TITLE: ANTIMICROBIAL ACTIVITY AND ANTIOXIDANT CAPACITY OF PIGMENTS PRODUCED BY ANTARCTIC BACTERIA

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ABSTRACT:

The Antarctic continent is characterized as the environment of the superlatives due to the extreme environmental conditions, such as the lower temperatures and high incidence of ultraviolet radiation. In this context, microorganisms adapted to Antarctica may represent genetic resources of great biotechnological applicability. The aim of this study was to evaluate the antimicrobial and antioxidant profile of pigments produced by bacteria isolated from lichens collected in the South Shetlands (Antarctica Maritime). The isolates that produced pigments were reactivated in Nutrient Agar culture medium at 15.0 °C for 7 days and thereafter, a bacterial inoculum was standardized on 10⁷ cells and inoculated for biomass production in 50 ml of nutrient broth. The extraction of the pigments was carried out from the bacterial pellet extracted with absolute ethyl alcohol, followed by vortexing and subsequent centrifugation to remove cell debris and the translucent pigment was obtained. The pigments were evaluated against microorganisms Micrococcus luteus ATCC 4698, Staphylococcus aureus ATCC 6538, Bacillus subtilis ATCC 6051 and Candida albicans ATCC 10231 and the assays were performed on Mueller-Hinton Agar (MH) and disc diffusion method. Negative controls (ethanol) and positive control (oxacillin, penicillin and vancomycin) were also used. For the antioxidant assay, was realized the FRAP method (Ferric Reducing Antioxidante Power) and 2,4,6-tripyridyl-s-triazine (TPTZ) as the substrate, and the curve standardized with FeSO₄ and absorbance reading at 595 nm. Of the 16 pigments evaluated, it was verified that only the 12.LB13 pigment, orange color, and bacterium isolated from the lichen Xanthoria candelaria showed activity against Micrococcus luteus ATCC 4698. In relation to the antioxidant capacity it was observed that the pigments produced by 4.LB25 and 13.LB19 presented better activities, such as 3.17 and 1.46 mM FeSO₄. Most of the bacteria pigments showed absorption spectrum from 200 to 800 nm similar to carotenoids with spectrum absorbs strongly between 400-500 nm. In this sense, it is observed that Antarctic bacteria have potential for the production of pigments with antioxidant activity.

Keywords: Antioxidant activity, Microbial pigment, Lichens.

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