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Exploring antimicrobial activities of extremophilic bacteriophages

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• Introduction

AMR phenomena

With the emergence of the worldwide problem of antimicrobial-resistant bacteria, phages have gained a large interest as an alternative approach to combat the rise of resistant bacteria. Phage therapy is the use of phages in place of antibiotics to treat bacterial infections. It is considered a promising approach for several important reasons. Also, phages can be isolated nearly from any environment where bacteria can be found.

Hot springs and extremophiles

The hot spring ecosystem harbors a wide range of extremophiles diverse microorganisms, including phages that are capable of surviving within a temperature

range of 55°C to 80°C.

Saudi Arabia's extreme environments, Al-Lith hot springs

Hot springs in Saudi Arabia host a diverse range of microorganisms, including thermophiles and extremophiles. These microorganisms can have applications in biotechnology, Additionally, studying and investigating these microorganisms such as bacteriophages may reveal the potential for novel antibiotics and other health-related compounds.

• Methods and results

Sample collection

Sediment, water, and wet shore samples were collected from Al-Lith hot springs.

Bacteriophage isolation

The samples will undergo a series of filtration steps, plaque assay, and spot assay, followed by serial dilution, then preparation of lysate for extracting genetic material.

Phage Identification

RNA extraction using a commercial kit followed by gel electrophoresis.

• Conclusion

Bacteriophages are promising alternatives to antimicrobial agents and will help solve the AMR phenomenon. The findings exhibit great promise, and subsequent investigations will involve the isolation and characterization of the phages through the utilization of molecular and electron microscopy techniques. Also, increased effort will be aimed at studying a broader range of isolates, with a focus on resistant pathogenic bacteria. Further investigations will be conducted to enhance the bacterial hosts for advantageous applications.

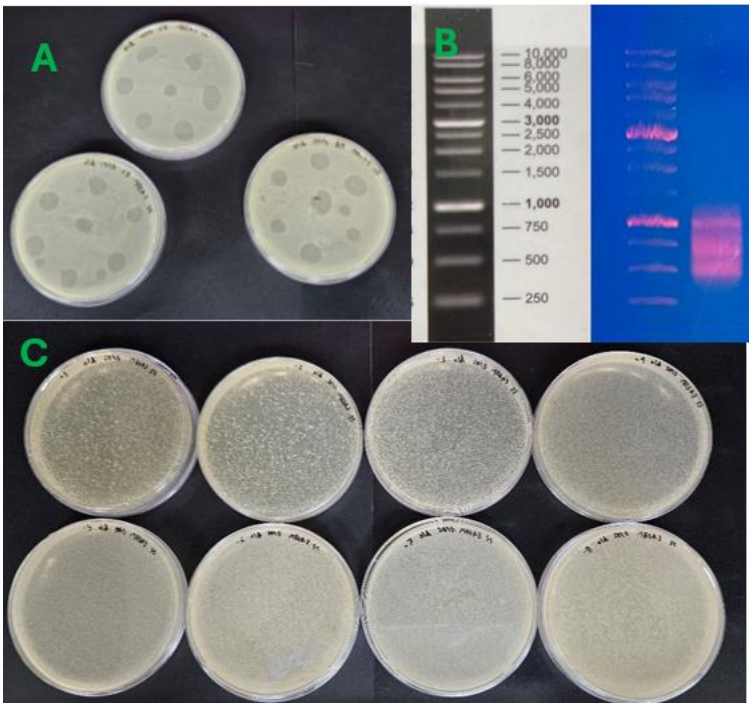

Figure A: Spot assay experiments demonstrated the inhibitory effects of isolated bacteriophages on MRSA resistance.

Figure B: MRSA bacteriophage (RNA) on gel electrophoresis.

Figure C: Plaque assay of bacteriophages shows its effect on MRSA-resistant bacteria.