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# BACTERIAL HEMORRHAGIC SEPTICEMIA IN FISHES FOUND IN FISH MARKETS OF BHOPAL

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### **ARTICLE INFO**

### ABSTRACT

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*Aeromonas hydrophilla* and other motile aeromonads are among the most common bacteria in freshwater habitats throughout the world, and are frequently associated with severe disease among cultured fishes. Determinations of the etiology of diseases involving aeromonad infections has been complicated by the genetic, biochemical, and antigenic heterogeneity of members of this group. Consequently, motile aeromonads consist of a complex of disease organisms that are associated with bacterial hemorrhagic septicemias in fishes. From descriptions of fish diseases in the early scientific literature, Otte (1963) speculated that septicemic infections in fish caused by motile aeromonads were common throughout Europe during the Middle Ages.

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# **INTRODUCTION**

Aeromonas hydrophila is a heterotrophic, gram-negative bacterium of the Aeromonadaceae family. This bacterium has a rod shape with rounded ends reaching 1 -3µm in length. Polar flagella allow motility. A. hydrophila can be considered as an opportunistic pathogen which is linked to infections in fish and humans. Infection most usually occurs and when an organism is dealing with environmental change. This could be a change in temperature or when infected with a different bacterium. In fish, the bacteria mainly infect the kidneys and liver resulting in disease that is thought to be the result of stress. Infection in humans can be caused by ingestion of infected food such as fish or meat. Once ingested the bacterium progresses to an organ via the bloodstream. Alternatively the bacterium can infect open wounds. The bacteria have pili which they utilise in attachment to host organism and invasion of the cells or organs. Colonisation occurs by asexual reproduction. Upon cell invasion, the enterotoxins are activated causing cell damage. Transmission in fish occurs when infected fish are moved into new fisheries without sanitation. The bacteria are largely antibiotic resistant, can survive refrigeration and are also able to grow at temperatures in a wide range up to 37°C. However, a sodium/calcium hypochlorite solution can kill this bacterium. Infection in fish may cause diseases including tail and fin rot, heamorrahagic septicemia and ulcer disease. Infection in humans can lead to a number of diseases including septicemia,

meningitis, pneumonia and gastroenteritis. The bacteria can also infect open wounds causing cellulitis, myonecrosis and ecthyma gangrenosum. The latter two diseases occur more commonly in the immunocompromised, although infections do also occur in immunocompetent people

In many isolations of bacteria from hemorrhagic septicemias in fish, the putative bacterium was misidentified. Consequently, it is now recognized that certain isolations of bacteria ascribed to the genera Pseudomonas, Proteus, Bacillus, Aerobacter, and Achromobacter were actually in the genus Aeromonas. Although motile aeromonads have appropriately received much notoriety as pathogens of fish. these bacteria also compose part of the normal intestinal micro flora of healthy fish (Trust *et ale* 1974). Therefore, stress can be a contributing factor in outbreaks of disease caused by these bacteria. In the United States, A. hydrophila primarily causes disease in cultured warm water fishes: minnows, bait fishes, channel catfish (ictalurus punctatus), and striped bass (Morone saxatilis). However, the pathogen may also affect a variety of cool water and coldwater species.

## **MATERIALS AND METHODS**

Fishes, from water bodies, with high microbial load reach the market. Following four major fish markets of Bhopal namely

Itwara, Bittan, Piplani and Govindpura fish markets were selected for present study

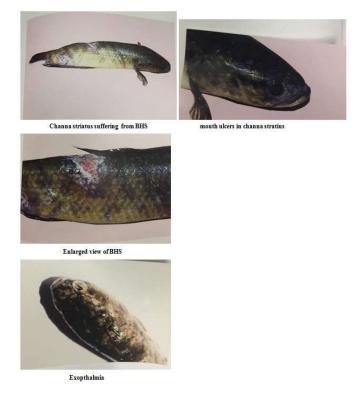
Bacteriological examination For the purpose of bacteriological examination, the methodology given by Bullock *et al.* (1971), Austin and Austin (1987) and Plumb (1994) have been followed.

### **Observations**

Aeromonas hydrophilla causes diverse pathologic conditions that include acute, chronic, and latent infections. Severity of disease is influenced by a number of interrelated factors, including bacterial virulence, the kind and degree of stress exerted on a population of fish, and the resistance and physiological condition of the host. Pathologic conditions attributed to members of the A. hydrophilla, complex include dermal ulceration, hemorrhagic septicemia, red sore disease, red rot disease, and scale protrusion disease. In the acute form, these conditions are characterized by a rapidly fatal septicemia with few gross signs of disease. When present, the following signs are most significant: exophthalmia, reddening of the skin, and accumulation of fluid in the scale pockets (Faktorovich 1969).

 Table 1 Showing bacterial flora in different tissues of Channa striatus suffering from BHS

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophilla	8.0x103CFU/g	10.3 x10 <sup>3</sup> CFU/g	2.0x103CFU/g	5.0x103CFU/g
Pseudomonas fluorescence	10.0x10 <sup>3</sup> CFU/g	6.0x10 <sup>3</sup> CFU/g	3.0x10 <sup>3</sup> CFU/g	6.0x103CFU/g



The abdomen may become distended and scales may bristle out from the skin. Internally, the liver and kidneys are target organs of an acute septicemia. The liver may become pale or green and the kidneys may become swollen and friable. These organs are apparently attacked by bacterial toxins and lose their structural integrity (Huizinga *et al.* 1979). Even when tissue damage in the liver and kidneys is extensive, the heart and spleen are not necessarily damaged. However, splenic ellipsoids are often centers of intense phagocytic activity by macrophages (Bach *et al.* 1978). Chronic stages of A. hydrophilla are primarily ulcerous forms of disease. Therefore, the predominant clinical signs include dermal ulceration, with focal hemorrhage and inflammation. Both the dermis and epidermis are eroded and the underlying musculature becomes severely necrotic (Huizinga *et al.* 1979). Inflammatory cells are usually lacking in the necrotic musculature, whereas the adjacent epidermis undergoes hyperplasia that results in a raised margin. At this stage, the infection has usually become systemic. Internally, tiny pinpoint hemorrhages (petechiae) sometimes occur throughout the peritoneum and musculature. The lower intestine and vent, which sometimes protrude from the body, are often swollen, inflamed, and hemorrhagic. Additionally, the intestine is devoid of food and filled with a yellow mucus-like material

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Many of the isolates, especially those from low-salanity sites, were also identified by the API 20E system as A. hydrophilla. However the DNA homology ratios of all of these isolates excluded them from this species.

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