



Evaluation of Physicochemical analysis of water in Chaur Area of Haweli Kharagpur, Munger.

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Abstract: Fishes are important aquatic fauna a good source of human food that are exposed regularly by water contaminants resulting in regular declination fish population.

In present study analysis of water samples taken from chaur of Haweli Kharagpur, Munger between August 2017 to 2018, August 2018 to 2019 August 2019 to 2020 ad August 2020 to August 2021 was done.

The assessment of total alkalinity total hardness, pH, DO, FCO₂, CO₃⁻⁻ were performed.

The result showed that quality of water of chours of Haweli Kharagpur, Munger is not most sensitive to pollution.

Key Words: Pollution, Chaur, Water.

1. INTRODUCTION:

The rivers, ponds etc. are the ecosystems, which are affected by environmental pollution at most. The release of domestic, industrial, and agricultural origin pollutants into water sources without adequate filtering and their accumulation lead to water pollution, and many organisms living in streams face with the risk of extinction. Such events obviously indicate the necessity of researching the pollution level of streams (Taş, 2006). Extensive work on the physico-chemical analysis of the fresh water ponds and other source of water have been done in India.

George (1966) made a comparative plankton study in relation to certain physico-chemical factors in few ponds of Delhi. Michael (1969) reported the seasonal trends in the physico-chemical factors of freshwater fish pond and their role in fish culture. The present work is designed to investigate the physico-chemical parameters of water of chours of Haweli Kharagpur so to monitor the extent of water pollution in that area.

2. MATERIAL AND METHODS:

The present study highlights the important physical and chemical parameters of chaur area in Haweli Kharagpur of Munger district.

Among the physico-chemical factors, water temperature, turbidity, pH, dissolved oxygen, free carbon dioxide, alkalinity, total hardness, chloride, silicate; determine the hydrological conditions of a water body.

For the estimation of various physico-chemical parameters, surface and subsurface water samples were collected at monthly intervals for a period of two years (2018-19) and (2019 - 2020). It was generally done between 9-11 a.m. in the morning. The work was done on two consecutive days at chours area. Temperature pH, DO₂, FCO₂, Carbonate, bicarbonate alkalinity were estimated on the spot whereas the other parameters were determined in the laboratory according to A.P.H.A. (1975).

3. PHYSICAL MEASUREMENT :

(A) TEMPERATURE :



The water temperature was measured with mercury thermometer graduated upto 110°C (1°C divided into ten division at 0.1 °C).

4. CHEMICAL MEASUREMENT :

(A) HYDROGEN-ION-CONCENTRATION (PH) :

It was determined by a portable graph pH meter of systronics make Sr. No. 023.

(B) DISSOLVED OXYGEN (DO₂):

Dissolved oxygen was analyzed by modified Winkler's method.

(C) FREE CARBON DIOXIDE (FCO₂):

Free carbon dioxide was determined by titrating the sample with N/44 Sodium Hydroxide using Phenolphthalein as indicator.

(D) ALKALINITY (CARBONATE AND BICARBONATE):

Carbonate and bicarbonate alkalinity were analyzed by titrating 100 ml of the sample with N/50 Sulphuric Acid solution using Phenolphthalein and Methyl Orange as indicator respectively.

(E) SILICATES (SiO₂):

Silicate was obtained by colorimetric method using picric acid solution as standard, equivalent to 0.001mg silica/ml (Jhingran et.al.,1969).

5. STATISTICAL ANALYSIS :

Student's "t" test was applied for statistical analysis of data.

TABLE-1

PHYSICO-CHEMICAL ANALYSIS OF WATER IN CHAUR AREA OF H. KHARAGPUR, MUNGER.

Parameters	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Water Temp.(°C)	34.6	32.2	26.6	23	20.6	20.4	21.8	25	31.8	32.8	33.6	34.2
pH	7.9	7.8	7.6	7.8	8.0	7.2	7.8	7.6	7.8	8.0	8.2	7.6
DO ₂ (mg/l)	5.1	5.5	6.8	6.7	6.2	6.5	5.5	5.8	5.7	6.7	6.5	5.0
FCO ₂ (mg/l)	18.0	19.0	19.5	18.5	19.0	19.5	20.0	20.5	21.0	21.5	20.0	20.5
CO ₃ ⁻ alk. (mg/l)	29.91	29.93	29.92	29.94	29.95	29.98	29.97	29.94	29.96	29.98	29.99	30.0
HCO ₃ ⁻ alk.(mg/l)	110	112	112	122	145	150	148	140	165	190	110	135
Total alk.(mg/l)	139.91	141.93	141.92	151.94	174.95	179.98	177.97	169.94	194.98	219.98	139.99	165
Silicate	7.00	8.45	12.0	15.0	13.0	17.5	17.0	18.0	19.0	20.0	21.6	22.5

Notation: DO₂ Dissolve Oxygen, FCO₂ - Free carbon dioxide, Alk₃ CO₃⁻ - Carbonate alkalinity, HCO₃⁻ - Bicarbonate alkalinity, Si⁺ – Silicate .

6. RESULT AND DISCUSSION:

Physico-chemical factors contribute in making up of the specific ecosystems, which determined the trophic dynamics of the water body. It is necessary to know the physico-chemical properties of water to study the culture practices of the fish in water bodies. The productivity of a water sheets depends primarily on the physico-chemical and biological characteristics of water. These properties again depend on the nature of bottom soil and climatic conditions. In India first ecological study on a reservoir was carried by Ganapathi on Red hill Lake, Madras.



pH reflects the chemical condition of the water. The pH was higher during summer months, which may be due to carbon dioxide-bicarbonate system. Water was alkaline throughout the study period (7.2 to 8.2) and similar observations were reported by pasar and Munshi (1974), and Saha (1985).

The oxygen dissolved in water depends upon its temperature and also the photosynthetic activity of the plankton and plants. However, in summer, though the photosynthetic activity was longer and greater quantity of oxygen was brought into the chaur, the values of dissolved oxygen were less due to high temperature. It may be also due to higher decomposition rate during summer.

Carbon dioxide is an important component of the buffer system and influence the concentration of carbonate and bicarbonate in water. There are different sources of carbon dioxide in natural waters such as atmosphere, respiration by plants and animals, bacterial decomposition of organic matter etc. A number of workers have discussed about the chemical equilibrium involving free carbon dioxide and bicarbonate-carbonate alkalinity.

The amount of free carbon dioxide evolved during respiration is always less than the amount of free carbon dioxide consumed during photosynthetics. Hence during summer, due to high temperature and longer duration of sunshine, the rate of primary productivity is higher. In summer there is complete removal of carbon dioxide from subsurface layers of water and also from soluble bicarbonate being converted into insoluble carbonate.

The higher concentrations of carbon dioxide in monsoon months in the chaur are chiefly due to the rainwater. The absence of carbon dioxide during some months may be chiefly due to its complete consumption in carbon assimilation and or its complete conversion into carbonic acid and ultimately into stable carbonate and bicarbonates (Rawson, 1959). Carbon dioxide showed a well-marked inverse relationship with dissolved oxygen (Ganapati, 1943; Saha et al., 1959; Pahwa and Mahrotra, 1966).

Higher values of water temperature were recorded during 12.00 hrs in almost all the seasons which may be due to direct solar radiation. Increase in pH values during day time, may be due to the photosynthesis activity. As the photosynthesis stops during night, higher values of carbon dioxide resulted in lowering of pH values.

7. CONCLUSION:

The result obtained from the experiments describes, From the physico-chemical properties of water obtained results of Haweli Kharagpur, Munger is evident that, at present the parameters like pH, concentrations of DO_2 , FCO_2 , CO_3 and HCO_3 silicate were at the levels

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