

**TITLE:** EVALUATION OF *Escherichia coli* STRAINS RESISTANT TO CARBAPENEMICS AND COLISTIN IN WASTERWATER OF RIO DE JANEIRO.

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## **ABSTRACT**

The Rio de Janeiro is a city known for its tourist attractions receiving annually a high number of visitors from all regions of the world. This continuous flow of people from different geographic regions can be a facilitator to introduce microorganisms with exotic characteristics in the sanitary environment. In addition, the current worldwide emergence of carbapenem and colistin resistance in Enterobacteriaceae is a major threat to public health. The aim of this study were evaluated the resident microbiota of *Escherichia coli* that showed resistance to carbapenems and colistin and detected the possible genes associated with resistance to these classes of antimicrobials. Were evaluated 43 strains of *E. coli* isolated from 5 sewage treatment plant and sewage pumping located in Rio de Janeiro city (Jacarepagua, Barra, Leblon, Copacabana and Alegria) between 2014 and 2017. All strains were submitted to biochemical identification. The resistance profiles were determined using the disk diffusion method for Imipenem (IMP) and Meropenem (MEM), and the minimum inhibitory concentration (MIC) were evaluate by agar microdilution technique for Imipenem (IMP), Meropenem (MEM), Ertapenem (ERT) and Colistin (COL) according to CLSI. The genes *bla<sub>KPC</sub>*, *bla<sub>IMP</sub>*, *bla<sub>VIM</sub>*, *bla<sub>NDM</sub>*, *bla<sub>OXA-48</sub>* e *mcr-1* were evaluated by Polimerase Chain Reaction (PCR) in 25 strains that presenting resistance to carbapenems and /or colistin. In general, of the 43 strains of *Escherichia coli* found, 37.2%, 34.9%, 23.25%, 7% and 2.3% were resistant to MEM, COL, IMP, ERT and MER respectively, and 16.3%, 4.65% and 2.3% presenting intermediate resistance to IMP, MEM and ERT respectively by methods of antimicrobial susceptibility tested. In relation to the detection of genes related to resistance to carbapenems 40% of resistant strains should the *bla<sub>IMP</sub>* gene, 8% should the *bla<sub>KPC</sub>* gene and 8% should the *bla<sub>OXA-48</sub>* gene and only 4% of the strains resistance to colistin presenting the *mcr-1* gene. The presence of *Escherichia coli* strains resistant to carbapenem and colistin from sewage pumping and treatment plant source combined with the detection of resistance genes reinforces the importance of this environment as a facilitator in the resistance dispersion presenting a potential risk to the population. The results reflect the need for continuous surveillance for the development of possible control actions.

**Keywords:** wasterwater, carbapenemics, colistin, *Escherichia coli*

