

TITLE: Detection of antimicrobial resistance genes and virulence determinants in *Enterococcus faecalis* isolated from environmental samples in Brazil

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ABSTRACT:

The genus *Enterococcus* is part of the microbiota of humans and animals and has been detected in environmental samples, such as soil, sediment, and water. To date, more than 50 species belonging to this genus have been described, highlighting the *Enterococcus faecalis*. Due to the high number of infections caused by this bacterium, studies have evidenced that *E. faecalis* may have greater plasticity in its genome, thus allowing its high versatility to survive and grow in different conditions. Furthermore, *E. faecalis* has intrinsic resistance to different antimicrobial classes and can acquire clinically relevant antimicrobial resistance genes (ARGs). Therefore, this study aimed to investigate the antimicrobial resistance profile and the presence of clinically relevant ARGs and virulence genes in *E. faecalis* obtained from environmental samples. A total of 81 samples (35 from water sources and 46 from soils) belonging to different cities in Brazil were collected. For bacterial isolation, Kanamycin Esculin Azide agar was used, and the isolates obtained were identified using genus and species-specific primers for *Enterococcus* sp. and *E. faecalis*. Antimicrobial susceptibility testing was performed using the disk diffusion method. Clinically relevant ARGs and virulence genes were searched by conventional PCR. Eleven isolates were identified as *E. faecalis*, which presented resistance (9% to 73%) to erythromycin, tetracycline, doxycycline, fosfomicin, minocycline, rifampicin, linezolid, and vancomycin. Different ARGs were found, including *ermB*, *tetM*, *vanC1*, *tetL*, *tetO*, *mefAE*, *ant(6')-Ia*, *aph(3')-IIIa*, *aph(2'')-Id*, and *aac(6')-Ie-aph(2'')-Ia*. Regarding virulence genes, *gelE*, *ace*, and *esp* were detected. This study calls attention to the presence of antimicrobial-resistant *E. faecalis* isolates harboring clinically relevant ARGs and virulence genes in environmental samples.

Keywords: *Enterococcus faecalis*, Antimicrobial resistance, Virulence, Soil, Water.

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