TITLE: *ESCHERICHIA COLI* RECOVERED FROM A RIVER: POSSIBLE CORRELATION OF ITS ANTIMICROBIAL RESISTANCE AND THE MERCURY CONCENTRATION IN WATER

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ABSTRACT: Mercury (Hg) and others heavy metals have been considered an environmental chemical micropollutants. These recalcitrant compounds reach the environment as domestic and industrial residues from anthropic activities. Bacterial resistance to antimicrobials may be related to the presence and resistance to metals in various environments. Regarding to Hg, bacterial resistance involves the *mer* operon, which is often located in conjugative plasmids and other mobile genetic elements. It should be noted that resistance genes to some antimicrobials have been also detected in this operon, contributing to the spread of bacterial resistance. Thus, this study aimed to determine the concentration of Hg in the waters of a river of Minas Gerais, Brazil and assess the possible correlation with the antimicrobial resistance in *E. coli* recovered from these samples. For this purpose, three samples of water from the Pará River, Minas Gerais, Brazil were collected at different points (near the source and an average distance of 90 km between them). The concentrations of mercury in the water samples were determined using the UV-VIS spectrophotometry technique. Selective media and biochemical-physiological tests were used to obtain and identify *E. coli* isolates. The minimum inhibitory concentration (MIC) to four antimicrobials of different classes was determined and interpreted according to the *Clinical Laboratory Standard Institute* (2016). The concentrations of mercury in the samples varied from 0.13 ± 0.01 to 0.35 ± 0.01 μg/mL and were higher than the limit established by current legislation. A total of 39 *E. coli* isolates was recovered and low level resistance to kanamycin (≤ 7.1%) and ciprofloxacin (≤ 4.3%) were observed. However, higher resistance was detected for ampicillin and tetracycline. An important data from this study was the detection of resistant *E.coli* isolates in the water collected near the source of the river, since the possibility of anthropic impact is more remote. In addition, our findings show that the concentration of mercury appears to be uncorrelated with the level of bacterial resistance, but future research is needed to elucidate this possible correlation. The data obtained here warn to the high mercury contamination and the presence of potentially pathogenic bacteria resistant to clinically relevant antimicrobials in water courses, which constitutes a risk to human and animal health.

Keywords: River, *Escherichia coli*, mercury, resistance, antimicrobials.

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