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PIONEER BIOPROSPECTION OF ANTI-PSEUDOMONAS AERUGINOSA BACTERIOPHAGES OBTAINED FROM SEWAGE SAMPLES FROM VARIOUS REGIONS IN NORTHERN BRAZIL

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RESUMO

Excessive use of antibiotics has contributed to the emergence of strains of *Pseudomonas aeruginosa* that demonstrate resistance to a variety of antimicrobial agents. This pathogen can cause hospital infections, in immunocompromised patients, in skin wounds, colonize urinary and intravenous catheters and cause serious respiratory infections. By 2050, more than 10 million people are expected to die from multiantibiotic-resistant bacteria, surpassing cancer in terms of mortality. The use of bacteriophages (phages), viruses that infect bacteria, becomes an alternative to antibiotic therapy. Given the high level of biodiversity in the Amazon region, the north becomes a promising source of discoveries of new phages. Therefore, the objective of this study was to isolate, for the first time, anti-*P. aeruginosa* in sewage samples from several regions of northern Brazil aiming for its use in phage therapy. The cultivation of *P. aeruginosa* strains (PA14, ATCC 27853, CCCD-P003 and PA01) was carried out in 5 mL of Luria Bertani (LB) broth and incubated in an oven for 48 hours at 37 ºC. Sewage collections were carried out in Santarém-PA, Macapá-AP, Rio Branco-AC, Belém-PA, Manaus-AM, and Porto Velho-RO. A total of 50 mL of each sewage sample was centrifuged at 4000×g for 30 minutes and the supernatant was filtered with a 0.45 µm membrane. The filtrates underwent phage enrichment, where they were mixed with equal amounts of LB medium and 4 mL of bacterial culture. After incubation for 18 hours at 37 °C, 10 mL was centrifuged and the supernatant was filtered again. Tests for the presence of anti-*P.aeruginosa* lytic phages were carried out using the double-layer agar method. Phage purification was performed by three rounds of isolation using the double-layer agar method. Promising phages for phage therapy are those that are capable of lysing the largest number of strains within the same bacterial species, which is why the host range test was performed. We have now isolated and purified a total of 57 anti-*P. aeruginosa*. It was observed that two phages isolated from Santarém-PA were able to lyse three strains of *P. aeruginosa* and four other phages (isolated from Santarém-PA, Manaus-AM, Rio Branco-AC and Macapá-AM) were able to lyse two different strains o f *P. aeruginosa*. Susceptibility tests on planktonic cells and biofilm, cytotoxicity tests and infection tests on mice are still being carried out. Our initial results point to a new alternative for combating *P. aeruginosa* infection. Funding source: process 2022/1437972 FAPESPA/CNPq

PALAVRAS-CHAVE: phages, phage therapy, Pseudomonas aeruginosa, sewage,

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multi-resistant bacteria

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