiotic resistance (p<0.01) in isolated microorganisms.

Keywords: *seawater quality, antibiotic sensitivity, resistance patterns*