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ANALYSIS OF WATER IN RELATION TO FISH PRODUCTION IN PATNA (GANGA RIVER) , NORTH BIHAR.

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ABSTRACT :

Water constitutes about 71% of earth surface. Of the surface water about 97% is salt water and remainder fresh water. Water helps maintain earth climate and dilutes environmental pollutants. Water is one of the most essential substances in our life..

KEYWORDS : *Confined water, Fish, Fresh water & Fish.*

INTRODUCTION:

The pollution of ground water is of major concern firstly because of its increasing utilization for human needs and secondly because of the ill effects of the increasing industrial activities. Sources of ground water pollution include sewers leakage in proper disposal of liquid wastes and solid wastes. Sewer leakage can also contribute pollution to certain extent by introducing high organic pollution, nitrate and chemicals and possibly bacteria into ground water.Ground water pollution can occur where industrial waste water is discharged into nalas, ponds and rivers.The production of fish in confined water depends mostly on the physicochemical properties of water, soil and certain biological factors.Works on confined water are available. For example such works are of Rai and Datta Munshi (1979), Rai (1980), Siddique (1983) Chaudhary (1987), Bazmi (1989), Dudani (1986), Rahmatullah (1992).

The present paper is an attempt to assess the water quality or confined water (Ganga river) in. relation to possibility of fish production and to suggest suitable water management.

MATERIALS AND METHOD

Collection of river water was made for the study of phyco–chemical parameters from the surface at a distance of 4.5 from the bank every month between 9–11 AM for one i.e. from February 2016 to January 2017. For study of Biological parameters, study was made only in three months i.e. May, August, and January, considering the impact of session only. The collected water samples were taken to laboratory for

(A) Physico–chemical analyses
(B) Phytoplankton Community Structure.
(C) Zooplankton Community Structure.
(D) Productivity.
(E) Benthos & Fishes.

(A) PHYSICO–CHEMICAL ANALYSIS :

The Physico—chemical analyses were made with reference to Transparency, Temperature, pH, Dissolved Oxygen, Free CO_2 Carbonated alkalinity, Total Hardness, Calcium and Magnesium.

Of the parameters noted above determination of Transparency, Temperature and pH were made on the collection spot and the remaining in the laboratory. Standard methods of A.P.HA. (1975) were followed for the analysis of each parameter noted abov except organic matter for which specific methods were adopted (Jhingaran et at 1969). Chemicals and reagents used for the analyses were of BDHI Merk. AR grade details of the methods adopted for the parameters under consideration may be seen under respective heads as follows:

1. Transparency (cm) :

It was measured by using Sacchi disc (20cm diameter). It was dipped into water until it disappeared and was uplifted with the help of string tied to it. The point of disappearance reappearance of the disc was note and the transparency was calculated as follows.

$$\text{Transparency} = \frac{d_1 + d_2}{2}$$

Where

d_1 = depth at which Sacchi disc disappeared.

d_2 = depth at which Sacchi disc reappeared.

2. Temperature (°C) :

The water temperature was recorded by using a centigrade mercury thermometer (Century type No CP 901).

3. pH :

pH of the river water was measured with the help of systronics pH meter (model 324)

4. Dissolved Oxygen (mgl^{-1})

It was estimated through Winkler's method (A.P.H.A., 1975)

Reagent used

1. Sodiumthiosulphate (0.025N)
2. Alkaline Potassium iodide Solution (100 g KON + 50 g KI +200 ml. distilled water)
3. $MnCl_2$ (40%)
4. Starch indicator (1g Starch + 100 ml. warm distilled water + few drops of formaldehyde solution)
5. HCL, (Cone.)

Procedure :

250 ml. of the water sample was taken in a reagent bottle. 1ml. of $MnCl_2$ and 1ml. of alkali iodide solution were added using separate pipettes. The solution was left for sometime to settle down the precipitates. 2ml. of cone. HCl was added to it.

100 ml. of the treated sample was taken in a 150ml conical flask. 2 or 3 drops of starch indicator was added to it and the solution was titrated with sodiumthiosulphate until the solution turned coluurless. The amount of dissolved oxygen was calculated through the following equation.

$$= \frac{(ml \times N)\, of\ tritration \times 8 \times 1000}{V_2\left(\frac{V_1 - V}{V_1}\right)}$$

Dissolved Oxygen (mgl^{-1})

Where

V_1 = Volume of Sample.

V_2 = Volume to the part of the contents titrated.

V = Volume of $MnSO_4$ + alkali iodide used.

5. Free carbon dioxide (mgl^{-1}) :

It was estimated by titrating the sample with a strong alkali using phenolphthalein as indicator.

Reagent used :

1. Phenolphthalein indicator l% (0.5g phenolphthalein +50 ml. of 95% ethanol + 50 ml, distilled water)
2. Sodium hydroxide (NaOH) – 0.05N

Procedure :

50 ml. of the sample was taken in a concial flask and few drops of phenolphthalein indicator was added. If pink colour appeared then it means CO_2 was absent. It the colour of the sample remained uncharged. It was titrated with 0.05 N NaOH until the colour of the solution turned to pink. Free CO_2 was calculated as follows.

$$\text{Free } CO_2 \text{ (ppm)} = \frac{(ml3\times N)\,of\ NaOH\ \times 1000\times 44}{ml.of\ sample}$$

6. Phenolphthalein alkalinity (mgl^{-1}) :

Reagent used

1. Phenolphthalein indicator 1%
2. HCL 0.1 N

Procedure :

50 ml of the sample was taken in a conical flask and few drops of phenolphthalein indicator was added. The colour of the solution turned pink and titrated with 0.1 NHCl until the colour disappeared.

Phenolphthalein alkalinity (P.A.) Was calculated as per the equation below.

$$\text{P.A. as } CaCO_3 = \frac{(ppm)\,(A\times N)\,of\ HCL\times 1000\times 50}{ml.of\ Sample}$$

Where

A. = ml. of HCL used.

7. Total alkalinity (mgl^{-1}) :

Reagent used :

1. HCL 0.l N
2. Methyl orange indicator 0.05 %

Procedure :

Two or three drops of methyl orange indicator was added to the above solution and it was titrated against 0.1N HCL until the yellow colour changed to pink. The total alkalinity (T.A.) was calculated through the following equation.

$$\text{P.A. as } CaCO_3 = \frac{(B\times N)\,of\ HCL\times 1000\times 50}{ml.of\ Sample}$$

where

B = ml. of total HCl used

Concentration of carbonate and bicarbonate was calculated from the table given below.

Table Calculation of the values of carbonate and bicarbonate alkalinity from the P(–1) and T (–2).

Result of Titration	CO_3 alkalinity on as $CaCO_3$	HCO_3 alkalinity as $CaCO_3$
P = O	O	T
P < 1/2T	2P	O
P = 1/2T	2P	O
P > 1/2T	2 (T–P)	O

(–1) P = Phenolphthalein alkalinity (– 2) T = Total alkalinity.

RESULTS AND DISCUSSION

The productivity of the River Ganga was studied in three seasons i.e. is in the months of May 2016, August 2016, and January 2017. Net Primary Productivity and Gross Primary Productivity was observed as per the method given in the Material & Methods. Ratio of Net productivity and Gross productivity was calculated. Similarly Community respiration and percentage of Gross productivity was also computed. The results have been presented in the Table -1

Net Primary Productivity (NPP)

At all observed, net primary productivity showed minimum in August and maximum in May. There was no significant variation was observed

Gross Primary Productivity (GPP)

At all observed gross primary productivity showed minimum in August and maximum in May. There was no significant variation was observed. Considering all observed stations and all seasons minimum value of GPP was observed in the month of August 2016 (0.034 gm/m3/hr.) and maximum at in the month of May 2012 (0.267gm/m3/hr.)

Community respiration (CR)

At all observed community respiration showed minimum in August and maximum in May (Table 1). There was no significant variation was observed. Considering all season minimum value of CR was observed in the month of August 2016 (0.008gm/m3/hr.) and maximum month of May 2016 (0.072gm/ m3/hr.)

FISHERS AND BENTHOS

Ganga river is a perrenial river. Fish farming is riot a common activity of this regions. But fishermen of local area used to capture fishes regularly. There is no standard method of fanning/ culture of fishes. Benthos of the river was examined regularly in three seasons. No abnormalities and uncommon fauna and flora observed during the period. This is in accordance with the observation made by Kumar (1998).

Table 1: Primary productivity

	Net Primary Productivity (NPP)	**Gross Primary Productivity (GPP)**	**NP/GP**	**Community Respiration**	**% of Gross Production**
May– 2016	0.195	0.267	0.730	0.072	26.966
Aug.– 2016	0.033	0.044	0.750	0.011	25.00
Jan.– 2017	0.110	0.145	0.759	0.035	24.135

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