TITLE: DETECTION OF GRAM-NEGATIVE BACTERIA RESISTANT TO MEROPENEM IN MANGROVES SEDIMENT

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ABSTRACT

Mangroves are environments that exhibit rapid cycling associated to a high concentration of bacterial decomposers. Mangrove estuaries may be impacted by anthropogenic pollution due to contamination by several pathogenic bacteria bearing resistance genes. This study aimed to evaluate the metabolic profile of the microbiota in mangrove sediments of the river Anil, at the island of São Luís-MA, in addition to verify the presence of Gram-negative bacteria resistant to meropenem. For characterizing the microbiota, about 06 (six) sediment samples were obtained from two distant sites along the Anil river. The sediment samples were serially diluted to determine the metabolic profile of the microbiota using the Ecoplate® kit. The equitability, substrate richness and Shannon index were calculated. For the quantification of meropenem-resistant Gram-negative bacteria, the samples were inoculated into Macconkey Agar medium supplemented with the drug in increasing concentrations (2-32 µg/mL). To analyze the genetic determinants of resistance, the genomic DNA was extracted with the KIT Wizard® and subjected to the detection of resistance genes (*bla*$_{KPC}$ and *bla*$_{NDM}$) by PCR-multiplex technique. Bacteria carrying resistance genes were identified by MALDI-QTOF. The genes fragments were sequenced using the ABI PRISM 3100 Platform, also analyzed by the MEGA 6.0 program, and the sequence identity was evaluated by *GenBank* using the BLAST algorithm. The results of this study showed a higher Shannon diversity index at the collection site located downstream of the Anil River, presenting a rich substrate consumption and high equitability. The downstream site had a count of meropenem-resistant Gram-negative bacteria of 7,150 CFU/g of soil. Six randomly selected bacterial isolates were positive for the presence of the *bla*$_{KPC-2}$ gene. These isolates were identified as *Stenotrophomonas maltophilia* and *Pseudomonas putida*. Evidence of Gram-negative bacteria bearing the *bla*$_{KPC}$ gene may lead to an increase in the number of resistant microorganisms, given that genetic material exchange may occur in mangroves. In addition, mangroves are rich in organic matter, and from the data obtained, it was observed a metabolic richness regarding to the profiles of carbon consumption.

Keywords: Mangroves, meropenem, *bla*$_{KPC-2}$, bacterial isolates.