

TITLE: ECONOMICAL POTENTIAL ASSOCIATED WITH CYANOBACTERIA OF THE ABROLHOS BANK

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ABSTRACT:

Turfs are considered functional units formed by the association of macro- and microorganisms. Cyanobacteria are considered one of the “hosts” in this association and play an important role in the structure and metabolism of the holobiont. Turf is the most abundant group of benthic organisms in the reefs of the Abrolhos Bank, covering approximately 56% of the area, similar to other places in the world. However, little is known about the ecological services or biotechnological potential of these organisms. Functional analysis of the metagenomes of Abrolhos turfs by Walter and co-workers (2016) identified a wide range of metabolic pathways, including genes related to the sulfur, nitrogen, oxygen, and non-oxygen photosynthesis cycles. In this study, strains of cyanobacteria associated with turf were isolated. The sequencing of their genomes (data not yet published) confirmed the abundance of this phylum and its contribution to the genomic diversity of the holobiont. To explore new activities and the biotechnological potential of these organisms, their growth and maintenance in the laboratory are important. We therefore cultivated eight strains of cyanobacteria from Abrolhos turfs in F/2 medium at 22°C, using artificial sea salt and a 12-h photoperiod. Analysis of the phylogenetic molecular marker 16S rRNA (amplicon) in these cultures identified two genera of heterotrophic bacteria—*Mameliella* and *Muricauda*—associated with the cyanobacteria strains. This association between cyanobacteria and heterotrophic bacteria is common in unialgal cultures, but not axenic. Nevertheless, the relationship is not well understood. The genomes of the cyanobacteria studied show a myriad of metabolic pathways and the potential to produce secondary metabolites, and the genomes of *Mameliella* and *Muricauda* that are available in databases indicate diverse machinery and the potential to produce secondary metabolites and pigments. Thus, this holobiont provides an opportunity for the discovery of new compounds such as enzymes and pigments of industrial interest and molecules with antimicrobial and antitumor activities. In addition, the identification of biological activities of these organisms contributes to elucidation of their ecological services and a better understanding of the role of turfs in the Abrolhos National Marine Park. This work will further discuss the economic importance of Abrolhos Bank cyanobacteria and their biotechnology applications.

Keywords: Abrolhos; Biotechnological potential; Cyanobacteria; Secondary metabolites; Turf

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