Host Range Determination

Date: 2024-11-24 ~ 2024-12-04 | **Operator:** Yuhang Gong | **Status:** Completed

Objective

Determine the infectivity of 5 phage isolates (R1, R2, R3, W1, W2) against two host strains (EcAZ-1 and EcAZ-2-OVA) through cross-validation.

Materials

Phages:

Name	Original Host	Notes
R1	EcAZ-2-OVA	Very small plaques
R2	EcAZ-2-OVA	Turbid plaques
R3	EcAZ-2-OVA	Large plaques, high titer
W1	EcAZ-1	Small plaques
W2	EcAZ-1	Medium plaques

Test Strains: EcAZ-1 (W, wild type), EcAZ-2-OVA (R, OVA-expressing)
Reagents: LB agar plates (1.5%), Soft agar (0.7%), Log-phase culture (OD_{600} ~0.5)
Equipment: Multi-channel pipette, 37°C incubator

Protocol

Spot Test Method:

1. Prepare double-layer agar plates with different host bacteria
2. Serially dilute each phage (10^{-1}, 10^{-2}, 10^{-3})
3. Spot 5 µL onto the plates
4. Incubate at 37°C overnight
5. Observe plaque formation

Scoring: +++ (Clear transparent) | ++ (Semi-transparent) | + (Turbid) | - (No plaque)

Experimental Records

Time	Operation	Observations/Notes
11-24~30	Host range experiment	Cross-validation of R/W bacteria and phages
12-04	Final confirmation	-

Results

Spot Test Results

Phage	EcAZ-2-OVA (R)	EcAZ-1 (W)
R1	+++	–
R2	+++	+++
R3	+++	+++
W1	+++	+++

Phage	EcAZ-2-OVA (R)	EcAZ-1 (W)
W2	+++	+++

Host Range Classification

Phage	Host Range	Susceptible Strains
R1	**Narrow**	**EcAZ-2-OVA only**
R2	Broad	Both strains
R3	Broad	Both strains
W1	Broad	Both strains
W2	Broad	Both strains

Conclusions

1. **4/5 phages exhibit broad host range**, infecting both EcAZ-1 and EcAZ-2-OVA
2. **R1 is the only narrow host range phage**, exclusively infecting EcAZ-2-OVA
3. R1 host specificity may relate to OVA-associated surface receptors

Notes

- Consider expanding test panel to include more *E. coli* strains
- R1 narrow host range mechanism warrants further investigation

Recorded: 2025-01-14