

Physico-chemical Condition of Water of Two Ponds of Bishunpur Sri Ram Muzaffarpur District (Bihar)

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ARTICLE DETAILS

Article History

Published Online: 30 November 2017

Keywords

Physico-chemical, Water supply, Fish-growth, Plankton, Pond

ABSTRACT

Physico-chemical conditions of two ponds of Bishunpur Sri Ram of Muzaffarpur have been examined in details for a period of one year. The study indicates that concentration of alkalinity, nitrate, chloride & phosphate were sometimes more than the prescribed limits.

INTRODUCTION

It is well known fact that all human activities modify the quality of our water resources. Direct human activities in the form of washing, bathing, offering of religious materials and cattle wading may prove to be much more effective. Along with the developments, urbanization and industrialization there is a greater evidence of deterioration of the water quality all over the world. While the natural factors like dust, storms, run-off weathering of minerals are slow process and the modern civilization has led to fast degradation of fresh water resources.

In rural areas of Bihar, the water body is subjected to greater human pressure by direct discharging for sewage and other wastes. Open defecation in the fields and along the drains and water resources is common in Bihar. Blind passage and road sides are used for defecation by common people. This creates health problems. One gram of human faecal matters contains millions of microorganisms and many of them are pathogenic.

The present study has been carried out on the ponds of Bishunpur Sri Ram of Muzaffarpur District of North Bihar. This village is located at the distance of 20 km east from the Muzaffarpur town. Both the ponds are perennial and very old and had been used exclusively for a raising the seed of number of fish varieties, but due to increased pollution from domestic

washes and other human activities, these water bodies have been abandoned.

The study has been designed to understand the factors responsible for hampering the growth of fish. The major factors studies include physico-chemical properties of water and sediments along with variations in communities of phytoplanktons and zooplanktons.

MATERIAL AND METHODS:

The samples of surface water were collected in glass jar from both the ponds in the year 2005 from month of January to December, after preserving them with a few drops of chloroform. They were transferred to the laboratory for further chemical analysis.

The analysis for physico-chemical parameters were made following procedures given by APHA (1975) and Trivedi&Goel (1984). The samples for phytoplanktons and zooplanktons were also preserved with 4% formalin. Counting of planktons were done with the help of Sedgwick rafter counting chamber.

OBSERVATION:

Monthly variations in some important physico-chemical parameters from both the ponds are given in Table-1 and 2.

Table-1: Physico-chemical condition of water of pond A.

Month	Temp. (in C)	pH	Dissolved O ₂ mg/litre	Free CO ₂ mg/litre	Carbonate mg/litre	Bicarbonate mg/litre	Chloride mg/litre
Jan'2005	15.00	6.75	8.4	Nil	10.00	32.00	40.00
Feb	17.75	8.75	5.7	Nil	20.5	31.5	41.5
March	22.35	8.65	1.0	16.00	12.00	21.00	69.5
Apr	22.5	8.00	1.0	2.5	14.00	71.00	70.5

May	23.5	7.75	9.5	8.5	Nil	48.00	68.00
Jun	25.00	7.00	11.5	12.75	Nil	28.00	40.00
Jul	29.5	7.5	6.4	7.5	Nil	30.00	65.00
Aug	29.00	7.3	5.3	9.25	Nil	32.00	67.00
Sep	28.00	8.65	1.75	2.50	2.5	19.5	62.00
Oct	27.5	8.75	4.75	3.50	7.5	23.5	61.00
Nov	21.8	8.55	3.6	Nil	14.35	30.00	57.00
Dec	19.8	8.50	4.5	Nil	7.5	28.00	42.00

Table-2: Physico-chemical condition of water of pond B.

Month	Temp. (in C)	pH	Dissolved O ₂ mg/litre	Free CO ₂ mg/litre	Carbonate mg/litre	Bicarbonate mg/litre	Chloride mg/litre
Jan'2005	15.00	6.5	8.2	Nil	10.00	32.00	41.00
Feb	17.5	8.5	5.6	Nil	20.00	31.0	42.0
March	22.00	8.65	1.2	15.00	13.00	22.00	70.0
Apr	22.25	8.00	1.0	2.0	14.00	72.00	71.5
May	23.5	7.5	9.0	8.0	Nil	49.00	69.00
Jun	25.00	7.25	11.0	12.50	Nil	27.00	42.00
Jul	28.5	7.5	6.0	7.00	Nil	29.00	66.00
Aug	28.50	7.25	5.3	9.00	Nil	31.00	68.00
Sep	28.00	8.55	1.50	2.25	2.5	19.0	63.00
Oct	27.0	8.75	4.50	3.25	7.0	22.5	60.00
Nov	21.5	8.5	3.5	Nil	14.0	31.00	56.00
Dec	19.0	8.5	4.0	Nil	7.00	28.00	42.00

DISCUSSION:

The physico-chemical and biological conditions of the ponds differ considerably though they were situated in the same locality.

The water temperature in the ponds reacted promptly to the change in atmospheric temperature (Table 1-2), due to small masses of waterbodies (Walch – 1952).

The hydrogen ion concentration depends on the amount of carbonates of calcium and magnesium and carbon dioxide fusion in the water. The later in turn is influence by the photosynthesis activities of the aquatic vegetation and the life cycle in the ponds. During photosynthesis, the plants derive CO₂ from bicarbonates of calcium and magnesium, converting them into carbonates which get precipitated. Due to the increase in the concentration of carbonates the water becomes more alkaline. A direct correlation between pH and carbonates has been reported by Nasar and Munsri (1974).

The oxygen contents in the ponds was also considerably affected by the metabolic activities of the biotic community. The low concentration of oxygen was partly due to low photosynthetic activity. Similarly, high value of oxygen may be related to vigorous photosynthetic activities of different species of algae. Dissolve oxygen content is also affected by

the respiratory activities of the organisms of the ponds and by the O₂ content in the pond was not only physical factor. This is also supported by the finding of Ganpati (1940). The concentration of the free carbondioxide was low and sometimes absent. Either it is consumed during photosynthesis by the vegetation as soon as it was formed or it reacts with carbonate to form bicarbonates. Ganpati (1940), George (1966) also did not detect free carbondioxide in some Indian fresh water ponds. According to Brown and Brook (1960) free carbon dioxide is not a conditioning factor of growth.

Carbonates and bicarbonates are inversely related. Carbon dioxide is derived from bicarbonates by converting the bicarbonates into carbonates. Carbonate alkality was never detected in both the ponds. The high concentration of bicarbonates during summer may be due to the decrease of water on account of its evaporation.

The chloride content is suggestive of pollution by organic matter of animal origin. The chloride contents of the ponds were high. During heavy rains the ponds received water from adjacent areas. The waste-water from adjacent areas enters the ponds. The indirect discharge of the wastes in the pond further added organic pollution.

From the above discussion it is suggested that physico chemical and biological condition of both the ponds are

suitable for Pisciculture.

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