



Isolation and characterisation of bacteriophages active against *Pseudomonas aeruginosa* strains isolated from ocular infections

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Background



Microbial keratitis

is the infection of the cornea caused by bacteria, fungi, Acanthamoeba and some viruses¹.



Pseudomonas aeruginosa

is the leading cause of contact lens-related MK, around 70% of cases¹.



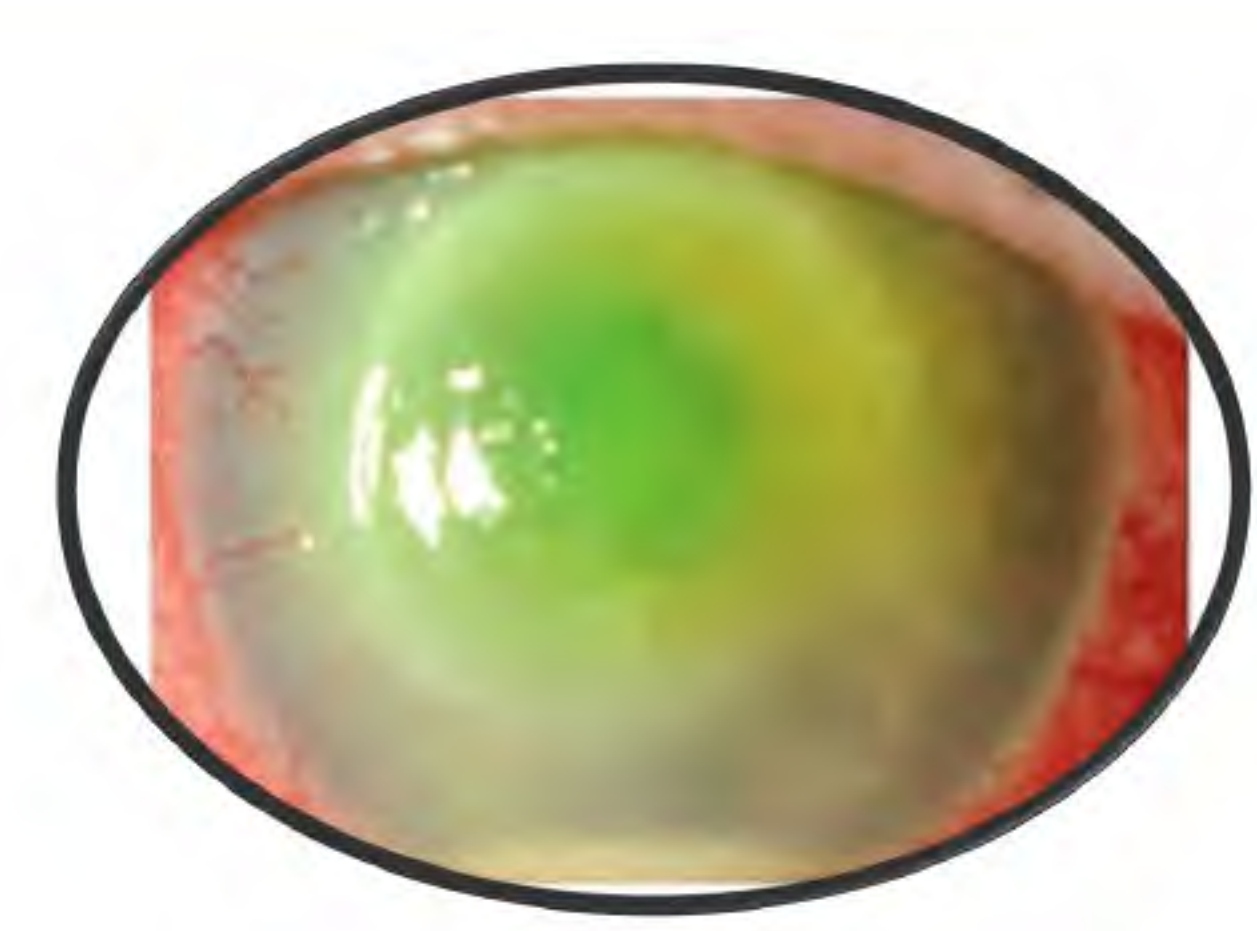
Antimicrobial resistance

is increasing, making this pathogen challenging to treat.



Alternative treatment needed:

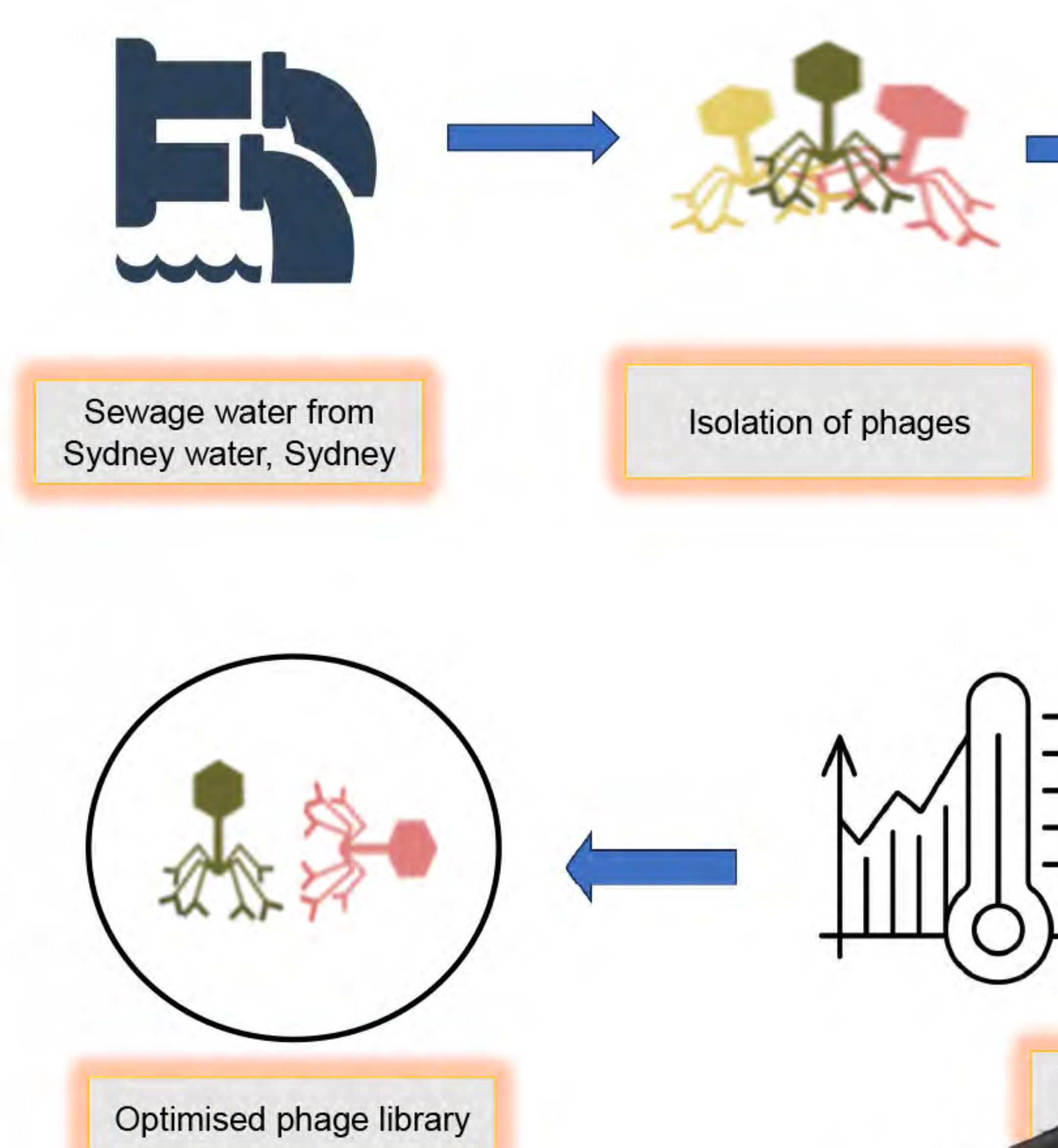
Bacteriophages (viruses that kill bacteria) to limit ocular infections caused by MDR pathogens².



Aims of Research

- To isolate, propagate and purify phages
- To improve and characterize our preliminary phage cocktail
- To assess the ability of this phage cocktail to reduce pathology during *P. aeruginosa* keratitis in an animal model

Materials and Methods



Results

Figure 1: Host determination of Phages

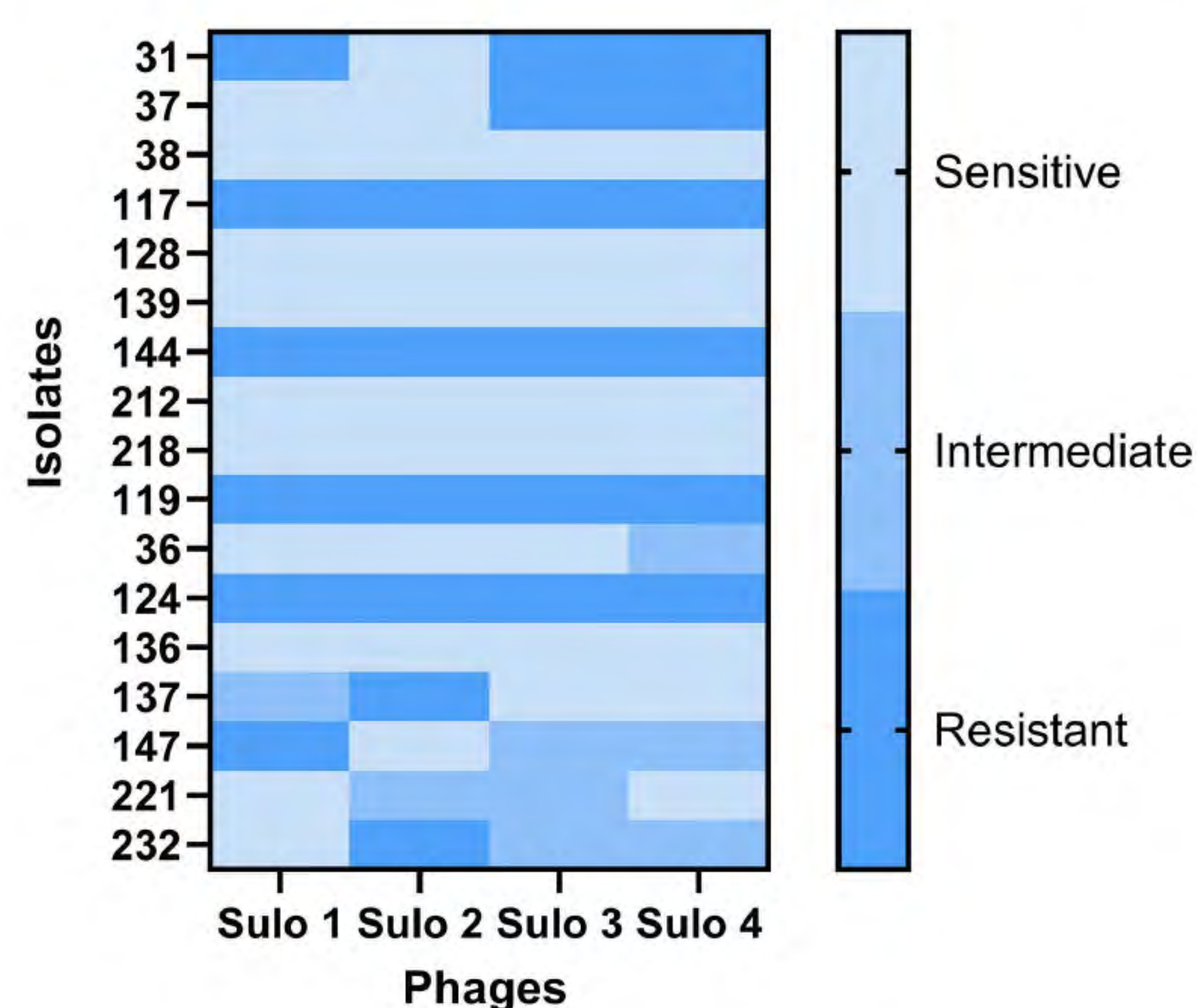


Table 1: Phages with their susceptibilities against isolates (n=11)

Phages	Susceptibility Rates (%)
Sulo 1	59
Sulo 2	59
Sulo 3	47
Sulo 4	47

Figure 2: Thermal stability of phages

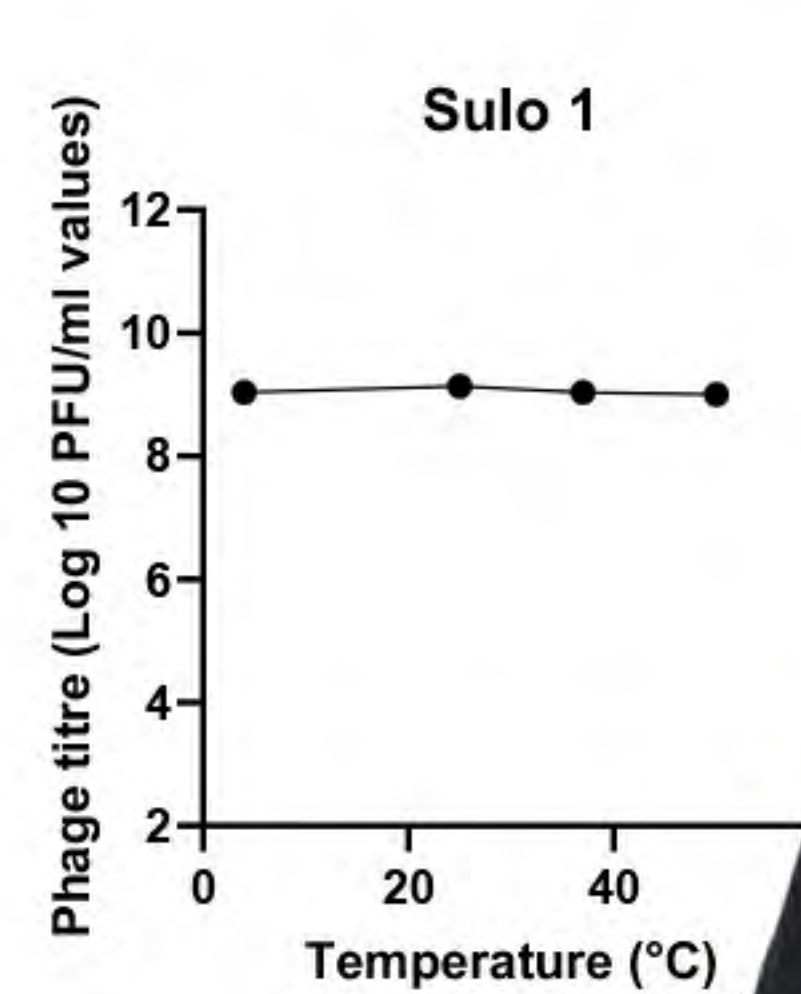


Figure 3: One Step Growth Curve

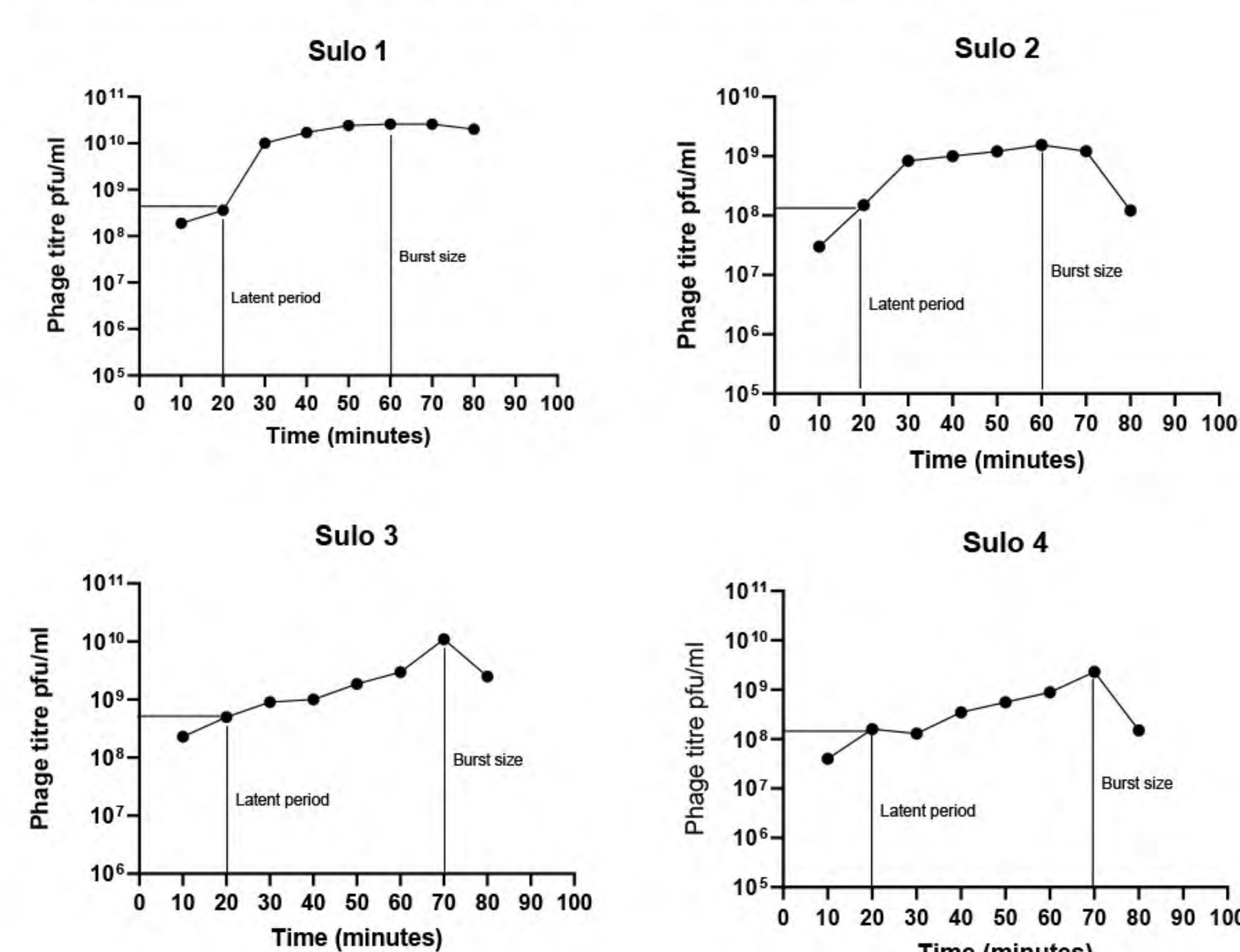


Table 2: Latent period and Burst size of phages

Phages	Latency (mins.)	Burst size (pfu/infected cell)
Sulo 1	20	260
Sulo 2	20	122
Sulo 3	20	110
Sulo 4	20	230

One step growth curve is used to measure latent period (time between infecting bacterial cell by phage and release of other phages) and burst size (average number of phage particles produced by infected bacterial cell)

Figure 4: Electron micrographs of phages



Identification of Podoviridae, Sulo 1 (C) Sulo 3 - Podoviridae

Table 3: Scientific names of phages

Phages	Scientific name B (Phage)
Sulo 1	PJN P053
Sulo 2	Vb_Pae_AM.P
Sulo 3	Pseudomonas phage P
Sulo 4	Pseudomonas phage A

Discussion and Conclusion

- This study has demonstrated that all phages showed efficient lytic activity against *Pseudomonas aeruginosa* and Sulo 2 being the most effective.
- The newly isolated phages could be distinguished in terms of morphology, host range, the identification.
- This study will help us to improve phage therapeutic efficacy via optimized phage cocktails and phage

References

- Stapleton, F. (2023). The epidemiology of infectious keratitis. *The Ocular Surface*, 28, 351-363.
- Subedi, D., Vijay, A. K., & Willcox, M. (2018). Overview of mechanisms of antibiotic resistance in *Pseudomonas aeruginosa*: an ocular perspective. *Clinical and Experimental Optometry*, 101(2), 162-171.

