

TITLE: GENETIC ENVIRONMENT OF THE *sul2*, *aph* (3')-IVi AND *bla*_{SCO-1} RESISTANCE GENES IN PLASMIDS OF *Enterobacter aerogenes* CLINICAL ISOLATES FROM RECIFE-PE, BRAZIL.

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ABSTRACT:

Enterobacter aerogenes is a gram-negative bacterium frequently involved in healthcare-associated infections and may be resistant to different antimicrobials agents, mainly due the acquisition of plasmids. However, there are still few studies about the plasmid genetic environment of this species in Brazil. Thus, the aims of this study were to analyze the genetic environment of *sul2*, *aph* (3')-IVi e *bla*_{SCO-1} resistance genes, found in plasmids from two KPC-producing *E. aerogenes* clinical isolates from septicemia in patients of the Intensive Care Unit of a public hospital in Recife-PE, Brazil. Plasmid DNA was extracted using the Qiagen Mini plasmid kit, quantified by the Qubit platform and the libraries were assembled using the TruSeq DNA PCR Free Kit. Plasmid DNA was sequencing using Illumina platform, in MiSeq equipment using a MiSeq Reagent Nano kit, v2 of 500 cycles. Open Reading frames (ORFs) were predicted and annotated using RAST. Manual curation and sequence similarity searches directed against the GenBank database were carried out using the Artemis genome browser and Resfinder 2.1. The plasmid sequences were compared to those available at GenBank using BLAST. The plasmids found belonged to the incompatibility groups IncA/C and IncL/M. The analysis showed that *aph* (3')-IVi gene, which confers resistance to aminoglycosides, was next to a *repC* gene and an ORFs for regulation and repression, followed by a hypothetical protein, *mobC* and *mobA* genes. With respect to *sul2*, it was inserted next to a hypothetical protein, followed by *cobQ* and *parB* genes. The *repC*, *mobC*, *mobA* and *parB* genes are constitutive of plasmids and aid in replication, conjugation and stability, performing important functions for horizontal transfer. The *bla*_{SCO-1} gene, which confers resistance to penicillins and cephalosporins, was found inserted close to a TnpA transposase, followed by a gene for cellulase. Previous reports of the *bla*_{SCO-1} gene were only in *Acinetobacter* spp., *Klebsiella pneumoniae*, *Salmonella enterica* and *Escherichia coli*, thus this the first report of this gene in *E. aerogenes* clinical isolates. These findings demonstrate the variety of antimicrobial resistance genes found in plasmids of *E. aerogenes*, suggesting the potential of this bacterium in disseminating these genes in the hospital environment.

Keywords: *Enterobacter aerogenes*, Plasmids, Resistance genes.

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