

IRN AR23485278 "Search for Lytic Bacteriophages for the Development of Novel Therapeutic Agents to Treat Salmonellosis in Poultry"

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Annotation

The research is aimed at developing alternative methods for treating poultry salmonellosis caused by *Salmonella enteritidis* serovars using bacteriophages. In the southern and southeastern regions of Kazakhstan, where the prevalence of salmonellosis is high, bacteriophages are considered an effective and environmentally friendly method for combating antibiotic-resistant infections. The study involves the isolation and sequencing of *Salmonella enteritidis* strains, isolation of lytic bacteriophages, examination of their properties, and evaluation of their therapeutic activity.

Research methods

Sample Collection: Biological material samples were obtained from poultry farms in Kazakhstan for the purpose of isolating *Salmonella* strains.

Salmonella Identification: Bioprobes were cultured on various nutrient media to determine their biochemical properties and antibiotic resistance.

Bacteriophage Isolation: Soil and water samples inoculated with *Salmonella* strains were used for bacteriophage isolation, with their lytic activity assessed.

Sequencing and Analysis: NGS sequencing and PCR methods were employed to assess the virulence of both *Salmonella* strains and bacteriophages.

Proteomic Analysis: Bacteriophage proteins were analyzed using SDS-PAGE (Laemmli method) followed by comparison with known analogues.

Statistical Analysis: Data were processed using the software tools "GraphPad Prism 8" and "Microsoft Excel."

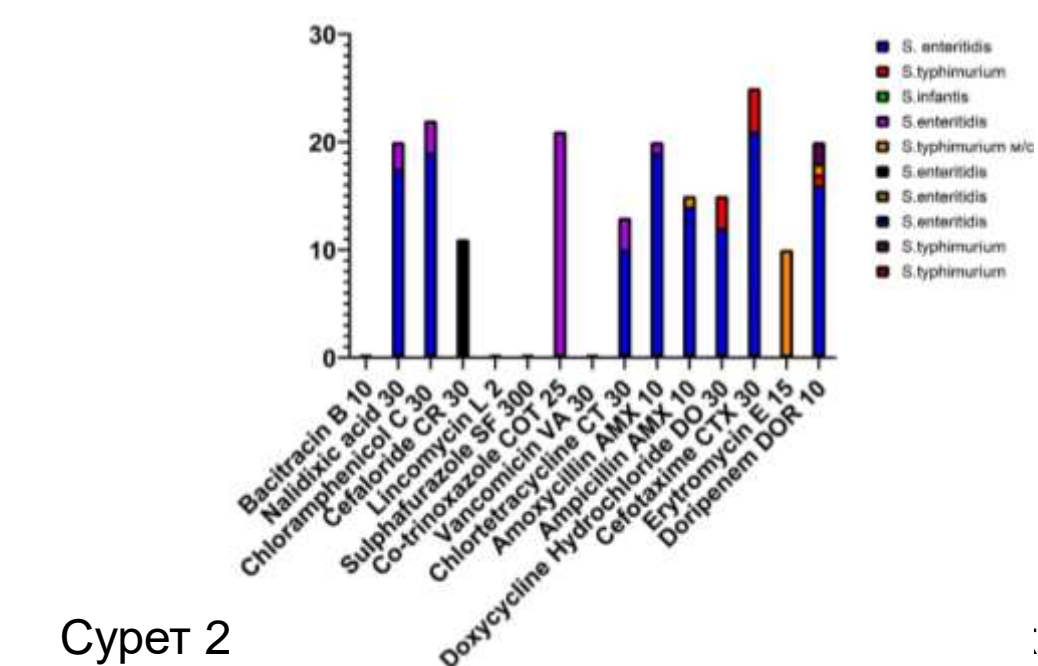
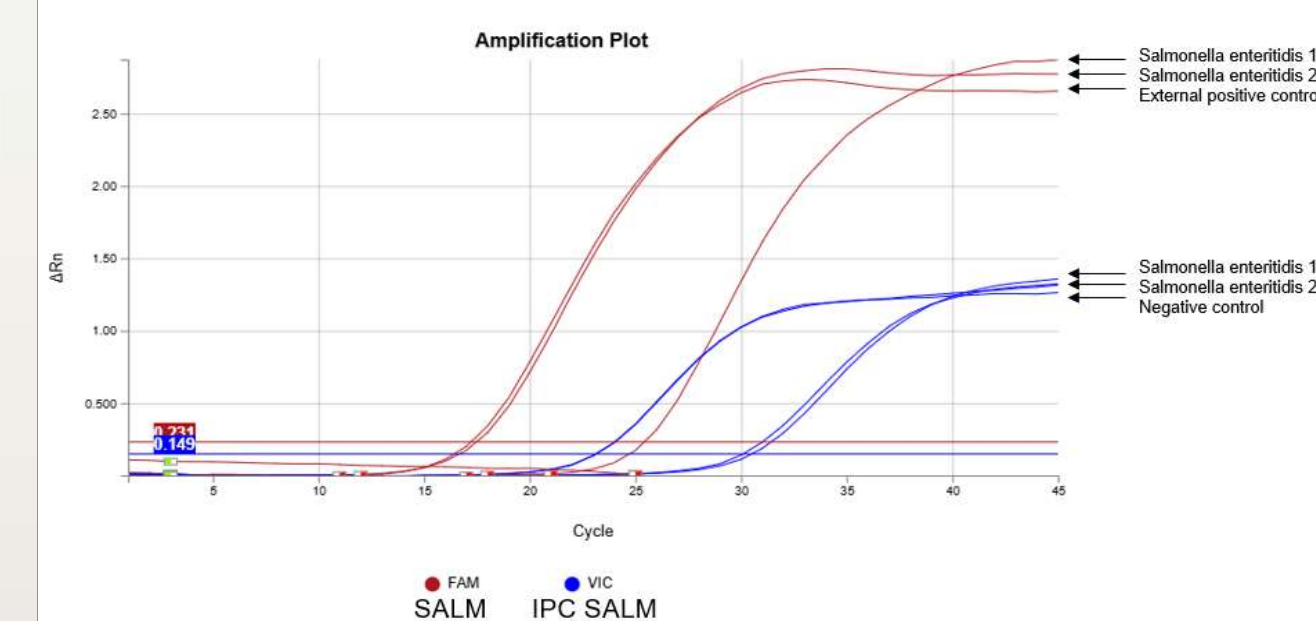
Purpose and objectives

Development of novel therapeutic agents against salmonellosis using lytic bacteriophages targeting *Salmonella enteritidis* serovars in poultry.

- Isolation of *Salmonella enteritidis* strains from chick biological samples.
- Collection of bacteriophage samples from poultry and the environment.
- Evaluation of the lytic properties of bacteriophages on test cultures.
- Sequencing of bacteriophages and bioinformatic analysis.
- Proteomic analysis and identification of virulence determinants.
- Study of the therapeutic activity of the bacteriophage in a poultry model.
- Testing and patenting of the phage-based biotherapeutic.

Results and discussions

- ✓ During the work, 10 strains were isolated, which were identified using molecular genetic methods (Figure 1).
- ✓ In 10 *Salmonella* isolates, resistance was detected to antibiotics widely used in Kazakhstan, such as doxycycline, lincomycin, tetracycline and others (Figure 2).



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- ✓ Five strains of bacteriophages were isolated from the surrounding materials and their lytic properties were tested. The therapeutic activity of the isolated bacteriophages against bacterial strains will be investigated later.