OPEN ACCESS Freely available online

ISSN: 2155-9546
Journal of Aquaculture Research & Development

Perspective

Evaluation of Molecular Techniques in Aquaculture and a Dynamic Approach to Bio Analytical Sensors

Paul Garlock*

Department of Fisheries and Aquaculture, Federal University Gashua, P.M.B 1005 Gashua, Yobe State, Nigeria

ABOUT THE STUDY

Pathogen exposure to indigenous hosts is a persistent and pervasive problem in aquatic ecosystems, maybe far more than in terrestrial systems. Infectious pathogens are defined as microorganisms that can harm the host. Infectious pathogens are one of the greatest threats to the success of aquaculture. Caring for a large number of fishes packed in a small space creates an ideal environment for the growth and transmission of infectious diseases. Fishes are anxious and more prone to sickness in this crowded, artificial habitat. Furthermore, infections spread more easily in congested communities due to the water environment and restricted water flow. However, one of the most notable trends in recent years in the biological sciences has been the fast growth of molecular biology tools. Molecular biology theory and technology are now widely applied in plant and animal improvement, detection and treatment of human illnesses, and other domains. Molecular biology approaches are now being used in very valuable aquatic environments. Molecular biology is critical in overcoming difficulties in aquaculture technology, expanding new regions, and changing the existing industrial paradigm. Molecular biology methods can be used to identify harmful microbes down to sub-species or strains, depending on the scope and objective of the research. Polymerase Chain Reaction (PCR), probe hybridization, restriction enzyme digestion, and nucleotide sequencing are all examples of molecular diagnostic procedures, with the first two being the most used. Molecular diagnostic technology has already been used to efficiently detect and identify bacterial, viral, parasitic, and fungal infections in fish, shrimp, and shellfish.

Numerous nations have explored and analyzed aquaculture-related molecular biology techniques, with an emphasis on developing new forms of excellent breeding, cultivating high-yield stress-resistant varieties, and developing new technologies and methods for detecting and treating disorders. As a result, there is still a lot of room for advancement in the application of molecular biology approaches to the enhancement of aquaculture species and disease prevention. PCR is a process of enzymatic synthesis and amplification of particular DNA fragments *in vitro*. It is one of the most widely used molecular detection methods. Templates, primers, polymerase, deoxy-nucleoside triphosphate, and the necessary buffer are all part of a typical reaction system. Denaturation, annealing, and extension are all part of the PCR thermal cycle. Additional verification tests are required since the PCR is impacted by a variety of circumstances (such as restriction enzyme digestion, probe hybridization, or nucleotide sequencing). A variety of PCR-based pathogen detection techniques have been developed by a number of researchers. For example, a PCR-amplified fstA gene was used to identify Aeromonas in salmon, and a multi-PCR was designed to detect five different bacterial diseases in fish at the same time. The White Spot Syndrome Virus (WSSV) of *Penaeus monodon* was detected using a nested PCR.

According to the idea of base pairing, *in situ* nucleic acid hybridization binds known base sequences with designated nucleic acid probes with nucleic acid bases in organization or cells to generate hybrids. The hybridization signals with a colour are created *in situ* using histochemistry or immunohistochemical staining procedures with the matching markers detecting equipment. This approach makes use of PCR technology, advantages and limitations of each category with antigen material mass concentrations as low as 2 ng/L, immune PCR has a high sensitivity. Many elements influenced the situation, thus it was necessary to investigate the situation. Nested-PCR Specificity, 100 times more sensitivity than standard PCR, quick Complex in operation, prone to pollute the environment PCR contamination is effectively eliminated using real-time quantitative fluorescence PCR Specificity. High sensitivity, specificity, and practicability are costly. *In situ* hybridization, for example, was used to identify WSSV in Chinese shrimp, demonstrating that this technology has a wide range of applications in the diagnosis of shrimp epidemic outbreaks. As a molecular diagnostic probe, the gyrase B gene (gyrB) was used.

In 27 artificially infected shrimp samples, the virus (*Vibrio, parahaemolyticus*) was found, providing us with a rapid, reliable, and sensitive approach for *V. parahaemolyticus* identification in

Correspondence to: Paul Garlock, Department of Fisheries and Aquaculture, Federal University Gashua, P.M.B 1005 Gashua, Yobe State, Nigeria, E-mail: garlopa@edu.ng

Received: 25-Apr-2022, Manuscript No. JARD-22-17007; **Editor assigned:** 29-Apr-2022, PreQC No. JARD-22-17007 (PQ); **Reviewed:** 13-May-2022, QC No. JARD-22-17007; **Revised:** 20-May-2022, Manuscript No. JARD-22-17007 (R); **Published:** 27-May-2022, DOI: 10.35248/2155-9546.22.13.679

Citation: Garlock P (2022) Evaluation of Molecular Techniques in Aquaculture and a Dynamic Approach to Bio Analytical Sensors. J Aquac Res Dev.13.679.

shrimp. Studies of aquatic animal cell culture began in the domain of fish, which is another effective cell culture approach. Since the first RTG2 cell line of rainbow trout gonad was created in 1963, other fish cell lines have been established. Primary cultivated cell lines RTH-149 from brown trout liver, for example. ZC7901, CAB80, CIK cell lines, rainbow trout macrophage cell line, and the radiation-induced adaptive response of fish cell lines were among the many developed fish cell lines. Analyzing pre-cytoplasmic extracts of fish cell lines for investigations on cell apoptosis. Shellfish, shrimp, and other aquatic creatures have had less success in cell culture studies. Molecular biology technology will play a larger role in the production of excellent strains, germ plasm identification, pathogen detection, and disease prevention as a result of the increasing investment, and will have a global influence on aquaculture.