

TITLE: SUSCEPTIBILITY TO BETALACTAM ANTIMICROBIALS AND PHENOTIPIC DETECTION OF ESBL, KPC AND AmpC IN *ESCHERICHIA COLI* RECOVERED FROM A RIVER

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ABSTRACT:

The natural environment has been considered important in the emergence and dissemination of bacterial resistance to antimicrobials. Specifically, river water can be contaminated by human or animal excreta, since it inserts microorganisms and active residues of antimicrobials. *Escherichia coli*, a Gram-negative belonging to human and animal intestinal microbiota and potentially pathogenic, can survive in a wide variety of hosts and environments, including the aquatic. In the clinical setting, betalactams agents are widely used in the therapy of infections caused by *E. coli*. However, several mechanisms of resistance to these drugs in Gram-negative have been described, such as enzymatic inactivation by Extended Spectrum Beta-lactamases Enzymes (ESBL), inducible beta-lactamase enzyme (AmpC) and *Klebsiella pneumoniae* Carbapenemase (KPC). Here, the susceptibility profile to eight betalactams antimicrobials was investigated in 32 *E. coli* isolates recovered from water of one of Minas Gerais's, Brazil main river by a standard agar diffusion test. In addition, the production of ESBL, KPC and AmpC was investigated using phenotypic methods, in according to *Clinical Standard Laboratory Institute* (CLSI, 2017) and Elsayed et al. (2015). In general, high sensitivity to betalactams (>65.6%) was observed, mainly to ceftriaxone and imipenem. However, *E. coli* resistant to amoxicillin / clavulanic acid (4/32), cefoxitin (8/32) and meropenem (4/32) were also found. It is worth mentioning the detection of carbapenem-resistant *E.coli* in this environment. This is of particular concern, considering that carbapenems are compounds of the last generation of the betalactams class. In this study, no *E. coli* isolates was beta-lactamase producers (ESBL, KPC, AmpC). Nevertheless, the data obtained indicate the presence of other mechanisms of resistance to betalactams circulating among these isolates. This study reveal the importance of investigating the susceptibility profile to betalactams agents in clinically relevant bacteria recovered from natural environments and point out the need to monitor and implement strategies to contain the dissemination of resistance to these compounds of great clinical relevance.

Keywords: River, *Escherichia coli*, Betalactam, ESBL, KPC, AmpC

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