TITLE: IDENTIFICATION OF ANTIBIOTIC RESISTANCE GENES IN CAVE SAMPLES

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ABSTRACT

Caves are geologically isolated environments with limited information about microbial communities. Antimicrobial resistance genes were found in several natural environments but their presence in caves are very limited. In order to assess the presence of beta lactam antibiotic-resistant *bla*$_{\text{TEM}}$, *bla*$_{\text{SHV}}$, *bla*$_{\text{CTX-M}}$ genes and *bla*$_{\text{KPC}}$ and *bla*$_{\text{NDM}}$, resistant to carbapenems were collected 20 samples in seven caves from Paripiranga, São Desidério, Lençois and Iraquara; all located in Bahia, Brazil. Samples were taken from caves with different lithologies (six limestone and one metasandstone caves), different sizes (100m caves and kilometers-long caves), presence of guano and distance from the entrance (samples take in the entrance and samples far from the entrance). Total DNA was extracted from each sample, subjected to standard PCR reactions and qPCR with primers specific for the genes listed above. The presence of *bla*$_{\text{TEM}}$, and *bla*$_{\text{SHV}}$ *bla*$_{\text{KPC}}$ were detected in a total of 11 samples, however *bla*$_{\text{TEM}}$ was detected in only one sample, *bla*$_{\text{SHV}}$ was detected in two samples and *bla*$_{\text{KPC}}$ was detected in 10 samples; two of those samples also had *bla*$_{\text{SHV}}$. The *bla*$_{KPC}$ gene were identified in some samples related to the entrance (small caves and entrance sample itself) and guano related samples. However, five samples from apparently pristine cave presented at least one of those three genes. The results show that the microorganisms present in caves harboring antibiotic resistance genes and further studies will be performed to identify those organisms.

Keywords: Caves; Bacterial resistance; beta lactam; qPCR

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