

**TITLE:** Diversity and Bioprospecting of marine sponges-associated bacteria for compounds with anti-oomycete activity.

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**ABSTRACT:**

The present study investigated the diversity and composition of sponges-associated bacterial communities, *Didiscus oxeata* and *Scopalina ruetzleri*, and the potential these microorganisms as producers of bioactive substances with anti-oomycete properties. The sponge specimens were collected at St. Peter and St. Paul archipelago, Brazil. The analysis culture-independent detected a complex and specific microbial system living in sponges, with the operational taxonomic units dominant classified in the phyla: Acidobacteria, Actinobacteria, Chloroflexi, Proteobacteria and Gemmatimonadetes. In total, fifty-six isolates obtained by culture-dependent method were represented by three bacterial phyla: Actinobacteria, Firmicutes and Proteobacteria. Phylogenetic analyses indicated that the cultured bacteria were already detected in the marine environment. All bacterial isolates were evaluated by their antagonisms against *Pythium* species. Two of them, *Terrabacter* sp. ASPSP 140 and *Bacillus* sp. ASPSP 434 demonstrated strong potential in inhibiting the following species *P. aphanidermatum*, *P. ultimum* and *P. graminicola*. The bioactive secondary metabolites of both, characterized by LC-MS/MS, were identified as a mixture of cyclic dipeptides belonging to the class of diketopiperazines. These data support the potential of bacteria associated with marine sponges for the control of plant-pathogenic oomycetes and it provide the basis for the future development of new fungicides with reduced environmental impact.

**Keywords:** bioassay-guided fractionation, cyclic dipeptides, new agrochemical agents, *Pythium* spp., tandem mass spectrometry

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