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PREDATORY BEHAVIOR AND ANTIBACTERIAL POTENTIAL OF MYXOBACTERIA ISOLATED FROM BRAZILIAN COASTAL ECOSYSTEMS

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Myxobacteria are Gram-negative rod-shaped bacteria that exhibit complex social behaviors, including cooperative predation. This strategy relies on the secretion of hydrolytic enzymes and specialized metabolites, many of which display antibacterial, antifungal, and anticancer activities. Despite their recognized biotechnological potential, studies on myxobacteria from coastal ecosystems remain limited, leaving a largely unexplored microbial diversity. This study aimed to study the micropredatory behavior of Brazilian marine myxobacteria considering the production of secondary metabolites. In this context, 22 strains from the MyxoMarin collection, the first collection dedicated to the curation of culturable myxobacteria strains from Brazilian coastal environments, were cultivated in liquid VY/2 medium supplemented with XAD-16 resin (2%). Crude extracts were obtained by acetone:methanol (1:1) extraction and screened for antibacterial activity against *Escherichia coli* using the TTC assay at 250 µg/mL. A total of 13 strains produced extracts with noteworthy activity, with inhibition values ranging from 11.81% to 48.22%, highlighting BRX070 (48.22%) and BRX029 (41.64%) as the most active. Predation assays were carried out with the initial 22 strains in solid WCX medium containing *E. coli* DH5α as bait. While various strains revealed compelling predatory capacity, BRX070 and BRX029 displayed significant growth in such conditions accompanied by extensive lysis zones across *E. coli* inoculum, compared to the other strains. Therefore, these strains were selected for coculture with *E. coli* DH5α in liquid medium followed by extract production. Crude extracts were analyzed by HPLC-DAD, which revealed clear differences in chemical profiles between those obtained by myxobacteria in coculture or in axenic conditions. However, no increase in antibacterial activity was observed. Although coculture did not enhance antibacterial activity, the observed chemical shifts suggests differential activation of biosynthetic pathways, highlighting the need for further studies focusing on the elucidation and function of these compounds induced in coculture conditions. Moreover, further studies must also focus on investigating hydrolytic enzyme production, which play a central role in predation, to better understand the mechanisms underlying prey degradation. Together, these findings underscore the promise of myxobacteria as valuable sources for the discovery of new antibiotics and hydrolytic enzymes of biotechnological relevance.

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