

TITLE: PROSPECTION OF BENEFICIAL MICROORGANISMS FOR CORALS ISOLATED FROM THE BRAZILIAN ENDEMIC CORAL *MUSSISMILIA HISPIDA*.

AUTHORS: MESSIAS, C.; VILLELA, H.; SANTORO, S.; DUARTE, G.; VILELA, C.; PIEDADE, D.; ROSADO, P.; PEIXOTO, R.

INSTITUTION: INSTITUTO DE MICROBIOLOGIA PAULO DE GOÉS, UNIVERSIDADE FEDERAL DO RIO DE JANEIRO, UFRJ, RIO DE JANEIRO, RJ (AVENIDA CARLOS CHAGAS FILHO, BLOCO E, SUBSOLO. CEP 2194159, RIO DE JANEIRO - RJ, BRAZIL).

ABSTRACT:

Coral reefs are among the most biologically diverse ecosystems on Earth, being important economically and ecologically. These structures play essential roles such as protection of the coastlines from the damage of waves and storms, they provide habitats and shelter for several marine organisms and great tourist attractions. Corals are considered holobionts, being defined as the assemblage of the host organism and its symbiotic microbiota. This associated microbiota is crucial for coral health and the manipulation of the beneficial microbiome associated with corals (BMC, Beneficial Microorganisms for Corals) has recently been proposed. Therefore, the objective of this work is to isolate microorganisms that present BMC properties from the coral *Mussismilia hispida*. This species is an important and endemic reef builder in Brazil and the assembly of a consortium of bacteria that can benefit corals is extremely important to preserve these ecosystems. For this, a 37-polyps' colony of *M. hispida* was submitted to thermal stress, and only one polyp survived after that. The bacterial microbiota of two polyps were analysed, one dead polyp and the other still alive. A total of 84 bacteria were isolated by plating in Luria Bertani medium with 2.5% sodium chloride, 23 from the dead polyp, 30 from the live polyp mucus and 38 from the tissue and part of its skeleton. Initially, analyses of the 30 isolates from the surviving polyp mucus were performed. All strains were characterized by the morphological analysis of the colonies, Gram and catalase tests. In addition to that, two different approaches to find out antagonistic activity against three different strains of coral pathogens (*Vibrio alginolyticus* 40 B and *Vibrio corallilyticus* P1, *Vibrio corallilyticus* BAA450) were performed. One test used dead isolates (to verify constitutive antimicrobial production) and the other one used live isolates (to verify induced antimicrobial production). Among the microorganisms tested, 66% presented antagonism to at least one of the pathogens tested, which is an indispensable BMC characteristic. The 20 isolates with more BMC activities detected in this first step were subjected to the detection of nitrification and denitrification genes and genes related to the degradation of DMSP,

by the polymerase chain reaction (PCR). Finally, the DNA sequencing of these selected isolates was performed. The next step is to characterize the remaining isolates, so that we will be able to better understand the protective mechanisms of the bacteria associated with corals and, finally, set up a consortium that will confer them resistance against environmental stresses.

Keywords: beneficial microorganisms for corals, *Mussismilia hispida*, coral reefs, 16S rRNA sequencing, *Vibrio alginolyticus*, *Vibrio corallilyticus*, antagonistic activity.

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