AEAE CONGRESS

BMAT-2021

4th International Congress of Biochemistry and Microbiology Applied Technologies

4th INTERNATIONAL CONGRESS OF BIOCHEMISTRY & MICROBIOLOGY APPLIED TECHNOLOGIES

05-07 November

Hammamet, Tunisia

BOOK OF ABSTRACTS

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4ème INTERNATIONAL CONGRESS OF BIOCHEMISTRY & MICROBIOLOGY APPLIED TECHNOLOGIES
05-07 November
Hammamet, Tunisia

B-P-77

Evaluation of minimum inhibitory concentrations of plant extracts against environmental fungi and dermatophytes

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Background: The outbreak of COVID-19 disease caused by SARS-CoV-2 has led the scientific community to search for new alternatives to help control the virus. In this context, the use of face masks has been recommended as a preventive measure against the spread of SARS-CoV-2. The application of antimicrobial agents in the tissues used to produce masks would be an additional hurdle on the prevention of other respiratory infections and secondary fungal infections that occur from touching contaminated masks. In this context, impregnation of the fabrics with plant derived extracts is an attractive approach since they are potentially safe, free of adverse side effects, and powerful antimicrobials. The objective of this work was to study fifteen plant extracts to select the most efficient against environmental fungi and some dermatophytes.

Materials/Methods: The minimum inhibitory concentration (MIC) of each plant derived extract was determined by broth microdilution in 96-wells microtiter plates. Concentrations ranging from 50 mg/mL to 1.5625 mg/mL were tested against the different fungi. Briefly, 100 mL of a 10^5 spores/mL solution were added to 100 mL of each extract concentration. After 48 h, 10 mL of each well were plated onto Sabouraud Dextrose Agar. Cultivation was carried out at 25 ºC for 3 days for the environmental fungi and 7 days for the dermatophytes. The MICs were regarded as the lowest concentrations that did not allow any visible growth when compared with the control sets.

Results: The results for the fifteen plant extracts tested against nine environmental fungal species revealed that only one extract was able to inhibit fungal growth of two of these fungi (*Cladosporium* sp. and *F. verticillioides*) at a concentration of 50 mg/mL. The results against the two filamentous fungi dermatophytes (*T. mentagrophytes* and *M. canis*) revealed these fungi to be the most susceptible to the extracts tested. Most of the extracts inhibited dermatophyte growth at concentrations < 50 mg/mL with the lowest MIC being registered at 3.125 mg/mL. Results for the yeast *M. furfur* revealed that only three plant derived extracts inhibited its growth with concentrations between 30 and 50 mg/mL.

Conclusion: The plant extracts tested against environmental fungi and dermatophytes revealed to be more efficient against filamentous fungi dermatophyte growth. Environmental fungi followed by the dermatophyte yeast, showed the highest resistance to these plant extracts.

Acknowledgments: Project financed by the European Fund for Regional Development (Fundo Europeu de Desenvolvimento Regional (FEDER)) through the Programa Operacional Regional Norte 2020, within the "PlantCovid" project, NORTE-01-02B7-FEDER-054870.

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