

**TITLE: BIOPROSPECTING OF BACTERIOCIN-LIKE GENES IN THE METAGENOME OF THE TUCURUÍ-HYDROPOWER PLANT RESERVOIR**

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**ABSTRACT:**

Bacteriocins are bacterial-synthesized peptides with antimicrobial activity. These biomolecules can be an alternative to combat multidrug resistant bacteria. Bacteriocins are already used as food preservatives and veterinary probiotics. Bioprospecting of bacteriocin-like genes was made in the metagenome of the Tucuruí hydropower plant reservoir, Brazilian Amazônia. A shotgun metagenomic sequencing approach was used in three layers of the water column (photic, aphotic, and sediment zones). Sequencing was performed on the Ion Proton (Thermo Fischer) platform with the Ion PI Chip that generated 200 bp-long reads with up to 10 Gb of throughput. Peptide sequences from the BAGEL4 were downloaded and converted to the database format using BLAST+. After sequencing, the raw data was filtered using the fastX-toolkit and subsequently compared to the BAGEL4 database using blastx. A total of 89,036 reads of bacteriocin-like genes were found on the photic zone, 26,228 on the aphotic zone and 59,567 reads on the sediment. To evaluate the prevalence of bacteriocin-like genes, the number of positive reads was normalized using the size of the genes and the total number of 16S rRNA genes. The most prevalent bacteriocin was Sonorensin that is normally synthesized by the species *Bacillus sonorensis*. This bacteriocin is effective against Gram-negative and Gram-positive bacteria, with great potential of application in medicine for preventing the formation of *Staphylococcus aureus* biofilms. A bacteriocin called Pyocin was found in all layers of the water column. Pyocin is primarily produced by *Pseudomonas aeruginosa* which is an opportunistic pathogen. Other relevant bacteriocins found were Colicin E7 and E9, Klebicin D and K, and Zoocin A. Colicin and Klebicin have as main target, species of public health concern such as *Escherichia coli* and *Klebsiella* sp., respectively. The bacteriocins detected in the water column of the Tucuruí hydropower plant reservoir presents a potential biotechnological application. They seem to be very widespread among the different layers of the water column, with a higher prevalence in the photic zone.

**Keywords:** Bacteriocins, Metagenome, Bioinformatic.

**Development Agency:** CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior; FAPESPA – Fundação Amazônia de Amparo a Estudos e Pesquisas.