

Título: BACTERIAL DIVERSITY AND ANTIBIOTIC RESISTANCE IN MINERAL WATER

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Resumo:

The bottled mineral waters are complex ecosystems with a high phenotypic and genetic diversity of autochthonous bacteria. Some studies have found bacteria that are resistant to various antibiotics in this type water. Bacteria that live in natural habitats are potential sources of antibiotic resistance genes that can be transmitted to human commensal and pathogenic bacteria. Evidence shows that at least some clinically relevant resistance genes have originated in environmental bacteria. Five brands of noncarbonated natural mineral water were analyzed using the media R2A and Pseudomonas isolation agar and these media supplemented with 32 mg/L amoxicillin or 4 mg/L ciprofloxacin. The bacterial isolates were genotyped by random amplified polymorphic DNA (RAPD) analysis and all non-clonal bacterial isolates were identified by analyzing the 16S rRNA gene sequence. Antibiotic resistance phenotypes were determined by agar diffusion method. Significant differences were observed between the brands concerning the colony forming units counts (CFU/mL). A wide diversity of bacterial species was found in four of the five mineral water brands, with the predominance of Betaproteobacteria followed by Alphaproteobacteria, Gammaproteobacteria and Firmicutes. Each brand evidenced particular bacterial species not shared by other brand. Opportunistic pathogens were found in two brands, such as *Burkholderia cepacia* complex, *Ralstonia picketti*, *Pseudomonas stutzeri*, *Pseudomonas mendocina* and *Mycobacterium gordonae*. Concerning the antimicrobial resistant phenotypes of the 106 isolates tested, we found that they showed resistance to 17 antibiotics belonging to eight different classes, including 3rd and 4th generation cephalosporins, carbapenems and fluoroquinolones. The detection of multidrug resistant bacteria in mineral water deserves more attention when it has densities as high as 10³ colony forming units (CFU/mL). There are two major concerns about observing multidrug resistant bacteria in mineral water. The first is related to the observation that some of these bacteria are confirmed or suspected nosocomial or opportunistic pathogens; the second concern is related to the possibility of resistance transfer to human pathogens.

Keywords: Antibiotic resistance; opportunistic pathogen; mycobacteria; drinking water; mineral water

Agência Fomento: CAPES