TITLE: DISTRIBUTION OF SPECIES AND ANTIMICROBIAL RESISTANCE AMONG *ENTEROCOCCUS* ISOLATES FROM SEAWATER SUBJECTED TO ANTHROPOGENIC INFLUENCE IN RIO DE JANEIRO

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ABSTRACT

The enterococci have been adopted as indicators of fecal pollution in water, as they are usually found in large numbers in the fecal microbiota of humans and animals. On the other hand, they play an important role in healthcare-associated infections due to their remarkable potential to acquire resistance to antimicrobials and to act as reservoirs of antimicrobial resistance genes. In this regard, seawater may play a role in the dissemination of clinically relevant bacteria and their genes, particularly in ecosystems subjected to anthropogenic impacts, such as the coastline of urban zones in Rio de Janeiro city. The present study evaluated the occurrence and profiles of non-susceptibility of enterococcal species recovered from seawater collected at four sites in the Rio de Janeiro coast [Guanabara Bay shore (S1), the Redonda Island (S2), Ipanema Beach (S3), Ipanema's submarine outfall (S4)]. Aliquots of water were filtered on cellulose ester membranes (0.45 µm) and deposited on MEI agar. *Enterococcus* suggestive colonies were streaked on Enterococcosel agar. Bacterial identification was performed by MALDI-TOF MS, and susceptibility to 18 antimicrobials was determined by disk-diffusion tests. A total of 299 enterococcal isolates were recovered. *Enterococcus faecium* was predominant in all four collection sites (S1 60.7%; S2 53.5%; S3 51.1%; S4 54.7%), followed by *E. hirae* (S1 20.5%; S2 32.1%; S3 29.7%; S4 21.4%), *E. faecalis* (S1 9.8%; S2 10.7%; S3 13%; S4 11.9%) and *Enterococcus casseliflavus* (S1 2.9%; S2 13.5%; S3 2.3%; S4 2.38%). *E. durans* (S1 3.9%; S3 3.5%; S4 5.95%), *E. gallinarum* (S1 0.9%; S4 2.38%), *E. aquimarinus* (S1 0.9%) and *E. thailandicus* (S4 1.19%) were also present. Susceptibility testing revealed the highest percentages of isolates classified as non-susceptible (including resistant and intermediate) to erythromycin (58.1%), nitrofurantoin (45.1%) and rifampin (54.8%). Isolates showing non-susceptibility to drugs of first choice for treatment of enterococcal infection, such as ampicillin (1.3%), gentamicin (1%), penicillin (3.6%), streptomycin (2.6%) and vancomycin (4.6%) were also found. Most (98%) isolates were resistant to at least one antimicrobial and 70.9% were multidrug-resistant (≥3 antimicrobial classes). The results illustrate the diversity of enterococcal species in the seawater locations investigated and draw attention to the possibility of dissemination of resistance genes, affecting the environment, biodiversity and human health.

Keywords: antimicrobial resistance, *Enterococcus*, seawater

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