

TITLE: ANTARCTIC FUNGAL PIGMENTS: ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES

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ABSTRACT:

Antarctica is known to be an extreme environment with lower temperatures, osmotic stress and high levels of solar radiation. Fungi and yeasts adapted to this environment can produce pigment of different color with biotechnological application. This study aimed to analyze the antimicrobial and antioxidant activities of pigments produced by yeasts and filamentous fungi isolated from Antarctic lichens. The fungi were isolated from 28 lichen samples collected in the OPERANTAR XXXV and XXXVI expeditions (summers of 2015/2016 and 2016/2017). Initially the isolates were cultivated in Yeast Malt Agar culture medium for the screening and those fungi that showed pigmentation were grown in Yeast Malt broth medium for pigment production and extraction. An inoculum of 10^7 cells/mL was standardized and the incubation at 15.0 °C for 168 hours at 120 rpm. Pigment extraction was performed by centrifugation, followed by extraction with absolute ethanol. The pigments were then subjected to the antioxidant activity assays by the FRAP (Ferric Reducing Antioxidant Power) method and 2,4,6-tripyridyl-s-triazine (TPTZ) as the substrate and the standard curve with FeSO₄ and absorbance was read at 595nm. The antimicrobial activity was performed by the disc diffusion method and microorganisms evaluated were: *Micrococcus luteus* ATCC 4698, *Staphylococcus aureus* ATCC 6538, *Bacillus subtilis* ATCC 6051 and *Candida albicans* ATCC 10231. Positive controls such as oxacillin, penicillin and vancomycin were used, and ethanol such as negative control. From the 10 pigment evaluated, significant results for antimicrobial activity was obtained by two pigments with orange-yellow color: strain 2.L19 (isolated from *Lecania brialmontii*) and 4.L2 (isolated from *Usnea aurantiacoater*). In relation to the antioxidant activity, it was observed that yeasts 6.L31 and 11.L31 (both isolated from lichen *Usnea aurantiacoater*) produced better results, such as 2.03 and 1.38 mM FeSO₄, respectively. It can be observed that there is a potential in the production of pigments with antioxidant activity by Antarctica yeasts.

Keywords: Antioxidant activity, fungal pigment, yeast pigment, Antarctica

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