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ORIGINAL RESEARCH ARTICLE

Preliminary Studies on Water Characteristics and Bacterial Population in Various Tissues of *Catla catla*

P. Prabhu*, U. Balasubramanian and G.Devendran

P.G and Research Department of Zoology and Biotechnology, A.V.V.M. Sri Pushpam College (Autonomous), Poondi - 613 503, Thanjavur District, Tamilnadu

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ABSTRACT

Aquaculture is concerned with the propagation and rearing of aquatic organisms. Many peoples are turning to aquaculture to improve the food production and to contribute for economic development. The present investigation, water sample and infected fish (catla catla) were collected in cultural pond from saliamangalam. Analysis of physicochemical parameters in water sample and bacterial populations were studied in skin, gill, fin and intestine of *Catla catla* by using bacterial culture medium. From the water quality analysis it clearly indicates that, changes in temperature, low oxygen level, low alkalinity, high organic load, decreased level of nitrite. Bacterial studies clearly indicate that there was no bacterial growth in control plate, the various infected fish tissue sample inoculated plates were showed significant growth of bacterial colonies, such as *Flexdacterium sp, Yersinia sp, Renibacterium sp, Mycobacterium, Edwerdsiella ictaluri, pseudomonas sp, Aeromonas sp,* found in predominantly. From the present study it was concluded that bacterial pathogens are most significant microbial agents affecting freshwater fishes (*Catla catla*) and climatic changes may play a great role in modulating the occurrence of bacterial fish diseases.

Key word: *Catla catla,* physicochemical parameters, Bacterial population, Bacterial infection.

1. INTRODUCTION

Water is elixir of life, a precious gift of nature to mankind millions of other species living on the earth. Aquaculture plays a vital role in many countries by offering better nutrition, higher income. Foreign exchange and better employment opportunities. Aquatic ecosystems are affected by several health stressors that significantly deplete biodiversity. Through water is a renewable resource, reckless usage and improper management of water system may cause serious problems in availability and quality of water. Water may be contaminated by various means, chemically or biologically and may be become unfit for drinking and other uses. The quality of water is usually determined by its physico chemical characteristics. It is a well established fact that domestic sewage and industrial effluent discharged into natural water result in deterioration of water quality and cultural eutrophication[1]. The other important sources of water pollution include mass bathing, disposal of dead bodies, rural and urban waste matters, agricultural run-off and solid waste disposal [2].

Bacterial infection is an important economic and limiting factor in intensive fish production [3]. Microbial quality of farmed fish is largely determined by the quality of water in which they were cultivated [4]. Bacterial diseases are more acute in cold water aquaculture than in warm water culture and may be aggravated by the unfavourable conditions (that is crowding, malnutrition and unstable temperature). Therefore this study to estimate the level of physico-chemical parameter of pond water and analysis the bacteria in different tissues of infected fish (*Catla Catla*).

2. MATERIALS AND METHODS

Water sample and infected fish (Catla Catla) were collected from Village cultural pond of Saliamangalam. The cultural pond water samples were collected in clean sterile plastic containers, during this study. The samples were transported to the laboratory within 3 hours for analysis of physico chemical parameters and bacteriological quality. The physico chemical characters includes, the determination of temperature, pH,

***Corresponding Author:** P. Prabhu**, Email:** phdprabhu@gmail.com

turbidity, salinity, 0_2 content, CO_2 content, iron, nitrite and phosphate by using the methods of APHA; Saxena; Manivasakam[5,6,7].

The standard techniques were followed for collection and bacteriological analysis of infected fish as described by Bezuidenhout *et al* [8]. The various tissue of infected fish sample was inoculated in spread plate technique was employed to bacterial population were determined using nutrient agar medium. All plates were incubated at 35^0C for 24 hours.

RESULTS AND DISCUSSION

The physico chemical and bacteriological characteristics are given in (**Table 1 & 2**) respectively. In the present study, the cultural pond water quality shows it clearly indicates that changes in temperature, O_2 level, low alkalinity, high organic load, decreased nitrite source, low oxygen and carbondioxide create unsuitable conditions in the environment where the fish lives (Table 1). Microbial populations were isolated from the infected tissues such as skin, gill, fins and gut of fresh water fish *catla catla* (**Fig1& 2**).

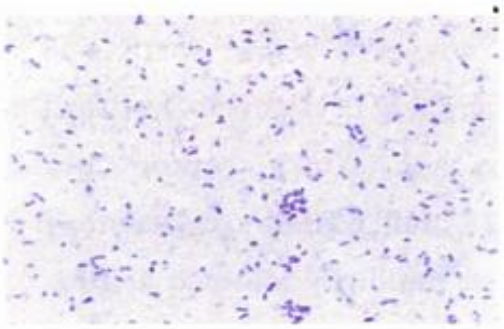
Fig 1 Culture methods of various tissue samples of infected fish

Catla catla

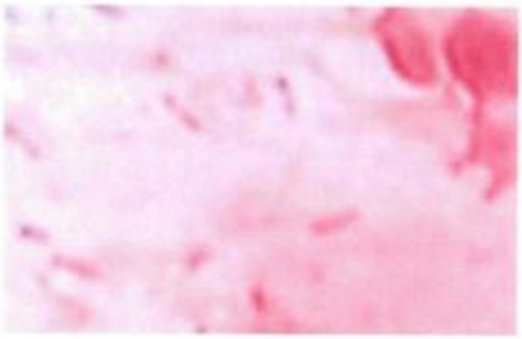
Spread Plates of Bacterial Culture

Streak Plates of Bacterial Culture

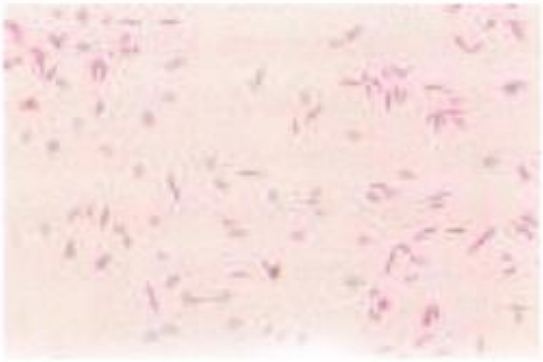
Fig 2: Microscopical Examination of Bacterial Species



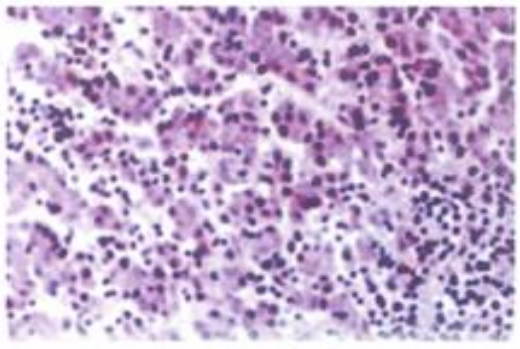
Streptococcus Iniae



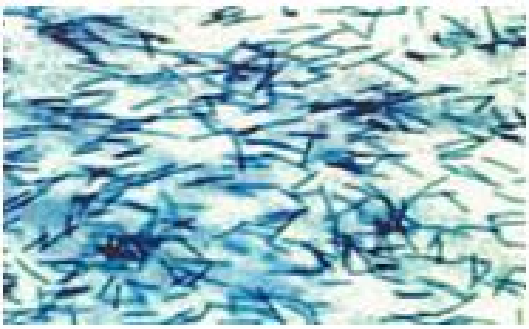
Pseudomonas fluoresens



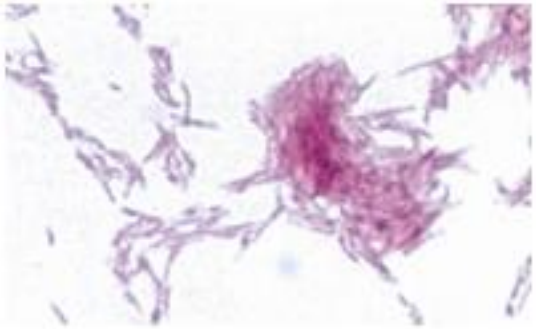
Yersiia ruckeri



Renibacterium salmoninarum



Flexibacterium



Mycobacterium sp

Edwardsiella ictaluri

Aeromonas

Table 1: Water Quality Analysis of Saliamangalam Village Pond

Parameters	Observed Result
PH	8.0
Temperature	32°C
Turbidity	28 Cm
Salinity	0.1515%
O_2 content	2.3099 ml/l
CO_2 content	6.00615 g/l
Iron	0.725 g/l
Nitrite	0.631 mg/l
Phosphate	31.1 mg/l

Table 2: Qualitative Analysis of Microbial Population in Infected Fish *Catla catla*

Identification of micro organism	Skin sample	Fin sample	Gill sample	Gut sample
Streptococcus iniae	+	+	+	-
[illegible]	+	+	+	-
Mycobacterium sp				
Yersinia ruckeri	+	+	+	-
Renibacterium salmoninarum	-	+	+	-
Flexibacterium	-	+	+	-
Mycobacterium	+	-	-	-
Edwerdsiella ictaluri	-	-	-	+
Aeromonas	+	-	-	-

(Table 2) indicates that there was no bacterial colony in control plate having nutrient agar medium (NA) where as petriplates which were inoculated with diluted tissue sample showed significant development of bacterial colony. Further subculture of individual bacterial colony was made in streak plate method which also showed significant development of bacteria. *Streptococcus iniae, Pseudomonas flouresens and Yersinia ruckeri, Renibacterium salmoninarum, Flavobacterium, Mycobacterium, Edwerdsiella ictaluri, Aeromonas* have been isolated from the infected fish sample skin, fin, gill and gut sample. So the poor water quality conditions for this reason they are a potential problem of village cultural pond.

pH is an important factor that determines the suitability of water for various purposes, including toxicity to animals and plants. The clarity of natural body of water is an important determinant of its condition and productivity. Turbidity in water is caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, plankton and other microscopic organism. Temperature of water may not be important in pure water because of the wide range of temperatures tolerance in aquatic life, but in polluted water, temperature can have profound effects on dissolved oxygen (DO) and biological oxygen demand (BOD). The fluctuation in river water temperature usually depends on the season, geographic location, sampling time and temperature of effluents entering the stream [9]. Phospate and nitrite determinations are important in assessing the potential biological productivity of surface waters. Increasing concentration of phosphorus and nitrogen compounds in the lakes and reservoirs to eutrophication.

Biological oxygen demand is a measure of the oxygen in the water that required by the aerobic organisms. The biodegradtion of organic materials exerts oxygen tension in the water and indicates the biochemical oxygen demand [10]. The bacterial genera such as *Stretoptococcus iniae,Pseudomonas flouresens and Yersina ruckeri* were predominant in infected fish and

may be due to domestic solid waste and sewage from various human activities. The bacterial population was found to be higher density in the infected fish. Hence the data show that the infected fish is considered to be unfit for eating purposes. So the poor water quality conditions are a potential problem of cultural pond.

REFERENCES

1. Shaw, B.P. Sahu, A. and Panigrathi, A.K., 1991. Water quality of the Rushikulya river estuary in relation to Waste water discharge from a Chlor-alkali plant. *pollut. Res*., 10, 139-149.
2. Tiwana, A.J., 1992. Water resource management quality and quality aspects. Proc. Int.con. Rural works and sanitation in develokping countries, IWWA, Nagpur, India. pp 6-17.
3. Bullock, G.C., 1971. Identification of fish bacteria. In diseases of fish. S.F. Sniezsko and H.R. Axeirod(Eds) Nepture, N.J.T.F.H. Publishers, pp 28-44.
4. Buras, N.L., 1993, Microbiological aspects of fish grown in trated waste water, water Res., 21(10) 1-10.
5. APHA, 1998. Standard methods for the examination of water and wastewater. 20th edition. American public health Association, American water works association, Water environment federation, Washington DC.
6. Saxena, M.M., 1994. Environmental Analysis-water, soil and air. Agro Botanical Publishers (India), 2nd Edition, 4-86; 121-125.
7. Manivasakam,N., 1982. Industrial Effluents. Origin, characteristics, effects, analysis and treatment. 4th Edition, Sakthi publications, Coimbatore, 267-333.
8. Bezuidenhout, C.C., Mthembu, N., Puckree, T., and Lin, J., 2002. Microbiological evalution of the Mhlathuze River, Kwazulu-Natal (RSA). Water SA 28: 281-286
9. Ahipathy, M.V., and Puttaiah, E.T., 2006 Ecological Characterizes of Vrishavathi River in Bangalore (India), *Environmental Geology*, 49:1217-1222
10. Abida M.V., and Harikrishna, 2008. Study on the Quality of Water in some streams of Cauvery River, *E-journal of Chemistry*, 5 (2): 377-378.