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Perspective

Importance of Microorganisms in Aquaculture

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ABOUT THE STUDY

Aquaculture depends on microorganisms since they are present naturally and can be added on purpose to serve a variety of purposes. Additionally, certain bacteria may shield fish and larvae from disease. As a result, it is crucial to measure and modify microbial populations in aquaculture habitats in order to improve water quality and stop the development of infectious illnesses. Within a few years, aquaculture systems may effectively manage ecosystem processes and monitor water quality using microbial populations. For a thorough understanding of both advantageous and disadvantageous aquaculture systems, microbiomes should be thoroughly researched. But these microbiomes must be developed and managed properly. Similar to this, using probiotic bacteria to control the microbiome may lessen the need for antibiotics in aquaculture. Recent studies have demonstrated that probiotic bacteria may significantly lower mortality in diseased fish larvae and can control fish pathogenic bacteria in live feed. However, a lack of knowledge of crucial microbial interactions and the overall ecology of these systems now restricts the effective regulation of the microbiota in aquaculture. Aquatic natural environments' microbial populations swiftly adjust to environmental changes. These changes may be modest, appearing as the activation or inactivation of certain metabolic pathways, or they may result in modifications to the general make-up and activity of the microbial community. Now that High Throughput Sequencing (HTS) technology has advanced so quickly, it is possible to monitor changes in microbial water communities using a comprehensive systems biology strategy. One water sample can be used to study the combined genomic and transcriptome composition [1-3].

Although not yet standardized, attempts are being made to incorporate such HTS technology into environmental monitoring programmes for natural marine systems. These approaches also hold great promise for aquaculture systems. The use of HTS as a tool to monitor the overall health of aquaculture systems is currently hindered by our lack of understanding of the system's microbial ecology, in addition to the well-known technical challenges associated with its application to natural samples, such as the extraction of representative environmental DNA, PCR amplification bias in targeted amplicon sequencing approaches, rapid RNA degeneration, etc. As a result, characterizing both the healthy and diseased aquaculture microbiome is a prerequisite for deploying HTS technology as a surveillance tool. Although research on the microbiome of farmed fish and the makeup of microbial communities in recirculating aquaculture systems has recently started, full characterization of the microbiota that lives in the aquaculture environment and how it performs is still in its infancy [4,5].

Another difficulty is that these aquaculture microbiomes are probably system-specific, necessitating the development of various procedures depending on the system in question. Fish aquaculture is severely constrained by the expansion of fish pathogenic bacteria and related disease outbreaks. For a single fish farmer, an outbreak may be financially disastrous. In exceptional cases, the spread of infectious diseases could even shut down a whole industry. Since bacterial fish pathogens are frequently thought to be the most harmful infectious organisms in aquaculture, the sector takes extensive steps to reduce the amount of pathogenic bacteria in its facilities. Antimicrobials, in addition to disinfectants and biocides, can be used to treat sick fish as a prophylactic measure. The rate of bacterial illnesses resistant to presently available antibiotics is on the rise, and this has brought attention to the risks of widespread antibiotic usage. Antibiotic resistance is outpacing the discovery and development of new drugs [6,7].

Therefore, it is imperative that we switch, as far as is practical, from the use of antibiotics to long-term prophylactic measures. A successful measure is the creation of vaccination programmes, for instance. This method is a key component of modern finfish aquaculture, and vaccines are available for a number of farmed fish species against a variety of fish pathogenic bacteria. However, because fish larvae and bivalve molluscs do not have formed adaptive immune systems, vaccination is not suited in larviculture and bivalve rearing. Vaccination programmes should be increased and extended in the coming years. Probiotics may be a suitable substitute for the preventive use of antibiotics in the manipulation of the bacterial population linked to the larvae, the rearing systems, or the live feed. Another issue is figuring out how to include probiotics into complex systems, including facilities

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for larval rearing, and if the probiotics will function effectively in such environments. Roseobacters are naturally occurring in the aquaculture environment, thus they ought to be able to survive in the systems [8]. It is unclear if the probiotics added to live feed would endure and grow farther down the system, despite efforts to explore the effectiveness of Roseobacter probiotics in live feed systems in the presence of aquaculture-relevant microbial communities.

REFERENCES

1. Abakari G, Luo G, Kombat EO. Dynamics of nitrogenous compounds and their control in biofloc technology (BFT) systems: A review. Aquac Fish. 2021; 6 (5): 441-447.
2. Harikrishnan R, Balasundaram C, Heo MS. Fish health aspects in grouper aquaculture. Aquaculture. 2011;320(1):1-21.
3. Dadar M, Dhama K, Vakharia VN, Hoseinifar SH, Karthik K, Tiwari R, et al. Advances in aquaculture vaccines against fish pathogens: Global status and current trends. Rev Fish Sci Aquac. 2017;25(3):184-217.
4. Gudding R, van Muiswinkel WB. A history of fish vaccination: Science-based disease prevention in aquaculture. Fish Shellfish Immunol. 2013; 35(6):1683-8.
5. Pridgeon JW, Klesius PH. Major bacterial diseases in aquaculture and their vaccine development. Anim Sci Rev. 2012;7:1-16.
6. Aly SM, Albutti A. Antimicrobials use in aquaculture and their public health impact. J Aquac Res Dev. 2014;5(4):1.
7. Gell FR, Roberts CM. Benefits beyond boundaries: The fishery effects of marine reserves. Trends Ecol Evol. 2003;18(9):448-55.
8. Ahmad I, Rani AB, Verma AK, Maqsood M. Biofloc technology: An emerging avenue in aquatic animal healthcare and nutrition. Aquac Int. 2017; 25:1215-1226.