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UJI STABILITAS DAN SPESIFISITAS *HOST* BAKTERIOFAGA *Escherichia coli* ISOLAT SELOKAN MATARAM YOGYAKARTA

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INTISARI

Escherichia coli merupakan salah satu bakteri dengan prioritas kritis berdasarkan World Health Organization (WHO) *Bacterial Priority Pathogens List*, karena mengembangkan kemampuan tinggi resistensi terhadap berbagai antibiotika. Perkembangan resistensi antibiotik pada *E. coli* lebih cepat dibandingkan penemuan dan pengembangan antibiotik baru sehingga diperlukan alternatif terapi, salah satunya menggunakan bakteriofaga. Namun, terapi faga masih menghadapi beberapa tantangan, seperti kisaran inang yang sempit, aplikasi yang terbatas, serta perbedaan viabilitas selama penyimpanan. Penelitian bertujuan untuk mengevaluasi stabilitas faga Sunnie (bakteriofaga *E. coli multidrug-resistant*) pada berbagai pH dan suhu, serta menganalisis kisaran inang bakteriofaga terhadap berbagai strain *E. coli*, bakteri Enterobacteriaceae, non-Enterobacteriaceae, dan Gram positif. Uji stabilitas faga dilakukan berdasarkan nilai titer (PFU/mL), menggunakan metode *spot test* pada LB agar *overlay.* Stabilitas pH diuji pada pH 3–12 selama 3 dan 24 jam, sedangkan stabilitas suhu diuji pada -18°C hingga 55°C dengan pengamatan pada hari ke-1, 3, 5, 7, dan 14. Sementara itu, uji kisaran inang dilakukan dengan metode *spot assay*. Hasil penelitian menunjukkan Faga Sunnie stabil pada rentang pH 5–9 dan toleran terhadap pH 11 selama 24 jam, serta stabil pada suhu -18°C hingga 37°C selama 14 hari dengan titer dalam kisaran 10^9 PFU/mL. Namun, faga sensitif terhadap kondisi ekstrem yaitu pH 3, pH 12 dan suhu 55°C yang menyebabkan inaktivasi. Uji kisaran inang menunjukkan faga Sunnie memiliki kisaran inang sempit (monovalen) karena hanya mampu menginfeksi *E. coli* MDR. Temuan ini menunjukkan bahwa faga Sunnie berpotensi sebagai kandidat terapi faga, tetapi perlu dikembangkan dalam koktail karena kisaran inang yang sempit.

Kata kunci: bakteriofaga *E. coli,* stabilitas pH*,* stabilitas suhu, kisaran inang, terapi faga

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STABILITY AND HOST SPECIFICITY OF *Escherichia coli* BACTERIOPHAGE ISOLATED FROM SELOKAN MATARAM YOGYAKARTA

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ABSTRACT

Escherichia coli is a critical priority pathogen on the WHO Bacterial Priority Pathogens List due to its ability to develop resistance to multiple antibiotics. The rapid increase of antibiotic resistance in *E. coli* has outpaced the development of new antibiotics, making alternative therapies such as bacteriophages necessary. However, phage therapy still faces challenges, including narrow host range, limited applications, and differences in phage viability during storage. This study evaluated the stability of Sunnie phage (a multidrug-resistant *E. coli* bacteriophage) at different pH and temperature conditions and analyzed its host range against various *E. coli* strains, Enterobacteriaceae, non-Enterobacteriaceae, and Gram-positive bacteria. Phage stability was measured by titer (PFU/mL) using spot test on LB agar overlay. pH stability was tested at pH 3–12 for 3 and 24 hours. Temperature stability was tested at -18°C to 55°C on days 1, 3, 5, 7, and 14. Host range was determined using the spot assay. The results showed that Sunnie phage remained stable at pH 5–9 and tolerated pH 11 for 24 hours, and stable at -18°C to 37°C for 14 days with titers around 10^9 PFU/mL. However, the phage was sensitive to pH 3, pH 12, and 55°C, which led to its inactivation. Host range determination revealed that Sunnie phage has a narrow host range (monovalent), infecting only MDR *E. coli.* This findings indicate that Sunnie phage has potential as a phage therapy candidate, but its narrow host range requires further development into a phage cocktail.

Keywords : *E. coli* bacteriophages, pH stability, temperature stability, host range, Phage therapy.