JMID/
Journal of Microbiology and Infectious Diseases

2023; 13 (1):25-30
doi: 10.5799/jmid.1265378

RESEARCH ARTICLE

Evaluating The Effectiveness of A Non-Locally Developed Commercial Phage Cocktail on Kenyan *Pseudomonas aeruginosa* Isolates

Ivy Jepkurui Mutai[1,2], Martin Georges[2], Atunga Nyachieo[1], Eric Odoyo[2], Anthony Kebira Nyamache[3], Jillani Ngalla[1]

[1]*Phage Biology Section, Department of Reproductive Health & Biology, Institute of Primate Research, Karen, Nairobi, Kenya*
[2]*Center for Microbiology Research, Kenya Medical Research Institute, Nairobi, Kenya*
[3]*Department of Biochemistry, Microbiology and Biotechnology, Kenyatta University, Nairobi, Kenya*

ABSTRACT

Objectives: The use of bacteriophages (phages) as an alternative treatment for multidrug-resistant bacteria has recently gained popularity. Phage cocktails have been proposed for broad-spectrum therapeutic effects against such resistant bacteria. However, the effectiveness of non-locally formulated phage cocktails for therapy on Kenyan isolates has yet to be evaluated and is a subject of investigation. This study aimed to determine the *invitro* effectiveness of a non-locally made commercial pyophage cocktail on clinical *Pseudomonas aeruginosa* isolates from Kenya.

Methodology: Forty-nine *P. aeruginosa* isolates from Kenya were subjected to a pyophage cocktail for efficacy studies using direct spot test (DST) and efficiency of plating (EOP).

Results: The success rate of the cocktail was observed on 16.3% (8/49) isolates only and ineffective on 83.7% (41/49) isolates. Of the eight isolates that showed cross-reactivity from DST, six had complete lysis with a faintly hazy background. Five of these six isolates resulted in successful and high phage progeny production in plaquing efficiency (EOP ≥ 0.5).

Conclusion: Non-locally made commercial pyophage cocktail was ineffective against the 83.7% endemic clinical strains of the Kenyan *P. aeruginosa* isolates, demonstrating the importance of locally derived phage cocktails against endemic and multidrug-resistant isolates. *J Microbiol Infect Dis 2023; 12(4):25-30.*

Keywords: *Pyophage cocktail, P. aeruginosa, spot test, the efficiency of plating, host range*

INTRODUCTION

Pseudomonas aeruginosa is one of the disease-causing organisms associated with nosocomial infections in intensive care units (ICUs). It is an opportunistic Gram-negative organism with reported increased trends in antimicrobial resistance and worldwide dissemination of high-risk clones [1,2]. This organism is notorious for causing ventilator-associated pneumonia, urinary tract infections, post-operative infections from surgical and burn wounds, and bloodstream infections, particularly among hospitalized and immune-compromised patients [2]. Indeed, globally, *P. aeruginosa* infections account for high mortality proportions of 18-61% and are linked to 10-15% of hospital-associated infections [18]. The pathogenicity of *P. aeruginosa* isolates is triggered by their ability to acquire resistance to many classes of antibiotics and their intrinsic property of antibiotic resistance [19].

Current research in Kenya has reported the detection of pan-drug-resistant *P. aeruginosa* and high-risk strain types, which calls for urgent regulation, containment measures, and alternative treatment options [3]. Bacteriophages (phages) have been considered alternative therapeutic agents [4,5]. The exploitation of phages-based therapy was first introduced in 1915 but declined with the

Correspondence: Ivy Mutai, Phage Biology Section, Institute of Primate Research, Karen, Nairobi, Kenya
E-mail : mutaiivy94@gmail.com
Received: 15 October 2022 Accepted: 18 February 2023