

Taxonomic assessment and antimicrobial screening of isolated bacteria from marine and terrestrial Antarctic samples

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ABSTRACT

Microorganisms dominate most of Antarctic ecosystem and play a crucial role in its functioning. They are called extremophilic microorganisms with unique and versatile metabolic properties with possible biotechnological applications in several areas. The aim of the present study was to taxonomically characterize psychrophilic microorganisms from Antarctic continent samples and to screen them for antimicrobial effects. Phylogenetic analysis revealed that most isolates shared 98–100 % sequence similarity to recognized species, including those recovered previously from the Antarctica environment, which belong to the major phyla Firmicutes, Bacteroidetes, Actinobacteria and Proteobacteria (classes Alpha and Gammaproteobacteria). A total of 361 bacteria strains, distributed in 38 different genera, were recovered and identified based on sequencing of the 16S rRNA gene. The main representative genera were *Arthrobacter* (29%), *Psychrobacter* (19%), *Pseudoalteromonas* (10%) and *Rhodococcus* (4%). Antimicrobial screening of 600 bacteria revealed sixteen strains capable of inhibiting growth of at least one of the strains: *E.coli*, *Micrococcus luteus*, *Staphylococcus aureus*, *Bacillus subtilis* and *Candida albicans*. One psychrotolerant bacterium, *Pseudomonas mandelii* strain 99, showed a broad antimicrobial range and was selected for further antiproliferative and antiparasitic tests due to low values in Minimal Inhibitory Concentration assay. Results demonstrated that the extremophiles from Antarctica represent an untapped source of diverse microorganisms capable of antimicrobial metabolite production.

Keywords: Antimicrobial activity, Antarctica, Bacterial taxonomy, Antiproliferative effect, 16S rRNA genes.

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