TITLE: EVALUATION OF ANTIMICROBIAL POTENTIAL OF MICROORGANISMS FERMENTATION PRODUCT FROM AMAZONIAN ANTHROPOGENIC DARK EARTH

AUTHORS: SENA AMORIM, L.F.; LUIZ, J.H.H.; PADOVAN, A.C.B.; CARVALHO, P.L.N.; ARIOSA, M.C.F.

INSTITUTION: UNIVERSIDADE FEDERAL DE ALFENAS, ALFENAS, MG (RUA GABRIEL MONTEIRO DA SILVA, 700, CENTRO, CEP 37130-001, ALFENAS – MG, BRASIL)

ABSTRACT:

The Amazonian Anthropogenic Dark Earth (ADE) has a high level of nutrients and great microbial diversity. It is a promising environment for isolation of biotechnological interesting microorganisms, among which can be highlighted fungi and actinomycetes. In view of the increasing resistance of pathogenic microorganisms to the known antibiotics, the objective of this study was to evaluate the antimicrobial potential of extracts from the fermentation product of actinomycetes and fungi isolated from ADE. Unidentified five actinomycetes and two fungi, isolated from ADE of Central Amazonia, were undergone to fermentation in Czapek broth, and their extracts were obtained with ethyl acetate solvent. Minimum inhibitory concentration (MIC) and minimum microbicidal concentration (MMC) assays were performed with the crude extracts against three pathogens: *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*. The extracts that had the best results of antimicrobial activity were characterized by thin-layer chromatography (TLC) with different developers (ultraviolet light, ninhydrin, phosphomolybdic acid and Dragendorff reagent). In addition, molecular biology experiments to identify the microorganisms considered promising were initiated with the sequencing of the 16S rRNA gene of the Actinobacteria. Two actinomycetes (preliminarily denominated FL3 and FL4) stood out for the antimicrobial potential against *S. aureus*, in which the extract FL4 presented MIC of 25-50 µg/mL and MMC of 100-200 µg/mL, and the extract FL3 presented MIC of 100-200 µg/mL and MMC > 400 µg/mL. These extracts possibly contain various substances which may be acting in synergism and / or antagonism with the compound of interest; therefore, the pure target compound may exhibit different antimicrobial activity than the crude extract. In the preliminary chemical tests, using TLC, it was possible to suggest the presence of chromophore groups (positive in UV light 254 nm) and also of primary amines (ninhydrin positive) in both featured extracts. Sequencing of the 16S rRNA gene fragment of the FL3 and FL4 isolates, and comparison of the sequences generated with the available sequences in the *Genbank* database, showed that the two lineages mentioned are of the genus *Streptomyces*. This data reinforces the relevance of this work, since several species of this genus are known to produce antibiotics and to be considered promising sources for the discovery of new antimicrobial compounds.

KEYWORDS: Anthropogenic Dark Earth; fermentation; antimicrobial; actinomycetes; fungi

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