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Commentary

Molecular Identification of Pathogenic Bacteria from Fishes

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DESCRIPTION

Molecular diagnostics is becoming increasingly relevant in the quick detection and identification of harmful organisms in clinical samples. For the detection and identification of bacteria, the genetic diversity of ribosomal genes provides an alternative to culture. Infectious illnesses in farmed fish are often caused by bacterial infections. *Streptococcus* species, *Aeromonas* species and *Edwardsiella* species are among the bacteria typically discovered in aquaculture species like the Asian catfish *Clarias batrachus*. One of the biggest difficulties in fish pathogen diagnosis and disease management is the lack of rapid, precise, and reliable methods of detecting and identifying infections. Traditionally, pathogens are cultured in or on an appropriate medium, and morphological, phenotypic, or biochemical properties of the presumed pathogen are analysed. *Enterococcus faecalis*, an opportunistic fish disease, has been linked to mass mortality in a variety of fish species across the globe. There is a scarcity of data and information on the presence of pathogenic agents in wild marine fish populations. As a result, in order to carry out adequate illness management, identification of disease-causing bacterial species is required. A vast variety of gram-positive and gram-negative bacteria have been linked to fish ailments all around the world.

Climate change is having an impact on the marine ecosystem, which is already under stress from anthropogenic factors such as overfishing, pollution, and habitat degradation. Pathogen development and survival rates, illness transmission rates, and host susceptibility may all be affected by climate change. All of the bacterial species identified in the fish were also found in the first water samples taken. Enteric bacteria isolated from fish serve as indicators of faecal contamination and/or water pollution. These bacteria have been linked to ulcerations, swellings, erosions, and hemorrhagic septicaemia, among other clinical symptoms. With specific media and growth conditions, *Mycobacterium* species can take several days to grow. Antibiotic resistance is a major concern in the treatment of bacterial infections all over the world. Antibiotic resistance is becoming a significant concern in the management of bacterial illnesses, necessitating the development of new disease management strategies.

Antibacterial activity of therapeutic plant extracts against human, plant, and fish infections. DNA extraction, PCR amplification, sequencing and phylogenetic analysis (single gene), multiple gene sequencing, and whole-genome sequencing are all methods of identification. Biochemical analysis for the detection of most bacterial infections from clinical samples, the majority of clinical microbiology laboratories still rely on culture. Traditionally, pathogen culture has been done on an agar-based medium (e.g., blood agar) that can support the development of a wide variety of pathogens. *Vibrio* species and *Mycobacterium* species are common bacteria found in nature, particularly in the ocean.

Fish infected with these bacteria could pose a zoonotic threat to humans. *Salmonella, Shigella*, and *E.coli* were isolated from the fish samples, indicating faecal contamination of the ponds as a result of livestock manure used as feed in the fish ponds. Currently, DNA array technology is the best method for detecting several targets at the same time. Because the signals are proportionate to the amount of target DNA, this technique is even more appealing for diagnosing fish pathogens and making disease management decisions. The presence of *Vibrio* species and *Mycobacterium* species in asymptomatic fish could imply that they can act as carriers and infect other species. There have been numerous approaches established, each with its own protocol, equipment, and expertise. Multiplexassays that allow accurate detection, identification, and quantification of several pathogens in a single assay, even if they belong to distinct super kingdoms, are still a big issue. To reduce *enterococcal* infection in fish, medicinal plant extracts could be used as a natural alternative to synthetic antibiotics. Because crude extracts contain various secondary metabolites, resistance to crude plant extracts is less likely to develop than resistance to pure antibiotics.

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