

TITLE: INVESTIGATION OF RESISTANCE TO CARBAPENEMS AND THE PRODUCTION OF CARBAPENEMASES IN AMPICILLIN-RESISTANT ENTEROBACTERIALES FROM A DOMESTIC SEWAGE IN THE CITY OF DIVINÓPOLIS-MG.

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ABSTRACT:

Carbapenems are bactericidal, broad-spectrum beta-lactam antibiotics that are active against Gram-positive and Gram-negative bacteria. These compounds were introduced in clinical practice in the treatment of infections caused by multiresistant Enterobacteriales. After this, Enterobacteriales resistant to carbapenems (CRE) rapidly emerged, having the production of carbapenemase enzymes as their main mechanism of resistance. Studies investigating the circulation of CRE in clinical setting are frequent, but in other environments, such as domestic sewage are unusual. Considering this scenario, this study aimed to investigate the distribution of resistance to carbapenems, as well as the production of carbapenemases among Enterobacteriales retrieved from a domestic sewage in the city of Divinópolis-MG. To evaluate the susceptibility profile to carbapenems, 37 Enterobacteriales were submitted to disc diffusion testing according to *Clinical Laboratory Standard Institute* - CLSI (2019). The possible production of carbapenemases was evaluated using Triton Hodge Test and the mCIM and eCIM methods together. A high susceptibility profile of the isolates to carbapenems (35/37; 94.6%) was observed, suggests that in aquatic environments CREs are not frequently found. No production of carbapenemase was detected in any of the isolates by the performed methods and considering their effectiveness and sensibility, it is possible to infer a low prevalence of Enterobacteriales producing carbapenemase (CPE) in domestic sewage. However, it should be highlighted that two isolates with decreased susceptibility to imipenem were found, which points out to the presence of other non-enzymatic mechanisms of resistance in the studied environment. It is noteworthy that in the clinical setting, the scenario is completely different, there is a high prevalence of CRE, as well as carbapenemase producers. Thus, considering the possible clinical-environmental bacterial exchange, further studies in non-clinical settings are suggested to monitor and contain the spread of resistance to carbapenems.

Keywords: Enterobacteriales, Carbapenems, Domestic Sewage, Production of Carbapenemase.

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