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INVESTIGATION OF THE PREDATORY ACTIVITY OF MYXOBACTERIA ISOLATED FROM BLACK SEA ALGAE

The rapid spread of antibiotic resistance among pathogenic microorganisms, which has become an especially relevant issue in Ukraine due to the ongoing military conflict, necessitates the search for new antimicrobial agents and alternative approaches to infection control. Myxobacteria are saprophytic social prokaryotes with pronounced predatory activity capable of lysing other microorganisms through the production of biologically active metabolites and hydrolytic enzymes. **The aim** of this study was to investigate the predatory activity of Black Sea myxobacteria against indicator strains of pro- and eukaryotic microorganisms. **Methods.** Predatory activity of 24 myxobacterial strains isolated from Black Sea algae was evaluated against *Staphylococcus aureus* ATCC 25923, *Enterococcus faecalis* ATCC 29212, *Escherichia coli* ATCC 25922, *Proteus vulgaris* ATCC 6896, *Salmonella enterica* NCTC 6017, *Klebsiella pneumoniae* ATCC 10031, *Pseudomonas aeruginosa* ATCC 27853 and *Candida albicans* ATCC 18804 using the microbial lawn assay. Indicator microorganisms were cultivated in nutrient broth, centrifuged, washed, resuspended in PBS buffer, and standardized to $OD_{600} \sim 1$. Aliquots of 200 μ L were spread onto oligotrophic agar medium as spots approximately 20 mm in diameter and air-dried to form a uniform prey lawn. Myxobacterial suspensions standardized to $OD_{600} \sim 2$ were inoculated into the center of the prey lawn and incubated at 29 °C for 5 days. Predatory activity was assessed visually and microscopically based on prey cell lysis zones and myxobacterial colony spreading. Complete or partial lysis of the prey lawn was considered indicative of predatory activity. **Results.** All of the investigated myxobacterial strains exhibited predatory activity against both pro- and eukaryotic microorganisms, although its intensity depended on the predator strain and the prey species. The most susceptible prey were *S. aureus*, *E. faecalis*, *E. coli*, *K. pneumoniae* and *P. aeruginosa*, showing complete lysis by most myxobacterial strains, with myxobacterial colony spreading diameters ranging from 20.6 ± 0.2 mm to 32.8 ± 0.2 mm. Partial lysis was observed in some predator-prey combinations. In contrast, *P. vulgaris*, *S. enterica* and *C. albicans* were resistant to certain myxobacterial strains, which spread across the prey layer without complete destruction. The strains V2, V4, and V13 demonstrated the highest predatory activity, causing complete lysis of all indicator prey microorganisms. **Conclusions.** Black Sea myxobacteria demonstrated a broad-spectrum of predatory activity against clinically significant bacteria and yeasts. Highly active myxobacterial strains could be a promising sources of novel antimicrobial compounds and lytic enzymes.

Keywords: antibiotic resistance, myxobacteria, predatory activity.

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