

## RECREATIONAL WATER AND ITS POTENTIAL IMPACT ON PUBLIC HEALTH: ISSUES ON THE DIVERSITY OF *Escherichia coli* ISOLATES RECOVERED FROM COASTAL WATER IN RIO DE JANEIRO CITY

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*Escherichia coli* is a diverse species with both commensal and pathogenic strains. Several highly adapted clones have acquired specific virulence elements and antimicrobial resistance traits that confer an increased ability to survive in adverse environmental conditions. *E. coli* contamination in aquatic ecosystems has emerged as a relevant concern with significant impact in public health. In this study, 100 *E. coli* isolates were recovered from 5 recreational coastal water areas in Rio de Janeiro city (Botafogo, Copacabana, Ipanema, Flamengo and Leblon) and further characterized according to phylotyping, diarrheagenic potential, antimicrobial resistance and diversity. Most of the isolates were included in phylogenetic group A (79%), followed by groups B1 (15%) and D (6%). Amplification assays detected one isolate harboring enterovirulence genetic markers for the enteroaggregative *E. coli* (EAEC) pathotype. Agar diffusion assays revealed that 12% of the bacterial population was susceptible to all antimicrobials tested and 88% were resistant or intermediate to at least one of the antibiotics. Resistance was observed to cefazolin (56%), tetracycline (33%), ampicillin (10%), cefuroxime and ceftiofur (5% each), and sulfamethoxazole-trimethoprim (4%). Intermediate phenotype was observed as follows: to ciprofloxacin (36%), cefazolin (32%), cefuroxime (18%), ceftiofur (8%), ampicillin (4%), and to tetracycline and tobramycin (1% each). Twenty-one different antimicrobial resistance profiles were detected and 9 isolates exhibited a MDR phenotype. Random amplification of polymorphic DNA (RAPD-PCR) typing detected a wide genetic polymorphism among *E. coli* isolates and supports the evidence of nonclonal bacterial population. Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) used for the identification of species and biotyping of *E. coli* isolates agreed with the conventional bacteriological methods and revealed a diversity of proteomic spectra among *E. coli* isolates that may be helpful in differentiating them. The results show that *E. coli* strains harboring important virulence and antimicrobial resistance traits are present in the recreational waters investigated. Considering that these strains may represent a risk, these findings indicate the need for continuous monitoring and improvements on the quality in these aquatic systems.

**Keywords:** *Escherichia coli*, recreational water, multidrug resistance, RAPD-PCR, MALDI-TOF MS.