

TITLE: PREDICTIVE FUNCTIONAL PROFILING THE OF METAGENOMIC LIBRARY FROM CORAL *Siderastrea stellata* E SIMBIONTES USING SCREENING FUNCTIONAL AND SEQUENCING BY ILLUMINA PLATAFORM

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ABSTRACT:

Coral reefs are invaluable sources of biological resources. Micro-organisms colonize corals and establish various symbiotic relationships. In these relations there is production of compounds with peculiar properties and promising from the biotechnological point of view. These compounds may be enzymes, toxins, secondary metabolites and signaling molecules. Therefore, the objective of this work was to carry out searches for biocomposites with biotechnological purposes through functional and structural metagenomics. For this the metagenomic DNA of *S. stellata* coral was cloned into pCC2FOS fosmid vector using heterologous host. The constructed metagenomic library was analyzed using functional screening and sequencing via the Illumina Miseq platform. Of the 3648 clones screened, eight proteolytic and six amylolytic clones were identified. Of the 3648 clones screened, eight proteolytic and six amylolytic clones were identified. The proteolytic clone P07H3 also showed antimicrobial activity against *Staphylococcus aureus* INCQS 00186, *Salmonella entérica* subsp. *enterica* serovar Enteritidis phage type 4 (*S. Enterica* PT4); *S. Enterica* PT11; *S Typhi* ATCC 5339. There was no identification of positive clones for lipase/esterase. The best enzymatic indices were exhibited by the amylolytic clones. Through the fosmid sequencing of clone P07H3 a single CDS was identified by RAST. This was framed in the beta-lactamase subsystem. Most of the sequenced fragments were classified as hypothetical proteins. However, there were alpha-amylase, probable oxidoreductase, sensory transduction histidine kinase, ABC-type amino acid transport, periplasmic component/domain, butyrate kinase. Hypothetical proteins when retested by blastx showed a defined functional domain. All identified ORFs had low identity with proteins deposited in the database used. Probably these gene sequences constitute novel putative proteins or proteins with novel functional characteristics. The Proteobacteria phylum was the one with the greatest predominance among the fragments analyzed. All the biocomposites captured through the functional screening showed biological activities never previously prospected in this coral and interesting for biotechnology. Sequencing shows that most of the genomic fragments of clone P07H3 are likely to be new proteins. This is the first report on the prospection of amylases, proteases or antimicrobials from *S. stellata* coral samples.

Keywords: Biocompound, Fosmid, Proteomic, RAST.

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