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“Optimizing Innovation in Knowledge, Education and Design”

EXTENDED ABSTRACT



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Assalamualaikum warahmatullahi wabarakatuh,



First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality. I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services. By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality. I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH



WELCOME MESSAGE (i-SPIKE 2023 CHAIR)



We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPIKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPIKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail

Chair

3rd International Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023)

Vib-PHAGES AS A SUPPORTIVE TOOL FOR DEVELOPMENT OF ANTIBACTERIAL TREATMENT IN AQUACULTURE

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ABSTRACT

Vibrio infections play a leading role in constraining the sustainable growth of the aquaculture sector worldwide and, consequently, are the target of manifold disease prevention strategies. During the early, larval stages of development, *Vibrio* species are a common cause of high mortality rates in reared fish. Antibiotic resistance is increasing among *Vibrio* species, with the use of phages constituting a promising, sustainable approach to prevent *Vibrio* infections in aquaculture. Vib-Phages is an alternative antibacterial treatment for Vibriosis. It can be used directly in fish feed or water.

Keywords: Aquaculture, Bacteriophage, *Vibrio* spp.

INTRODUCTION

Aquaculture is the fastest growing sector of food production worldwide. However, one of the major reasons limiting its effectiveness are infectious diseases among aquatic organisms resulting in vast economic losses. Fighting such infections with chemotherapy is normally used as a rapid and effective treatment. However, the rise of antibiotic resistance is limiting the

efficacy of antibiotics and creates environmental and human safety concerns due to their massive application in the aquatic environment (Ramos-Vivas et al., 2021). Bacteriophages are an alternative solution that could be considered to protect fish against pathogens while minimizing the side-effects for the environment and humans. Bacteriophages kill bacteria via different mechanisms than antibiotics, and so fit nicely into the 'novel mode of action' concept desired for all new antibacterial agents (Liu et al., 2022).

CONTENT

Description of your innovation / product development / design / process.

Vib-PHAGES HATCHERY is a cocktail of phages isolated from bivalve. Hence, they are safe on aquatic animals, humans and ecosystems. This destroys pathogenic bacteria which are even resistant to antibiotics and increases the efficacy of probiotics. 1 vial of Vib-Phages to be reconstituted in 1L of sterile sea water. It can be directly used in fish feed and water tank.

Background of the innovation / product development / design / process

The increasing prevalence of bacterial infections leads to the indiscriminate use of antimicrobials that are the most common solution in combating pathogenic microorganisms. However, in the case of aquaculture, the range of authorized antibiotics is very narrow, e.g. the Food and Drug Administration(FDA) in 2014 approved only oxytetracycline, florfenicol, and sulfadimethoxine/ormetoprim. In addition, most bacteria pathogenic to aquaculture are resistant to multiple antibiotics. That forces fish farmers to look for alternative solutions that allow effective protection of breeding populations. Bacteriophages (phages) are one alternative solution that could be considered as a prospective anti- microbial strategy in aquaculture.

The process in developing this product includes the phages were isolated from oyster and clam. The phages were characterized, purified & stored for further analysis. Then, the phages were scaled up in lab and undergone drying process. The in-vitro test was done to observe the efficacy of the phages (Figure 1).

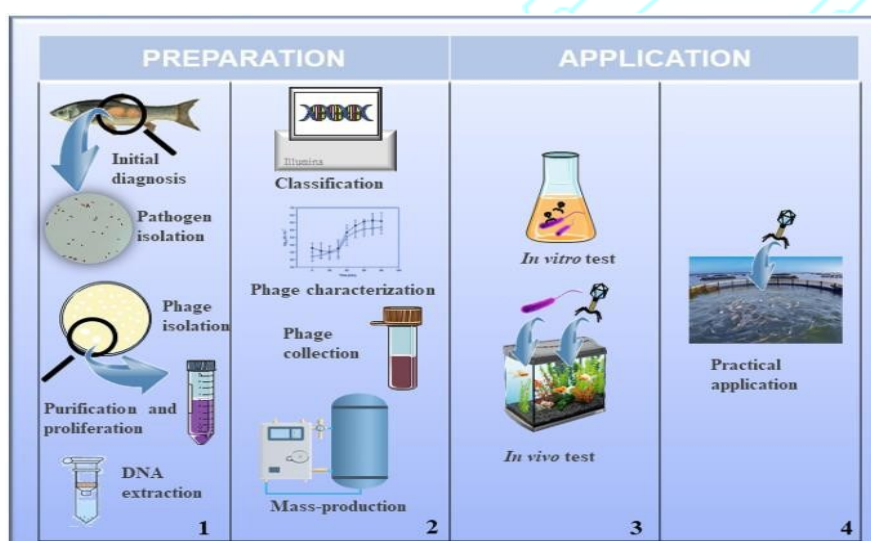


Figure 2. Process of product development Vib-phages

Important to aquaculture industry

Phages are extremely specific in their ability to infect and destroy certain species or strains of bacteria without affecting the core commensal microbiota of the host. Therefore, phage therapy is well suited to be part of the multidimensional strategies focused on increasing fish health in culture and, at the same time, a promising tool in counteracting the rise of antibiotic-resistant bacteria.

Advantages of your innovation / product development / design / process towards education and community.

Therapeutic bacteriophages, commonly called phages, are a promising potential alternative to antibiotics in the management of *Vibrio* infections of a wide range of organisms including cultured fish.

Commercial value in terms of marketability or profitability of your innovation / product development

Human safety, environmental friendliness, and techno-economic practicability of phage therapy in aquaculture. Creating biobanks of fish bacteriophages and their products (lysins) following established legal and regulatory frameworks for safe and stable use in countries with intensive aquaculture operations requires extensive maneuvers of the regulatory authorities and the pharmaceutical industry interested in their exploitation on a large-scale setting.



Figure 2. Vib-Phages as an alternative treatment for vibriosis

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