Título: ANTIBIOTIC RESISTANCE PATTERN AMONG GRAM-NEGATIVE MERCURY RESISTANT BACTERIA ISOLATED FROM BRAZILIAN AQUATIC SYSTEMS

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Resumo:

Mercury (Hg) is a pollutant widely distributed in the environment that has both natural and anthropogenic sources. Environmental Hg pollution causes a variety of toxic effects in the exposed populations and represents an important public health issue. Mercury is present in aquatic systems, and exerts a selective pressure on bacterial communities. Consequently, it enhances the emergence of resistant strains, which are able of detoxifying Hg(II) species. The bacterial genes that confer resistance to metals have been identified in mobile genetic elements, which carry antibiotic resistance also. The aim of this work was to evaluate antibiotic resistance in Hg resistant bacterial strains isolated from Brazilian aquatic systems of different geographic regions. Bacterial strains were isolated from water samples, using filtration devices. The occurrence of multiple resistance to Hg and antibiotics was analysed. Bacterial strains were plated on Nutrient Agar containing increasing Hg concentrations (5 µM, 10 µM, 20 µM and 30 µM) to determine the Minimum Inhibitory Concentration (MIC). Strains were identified using biochemical tests to species level. Disk diffusion technique was used to check bacterial susceptibility to some antibiotics frequently associated to Hg resistance phenotype. A total of 134 Hg-resistant Gram-negative bacterial strains were isolated from aquatic systems studied. Most of bacterial isolates was identified as belonging to the family Enterobacteriaceae (86%) with MIC equal to 20 µM (76%). The occurrence of resistance to at least one of antibiotics was observed in 72% of the isolates, notably Ampicillin (68%), followed by Tetracycline (12%), Sulfamethoxazole-trimethoprim (11%), Nalidixic Acid (7%), Chloramphenicol (7%), Kanamycin (7%), Streptomycin (4%) and Gentamicin (4%). Most strains presented multiple resistance to antibiotics and Hg (57%), with MIC lower than 20 µM, which 44% were isolated from the samples collected of the North Region, 31% from the Southeast, 16% of the Midwest and 9% of the South. These results point out to the ubiquitous presence and possible spread of bacteria resistant to environmental pollutants in water sources used for human and animal consumption in the different geographic regions studied. On the other hand, these isolates could contribute to long-term strategies to reduce the impact caused by mercury pollution.

Palavras-chaves: Bacteria, multiple resistance, mercury, antibiotics, environmental pollution.

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