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MYXOBACTERIA FROM COASTAL ENVIRONMENTS FOR BIOPROSPECTING OF BIOACTIVE NATURAL PRODUCTS

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Myxobacteria are predatory bacteria known for their ability to produce bioactive secondary metabolites. Despite this potential, they remain understudied in Brazil, particularly in coastal and marine environments. Therefore, this study aimed to isolate, characterize, and assess the biotechnological potential of myxobacteria from the central coast of São Paulo State to expand the MyxoMarin microbiological collection, the first in the country dedicated to this bacterial phylum, ensuring long-term preservation and availability for further scientific research. Sixteen sediment samples were collected from beaches and mangroves, from which 21 bacterial isolates were recovered with typical myxobacterial characteristics (formation of fruiting bodies and swarms). After purification, strains were cultivated in VY/2 media with 2% XAD-16 resin and extracted with acetone:methanol 1:1 v/v to obtain the respective extracts, which, in turn, were evaluated for 1) cytotoxic activity against the human colorectal cancer cell line HCT-116, by means of the MTT assay; 2) trypsin and chymotrypsin protease inhibition activity; and 3) the chemical profile of the bioactive extracts by HPLC. Of the extracts obtained from isolates, 10 were considered cytotoxic (IC_{50}<50µg/mL), with BRX-053 (1.57µg/mL), BRX-052 (2.22µg/mL), and BRX-041 (3.71µg/mL) revealing highest potency. In the trypsin and chymotrypsin inhibition assay, all extracts demonstrated some degree of activity, with BRX-041 (23%) and BRX-044 (20%) standing out for trypsin inhibition and BRX-041 (40%) and BRX-051 (43%) for chymotrypsin inhibition. HPLC analysis at 254 and 280 nm revealed similar chemical profiles among the most active extracts, suggesting the presence of related compounds. Future steps include taxonomical identification of the most promising strains and metabolomic analysis of bioactive extracts. These results highlight the potential of Brazilian coastal myxobacteria as an untapped source of new bioactive metabolites and, furthermore, consolidates the MyxoMarin as a strategic platform for bioprospecting marine natural products.

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