CRISPR-based Rapid On-Site Pathogen (CROP) Test Kit for Shrimp

Technology Overview

Intensified shrimp farming has led to increased disease outbreaks, causing substantial economic losses. Current diagnostic methods like Polymerase Chain Reaction (PCR) are effective but labor-intensive and limited to one pathogen at a time. CRISPR-based technology, particularly Cas12a, offers a sensitive alternative. Our unique proposition amplifies nucleic acids from three pathogens simultaneously: white spot syndrome virus (WSSV), infectious hypodermal and haematopoietic necrosis virus (IHHNV), and enterocytozoon hepatopenaei (EHP); enhancing detection capabilities and potentially revolutionising aquaculture disease management for improved sustainability and success.

Features & Specifications

This technology can detect multiple shrimp pathogens, including WSSV, IHHNV and EHP in a sample. It utilises Recombinase Polymerase Amplification (RPA) followed by CRISPR-Cas12a detection. By combining these techniques, it enables rapid and efficient identification of the presence or absence of multiple shrimp pathogens in a single sample.

The method involves:

- a) Amplifying three synthetic nucleic acids with specific primers. Using CRISPR-Cas12a for detection on the resulting
- b) double-stranded products, with pathogen-specific CRISPR RNA.
- c) Determining pathogen presence by observing emitted fluorescence, indicating their presence in the sample.





Customer Benefits

Advantages of the diagnostic kit are:

- Multiplex: 3 major pathogens of shrimp can be tested in a single test.
- Sensitive: CRISPR-based diagnosis has been demonstrated to be single copy sensitive.
- Specific: RPA & CRISPR-based diagnosis has been demonstrated to be highly specific
- Rapid: the test requires less than 45 minutes.
- On-site: the shrimp farmer can use the device or test the samples in the farm.
- Visual detection/results read out from battery operated hand-held device.

Potential Applications

This technology can be marketed as diagnostic kit for the detection of shrimp pathogens to:

- Aquaculture industries / shrimp farmers
- Regulatory authorities (SFA, NEA)



RIE & Partnership Development industrypartnerships@tp.edu.sg +65 6780 5595

www.tp.edu.sg