

TITLE: RESISTANCE TO ANTIMICROBIAL AND HEAVY METALS, AND PRESENCE OF PLASMIDS IN *Aeromonas hydrophila*

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ABSTRACT:

Among the causes of damage to fish farming are infections caused by bacteria of the genus *Aeromonas*, and the multidrug resistance among isolates of this genus may be attributed to the transfer of plasmids. The São Francisco River receives untreated industrial and household effluents, and the indiscriminate use of antibiotics in the production and environmental contamination with heavy metals might contribute to the proliferation of antibiotic resistant bacterial strains. The objective of this study was to analyze the resistance of *Aeromonas hydrophila* isolates obtained in the Vale do São Francisco to antimicrobials and heavy metals and to correlate this characteristic with the presence of plasmids. A total of 77 isolates of *A. hydrophila* from *Oreochromis niloticus*, *Lophiosilurus alexandri* and *Dendrocephalus brasiliensis* from Sobradinho-BA Dam and Bebedouro Project from CODEVASF-PE, Brazil were used. The resistance of the isolates to the antimicrobials (oxacillin, gentamicin, tetracycline and nalidixic acid) and heavy metals (cadmium, lead, copper and manganese) was verified by the Minimal Bactericidal Concentration (MBC) technique and the multidrug resistance evaluation with plasmid presence determined by the Multiple Antimicrobial Resistance (MAR) Index, whose indexes >0.3 are considered as a potential source of resistance gene transmission by the isolates. Plasmids of the isolates were extracted by means of two methods: one based on alkaline lysis and another in phenol chloroform, and submitted to 0.8% agarose gel electrophoresis with 3.5 µg/L of ethidium bromide and visualized in ultraviolet illumination (UV). High resistance to antimicrobials and heavy metals tested at concentrations ranging from 0.25 to 512 µg/mL was observed, with the exception of gentamicin and cadmium, that only 7 and 10 isolates, respectively, showed resistance. Fourteen isolates showed plasmids. In the IRMA analysis, all the isolates showed resistance to all possible antimicrobial profiles and did not indicate a relation with the presence of plasmids, which suggests that the resistance genes to these compounds are present in the chromosomal DNA, but they point to the possibility of transfer of resistance genes among isolates. These results suggest that urban and agricultural effluents may be responsible for the water pollution of the São Francisco River, causing resistance of the isolates to antimicrobials and heavy metals.

Keywords: pathogenic bacteria, multidrug resistance, antimicrobial, heavy metals

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