Bacterial and Archaeal Diversity in Freshwater Habitats in the Amazon River

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INTRODUCTION. The Amazon region has the largest hydrographic basin on the planet, which includes the Amazon River. It has a great biological diversity, including microorganisms; however, they are poorly studied. Microorganisms are responsible for most of the biogeochemical cycles that determine the terrestrial environment and freshwater and marine ecosystems, and they can be widely explored in biotechnology, thereby, this work aimed to study the microbial biodiversity in rivers and lakes of the Amazon region. MATERIAL AND METHODS. This study used DNA extracted from filtered water collected in the Solimões River, and other adjacent rivers and lakes. Cultivation-independent approaches were used, through amplification and sequencing of 16S rRNA gene fragments, using metagenomic DNA as template. RESULTS AND DISCUSSION. The samples were obtained from the water column and 13 libraries of bacterial 16S rRNA were constructed generating 2916 clones, and 5 libraries of Archaea 16S rRNA generating 659 clones. The analysis indicated a large abundance of microorganisms, which contribute to the maintenance of these environments and a large number of bacteria still not cultivable, which may contain genes of biotechnological interest. The most well-known freshwater cosmopolitan bacterial taxa Polynucleobacter was observed in all samples, whereas the phylum Thaumarchaeota was the prevailing Archaea. Microorganisms capable of degrading hydrocarbons were also observed and may be used for bioremediation studies or indicators of natural petroleum seepage. The results can be used for studies of environmental monitoring because the samples were collected from an area exposed to tanker navigation. Therefore, in case of any oil leakage we’ll have previous studies for comparison. CONCLUSIONS. This study gives an insight of the microbial diversity found in the world’s biggest river, with typical organisms from freshwater, Archaea and organisms still not cultivated. Our data may be used for environmental monitoring and prospection of organisms and genes of biotechnological interest.

Keyword: Amazon River, Archaea, Bacteria, Metagenomics, Polynucleobacter, Thaumarchaeota

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