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BACTERIAL DIVERSITY OF SNAKEHEAD IN UTTARPRADESH

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Ophiocephalus striatus is a high value and commercially important freshwater air breathing fish and popularly called as snakehead. In this study it was aimed to determine the existence of microbial load and its profile in *Ophiocephalus striatus*.

Materials and Methods

A total of 155 apparently healthy *Ophiocephalus striatus* and water were sampled and processed for bacteriological analysis during a two-year period (2003-2004) from local fish. Serial dilution of fish muscle homogenate and water were made in sterile physiological saline upto 10^{-6} . Brain Heart Infusion (BHI) Agar (Hi Media, India) was used for the enumeration of total aerobic heterotrophic bacteria expressed as total viable count (TVC) in samples.

The representative colonies constituting at least 10% of the total number of colonies on plates were selected and purified onto BHI plates. All the purified colonies were subjected to primary biochemical tests viz., Gram's staining, motility, production of acid and gas from glucose, oxidase, catalase and O/F reaction. Then the isolates were subjected to biochemical tests (indole production, H_2S production, citrate utilization, nitrate reduction, amino acid decarboxylation, sugar fermentation, etc) as per Barrow and Feltham (1992).

Results and Discussion

A total of 155 samples of *Ophiocephalus striatus* were collected for bacterial isolations from 31 collection sites. A total number of 127 isolates of bacteria were identified. Out of the total isolates, 80 isolates were from fish and 47 from water. The TVC of water and fish muscle ranged from 1.1×10^4 to 9.8×10^6 cfu/ml and 4.2×10^4 to 4.5×10^6 cfu/g respectively. Altogether, 19 genera were identified from water and tissue samples viz., *Aeromonas*, *Pseudomonas*, *Alcaligenes*, *Vibrio*, *Acinetobacter*, *Serratia*, *Enterobacter*, *Klebsiella*, *Micrococcus*, *Staphylococcus*, *Streptococcus*, *Bacillus*, *Moraxella*, *Aerococcus*, *Edwardsiella*, *Pediococcus*, *Cardiobacterium*, *Plesiomonas* and *Gemella*.

Bacteria isolated from the samples were predominantly Gram negative, although Gram positive ones were also recorded. From the fish muscle samples, the most frequently isolated ones were *Aeromonas*, *Pseudomonas*, *Alcaligenes*, Enterobacteriaceae and *Vibrio*. In water samples, 13 genera were isolated with *Aeromonas*, *Aerococcus*, *Acinetobacter* and *Vibrio* being the most frequently encountered isolates. The frequency of the each genus among the 127 isolates is as follows viz., 37 *Aeromonas* (28.7%), 12 *Pseudomonas* (9.3%), 9 *Edwardsiella* (6.97%), 9 *Alcaligenes* (6.97%), 8 *Aerococcus* (6.2%), 8 *Acinetobacter*

(6.2%), 7 *Enterobacter* (5.5%), 7 *Vibrio* (5.5%), 5 *Bacillus* (3.9%), 5 *Micrococcus* (3.9%), 4 *Klebsiella* (3.1%), 3 *Moraxella* (2.3%), 3 *Plesiomonas* (2.3%), 2 *Cardiobacterium* (1.5%), 2 *Streptococcus* (1.5%), 1 *Serratia* (0.78%), 1 *Staphylococcus* (0.78%), 1 *Pediococcus* (0.78%) 1 *Gemella* (0.78%) and 4 unidentified (3.1%).

The frequency of isolation of *Vibrio* sp from water samples was more than fish muscle. Among the total gram-negative bacteria isolated from *Ophiocephalus striatus*, the proportion of non-fermenters was 23.6%. *Edwardsiella* was isolated mainly in muscle. *Aeromonas*, *Micrococcus*, *Bacillus*, *Vibrio* and *Enterobacter* were most common in both types of samples.

The most prevalent genus *Aeromonas* was recovered from fish. Among *Aeromonas*, different species viz., *A. hydrophila*, *A. caviae* and *A. sobria* were identified using the Aero key II (Joseph and Carnahan, 1994). The isolation rate of motile *Aeromonas* detected in the samples of fish muscle was 28.7%. The result of this study indicates that raw *Ophiocephalus striatus* meat may be hazardous, in case of insufficient cooking or cross contamination during handling. Pal and Pradhan (1990) reported isolation of aeromonads, pseudomonads from the ulcers of air breathing fishes. The study revealed the dominance of *Aeromonas hydrophila* over other microbial species by the frequency of isolation from the fish samples and its abundance. *A. hydrophila* is an opportunistic pathogen infecting fish under physiological or environmental stress (Groberg, et al., 1978).

Four motile and brown pigment (on Nutrient agar plate) producing bacteria were isolated from apparently normal fish. According to Bergey's manual of Systematic bacteriology, production of brown water-soluble pigments is one of the nine key characteristics of *Aeromonas salmonicida* subsp *salmonicida*. But in our study, all the 4 strains of brown pigment producing isolates were motile. It has also been observed that other *Aeromonas* species namely *Aeromonas hydrophila* and *Aeromonas media* may produce such pigments (Allen et al., 1983). But the biochemical tests of the all brown pigment producing isolates did not confirm *Aeromonas salmonicida* subsp *salmonicida*, *Aeromonas hydrophila* and *Aeromonas media*.

Summary

Out of 155 samples of *Ophiocephalus striatus* collected from 31 collection sites. 127 bacterial isolates, (80 from fish and 47 from water) were identified. Altogether, 19 genera were identified from water and fish muscle tissue samples.

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