

RAPID ASSESSMENT OF MONTHLY VARIATION OF PHYSICO-CHEMICAL STATUS IN THE GANGA RIVER, HAJIPUR, BIHAR

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Abstract: The present research work is an attempt made of to measure water. Quality of Ganga river at hajipur, Bihar. Physico-Chemical status of the Ganga river were conducted during Nov.2017 to Oct 2019. On the basis of present study some parameters like temp., pH, TDS, Turbidity, Conductivity & Do are carried out in present research work. The result revealed well defined monthly variation. The whole river, at hajipur is getting polluted due to intense human activity.

Keywords: Physico-Chemical, Ganga river, Present work, Research etc.

Introduction

Water is most necessary gift of nature for our life but also sustaining all forms of life, food production & economic development (Mane et al, 2005). Fresh water is essential for all living beings. It is the basic medium through which the chemical constituents can pass from the abiotic portion of the ecosystem into the living portion.

River Ganga is the 3rd largest river having a total length of approx. 2025 KM. the water of this river is suitable for drinking bathing and all living beings.

Hajipur city is situated in West central of Bihar. It lies on the bank of Gandak river just north of the Ganga.

Present study carried out in three different sites i.e., (x) Konahara ghat, (y) Muktidham ghat and (z) Terharsiya ghat, Hajipur, Bihar in the Ganga river.

The maintenance of a healthy aquatic system depends on the Physico-Chemical properties of water. Lot of works have been performed on the monthly changes in the Physico-Chemical parameters of rivers, lakes, ponds and streams in India by several workers as.

Materials and Method

The present research work has been done in the Ganga river, hajipur, Bihar. The water samples were collected at the monthly intervals from Nov. 2017 to Oct 2019.

- Most of the parameters at the sampling sites. Like Temp., pH.
- Water temp. were recorded with the help of a mercury thermometer.
- pH of water was measured by a portable pH meter/ pH stripes.
- TDS was measured by a portable digital TDS meter.
- Turbidity of water was measured by nephelometer or turbidimeter. in NTU(nephelometer turbidity unit)
- The conductivity of water was measured by conductivity meter.
- The analysis of dissolved oxygen was done according to methods of APHA(1975) & Trivedi & Goel(1984)

Result

The monthly fluctuations in the Physico-Chemical properties of the Ganga river at hajipur, Bihar has been depicted in table 1 to Y. Water temperature was vary between 17.1°C (January 2018, site X) to 29.48°C (July 2018, site Z). The pH value varied from 6.8 (June 2018, site Y & May 2019, site Y) to 7.9°C (December 2018, site Z & December 2019 site Z). The TDS value observed 120mg/l (February 2019, site Z) to 158mg/l (September 2018, site X). Water is more turbid during rainy season. The turbidity value ranged from 54 (January 2018, site Y) to 89 (August 2019, site Z). The water is slightly acidic in rainy season. it is very rich in conductivity that value ranged from 368 μ s/cm(June 2018, site X). In dissolved oxygen control from 4.6(September, site Z) & 7.8 (December 2018, site Y).

Table- 1 : Average monthly variation in Temp. (°C), pH(μ s/cm) and TDS (mg/l) of 3 Ganga river at Hajipur, Bihar.

Where as :
 X- Konahara ghat
 Y- Muktidham ghat
 Z- Tehrasiya ghat

Months	Temp. (°c)			pH			TDS((mg/l)		
	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2017	22.1	25.5	24.2	7.3	7.1	7.6	153	142	134
Dec-2017	18.2	19.8	25.4	7.3	6.9	7.8	156	146	131
Jan-2018	17.1	19.5	21.3	7.6	6.9	7.3	148	144	130
Feb-2018	19.6	18.4	19.8	7.5	7.2	7.5	149	138	122
Mar-2018	22.2	21.5	21.9	7.2	7.3	7.7	152	132	126
Apr-2018	28.3	25.6	26.5	7.3	7.4	7.6	156	136	128
May-2018	28.8	27.7	28.2	7.2	6.9	7.5	152	138	132
Jun-2018	27.5	28.5	29.4	7.5	6.8	7.5	155	140	130
Jul-2018	29.6	28.7	29.8	7.6	7	7.4	148	142	126
Aug-2018	29.1	26.8	28.5	7.4	7.1	7.7	155	137	122
Sep-2018	28.8	29.2	25.7	7.6	7.2	7.8	158	138	128
Oct-2018	27.5	28.4	28.2	7.7	7.4	7.6	152	141	126

Table- 2 : Average monthly variation in Temp.(°C), pH(μ s/cm) and TDS(mg/l) of 3Ganga river at Hajipur, Bihar.

Months	Temp. (°c)			pH			TDS((mg/l)		
	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2018	19.8	27.2	26.7	7.6	7.1	7.6	152	140	130
Dec-2018	19.5	29.3	18.9	7.6	7	7.8	150	145	132
Jan-2019	18.8	19.5	19.5	7.5	7.1	7.5	158	142	134
Feb-2019	21.5	21.9	19.9	7.3	7.1	7.7	156	135	120
Mar-2019	22.8	26.7	23.8	7.4	6.9	7.7	148	138	126
Apr-2019	27.9	28.8	27.2	7.3	7	7.5	142	141	128
May-2019	28.2	29.2	28.8	7.1	6.8	7.4	144	138	130
Jun-2019	26.9	29.2	28.9	7.1	6.8	7.4	149	132	131
Jul-2019	28.2	25.9	29.2	7.6	7	7.3	146	130	128
Aug-2019	29.5	26.2	29.1	7.5	7.1	7.6	152	134	130
Sep-2019	28.7	29.8	29.1	7.5	7.1	7.7	156	137	132
Oct-2019	28.2	27.7	28.8	7.7	7.3	7.7	148	142	128

Table- 3 : Average monthly variation in Turbidity, Conductivity and Dissolved Oxygen Ganga river at Hajipur, Bihar.

Where as : X- Konahara ghat
Y- Muktidham ghat
Z- Tehrasiya ghat

Months	Turbidity			Conductivity			Dissolved Oxygen		
	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2017	68	59	65	360	330	310	6.5	7.1	5.8
Dec-2017	65	55	67	260	350	315	6.8	7.6	5.9
Jan-2018	55	54	69	268	350	330	6.7	7.4	5.9
Feb-2018	58	58	58	288	280	288	6.9	7.2	5.7
Mar-2018	59	66	59	280	276	269	5.8	6.8	5.3
Apr-2018	68	68	68	265	270	262	5.7	6.7	5.2
May-2018	65	65	71	275	262	272	5.8	6.5	5.3
Jun-2018	63	66	73	260	268	285	6	6.6	5.1
Jul-2018	72	68	78	280	275	270	5.1	5.8	4.8
Aug-2018	75	75	80	276	280	281	5.2	5.7	4.6
Sep-2018	78	72	82	266	262	285	5.3	5.5	4.8
Oct-2018	80	78	85	288	285	277	5.3	5.6	4.9

Table- 4 : Average monthly variation in Turbidity, Conductivity and Dissolved Oxygen Ganga river at Hajipur, Bihar.

Months	Turbidity			Conductivity			Dissolved Oxygen		
	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2018	68	59	62	358	320	310	6.8	7.8	6.2
Dec-2018	62	58	68	360	350	330	6.6	7.8	6.3
Jan-2019	64	65	65	362	352	345	6.7	7.6	6.8
Feb-2019	65	60	64	385	290	292	6.7	7.5	5.8
Mar-2019	72	69	72	258	270	268	6.2	7.1	5.5
Apr-2019	74	74	74	292	282	274	6.1	7	5.3
May-2019	73	69	72	298	288	280	6.1	7.2	5.2
Jun-2019	72	73	78	280	284	282	6.3	7.1	5.1
Jul-2019	78	79	85	286	282	272	5.8	6.6	5.1
Aug-2019	82	78	89	288	272	271	5.7	6.8	4.8
Sep-2019	83	78	87	262	278	270	5.8	6.5	4.6
Oct-2019	85	82	85	266	265	277	5.5	6.3	4.7

Discussion

Temp. : Temperature is an universal factor and change in it may the hydrobiology of the waterbodies (Prasad, 2002). Water temp. Is affected by ambient temp. (M unaware, 1970) as well as planktons present in the water body.

Turbidity: Water is clear and transparent during winter due to low turbidity. During summer it becomes turbid due to low water level and decomposition. During monsoon it becomes highly turbid due to silt and organic matter which enters into the system through surface runoff.

Conductivity : The conductivity of water depends on ion present in water. conductivity reflects the nutrient status of the water and distribution of macrophytes. (crowder et al. 1977. sinha, 1995 , 2002) minimum conductivity during winter may be due utilization of ion by the growing biotic conductivity during summer may be due to decomposition of macrophytes and dead animals.

pH (Hydrogen pon concentration) :

pH measurement gives the intensity of acidic or basic character of water has significant role in survival of aquatic planktons (sinha 1995). pH shows no significant acidic range munshi et al. (1993) have also reported slight of North Bihar, pH variation throughout the study period is 7.1 to 7.9 and it circumneutral in nature.

Dissolve Oxygen :

The solubility of dissolve oxygen in water depends on physical, chemical and biological activities and plays a vital role in distribution and abundance of phytoplankton. Dissolve oxygen also provide valuable information about the biological and chemical reaction going in water and it is a measure of one of the important environmental factors affecting aquatic life and the capacity of water to receive organic matter without causing nuisance (Wetzel, 1991; pillai et al, 1999, Sinha 1985, 2002). The do was in lower

range during summer due to low volume of water and increase in the number of macroinvertebrates per unit area which consumes oxygen for their respiration. Higher value of Do were observed in winter primarily due to high photosynthetic activity by the planktons.

TDS :

TDS full form is total dissolved solids. Minerals, salt or dissolved minerals such as calcium, chloride, nitrate, iron, sulfur and some organic matter that dissolved in water commonly referred as TDS. TDS expressed in terms in milligrams (mg) per lit of water, also referred in parts per million (ppm) affect the water test.

Conclusion

The Physico-Chemical analysis of water reveals that water of all of three sites i.e., (x) Konahara ghat, (y) Muktidham ghat and (z) Tehraisiya ghat in Ganga river, hajipur is very rich and suitable for macroinvertebrates and planktons. The data also revealed that the important parameters were within favorable range for macroinvertebrates. Therefore, the maintenance of a healthy aquatic ecosystem is dependent on the physico-chemical properties of water and biological activity, so the monitoring of the river water is mark the trend pattern of pollutants and their effect on living organism.

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