TITLE: MINIMETAGENOME OF CYANOBACTERIA *CYANOBIUM* SP. LEGE 06113 AND EVALUATION OF ITS BIOSYNTHETIC POTENTIAL

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ABSTRACT

Natural products are sources of inspiration for the development of new drugs and the potential of microorganisms in producing these compounds have been increasingly exploited due to the advance of genomic sequencing. Some microbial groups are more prolific than others, with emphasis on cyanobacteria which have already been described as producing compounds with antibacterial, antiviral, antifungal, anti-cancer, immunosuppressive, protease inhibitory and other pharmacological properties, making development and discovery of new natural cyanobacterial products of great biotechnological importance. In order to characterize the biosynthetic potential of the marine coccoid picocyanobacterium *Cyanobium* sp. LEGE 06113 was carried out the sequencing and assembly of its genome, as well as the identification of the genes involved in the biosynthesis of natural products, with emphasis on the new compound hierridin B, recently described as a product of this lineage, which presented antiplasmodial activity in in vitro models. After sequencing by the Ion Torrent PGM platform, the genome was assembled using a metagenomic approach since this isolate is not axenic. The complex genomic data obtained were submitted to the binning programs for the separation of the genomes. The resulting bins were cured and only the bin of the cyanobacterium was annotated. The possible biosynthetic gene pools were identified with the antiSMASH program and the results showed eight of them, two being involved in the production of terpenes, five in the production of bacteriocins and one in the production of type III polyketide synthetase (T3PKS). The T3PKS pool has three essential biosynthetic genes, six additional biosynthetic genes, three transport-related genes, and two regulatory genes. It is situated in a contiguous sequence of 41,133 nucleotides, being the probable cluster responsible for the biosynthesis of hierridin B in this lineage. This work allowed the elucidation of genes involved in the biosynthesis of this compound and will allow the identification of similar compounds in other microorganisms through functional genomics, reinforcing the importance of this tool for the discovery of new natural products.

Keywords: Cyanobacteria; Minimetagenoma; Hierridin B

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