DOI:10.33451/florafauna.v23i2pp359-362

FLORA AND FAUNA ISSN 2456-9364 (Online)

2017 Vol. 23 No. 2 PP 359-362 ISSN 0971 - 6920 (Print)

PHYSICO-CHEMICAL ASPECTS OF YAMUNA RIVER AT GOKUL BARRAGE, MATHURA (UP) INDIA

AJAY KUMAR RAJAWAT AND PRAVEEN KUMAR*

Department of Chemistry,
R.B.S. College, AGRA (U.P.) INDIA
*Department of Zoology,
B.S.A. College, MATHURA (U.P.) INDIA
* Corresponding Author
Email : pk_sharma75@yahoo.com

Received : 16.07.2017; ***Revised*** : 14.08.2017; ***Accepted*** : 13.09.2017

ABSTRACT

An attempt has been made to study the Physico-chemical condition of water of Yamuna River at Gokul Barrage, Mathura, (UP). The time period of study was July 2015 to June 2016. Three water samples were selected from different sites in each month for study. The parameters studied were Temperature, Turbidity, pH, DO, BOD, COD, Total Dissolved Solids and Suspended Solids. Almost all the parameters were found above the tolerance limit.

Figure : 00 References : 14 Table : 01

KEY WORDS : B.O.D., C.O.D., D.O., Effluents, Pollutants, Pollution, TDS, TSS, Turbidity.

Introduction

Water pollution is one of the most burning problems today. The unwanted substances are being regularly added to our environment, making it unsafe to live. Population growth, rapid economic development, industrialisation and unconscious human activities are slowly transforming our planet into a rotten place. Mathura (U.P.) is a one of the most historical and holiest place of India, being the birth-place of Lord Krishna, millions of pilgrims visit Mathura every year and use to take bath in the holy river Yamuna. Their stay in the city causes a severe sewage and garbage disposal problem. The sewage along with the garbage is disposed off either directly or indirectly into the river Yamuna through a number of wide drains and results in heavy water pollution.

Furthermore, Mathura is a fast developing city. A number of small and large industries are working here, which use very fast, harmful and non-biodegradable chemicals like sulphuric acid, silica powder, hydrochloric acid, detergents including alkyl benzene sulphonate and linear alkyl sulphonate and several dyes containing cyanides, arsenic, cadmium, mercury and led compounds. Their menacing effects have been manifested in the form of the death of thousands of aquatic organisms.

Materials and Methods

The sampling was taken in second week of each month in glass bottles with capacity 300 ml. The physico-chemical parameters of the water were determined on the spots, with the help of 'Portable water detection kit' (Model no. CK-710, manufactured by 'Century Instruments Pvt. Ltd., Chandigarh). The temperature was measured on the spot by using temperature sensitive electrodes of the portable water detection kit. Other physico-chemical parameters from samples were determined in the laboratory[1]. The results were compared with standard permitting parameters[14].

Results and Discussion

Temperature –

Temperature is one of the most valuable physical factor which regulates the natural processes of the environment. It was recorded in accordance with the seasonal changes. It ranged

TABLE -1 Physico-chemical parameters of river Yamuna from july 2015 to June 2016

(Average value of three sites)

Parameters	Units	Rains				Winters				Summers			
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Temperature	oC	30.2	29.4	24.8	22.0	22.1	19.4	16.6	21.4	23.3	27.4	34.1	35.6
Turbidity	NTU	126	128	97	115	88	101	68	91	83	77	85	133
pH	…	7.2	7.3	7.5	8.1	8.4	7.8	8.4	7.8	7.6	8.4	8.5	7.7
D.O.	Mg/lit.	2.1	2.2	4.2	6.5	3.1	9.4	8.3	4.5	9.8	6.6	2.7	1.9
B.O.D.	Mg/lit.	37.2	33.9	8.2	8.6	19.3	6.1	5.8	18.5	12.6	21.9	42.1	45.0
C.O.D.	Mg/lit.	43.5	24.5	14.8	18.9	31.1	18.1	12.6	32.4	18.1	56.1	13.9	58.0
T.D.S.	Mg/lit.	603	475	501	512	623	541	432	523	658	595	601	670
T.S.S.	Mg/lit.	426	398	435	435	459	503	356	461	432	433	511	502

between 16.6–35.6ºC. It was higher in May, June and July and lower during winter months *i.e.* December and January.

Turbidity –

It is the one of the common ways to measure the extent of the pollution. It is generally caused by untreated and undecomposed organic matter, sewage and industrial waste. It was very high in July and August because of the 'Janmashtami' and Shravan Maas' when there is a mass gathering in the city and millions of peoples take bath in Yamuna river. It was noted minimum 68 NTU and maximum 133 NTU.

pH –

pH shows the acidic or alkaline nature of water. The water of river Yamuna was found slightly alkaline. It ranged between 7.2-8.5. It showed similar trend to earlier workers[2,3,5-7,13].

Oxygen :-

Dissolved oxygen is essential for the decomposition of chemical waste and dead organic matter. It shows variable trend. It was maximum in winter but lower in summer. It ranged between 1.9 -9.8 mg/l.[4].

BOD :-

BOD is the amount of oxygen required by living aquatic organisms for their physiological process. It was found very high in summer and comparatively low in winter. It ranged between 5.8-45.0 mg/l. The findings were similar[5].

COD :-

It is the amount of oxygen required for the decomposition of chemical waste. A high value of COD shows a higher accumulation of organic waste in the pond. It was found higher during summer (58.0 mg/l) and lower during winter (12.6 mg/l). Which was in accordance with the observations preisacs[8,9].

TDS :-

Total dissolved solids also serve as indicator of pollution. Trend was found to be highly fluctuating. It ranged between 432 - 670 mg/l.[10,12]

TSS :-

Total suspended solids were found very fluctuating. TSS were higher in summer and lower in winter and ranged between 356 - 511 mg/l. The findings were similar[6,10,11].

Summary and Conclusion

From the above observations it was concluded that Yamuna river is highly polluted and the use of its polluted water may cause various diseases. Remedial measures are required to sustain the good quality of water and also to save the life of people.

References

1. APHA (1992) "AWWA. WFCW in Standard Method for the examination of water and waste water. American Public Health Association, New York.
2. DAKSHINI, K.M.M. AND SONI, J.K. (1979) 'Water quality of sewage drains entering Yamuna at Dehli'. *Ind. J. Env. Hlth.,* **21** (4) : 354-360.
3. GUPTA, S. (2016) Assessement of pollution hazards in ponds at Banda (UP) India. *Flora and Fauna* **22** (2) : 235-240
4. KUMAR, PRAVEEN AND SHARMA, H.B. (2004) 'Studies on fluctuating trends in some aquatic micro-organisms of Radha Kund at Mathura. *Flora and Fauna,* **10** (1) : 22-24.
5. KUMAR, PRAVEEN AND SHARMA, H.B. (2005) 'Physico-chemical characteristics of lentic water of Radha Kunda (District Mathura)'. *Ind. J. of Env. Sc.* **9** (1) : 21–22.
6. MATHUR, A.,SHARMA, Y.C., RUPAINWAR, D.C., MURTHY, R.C. AND CHANDRA, S.V. (1987) 'A study of river Ganga at Varanasi with special emphasis on heavy metal pollution'. *Poll. Res.,* **6** (1) : 37-44.
7. RATAN, N., SRIVASTAVA, S., PATHAK, A. AND SINGH, U.N. (2017) Water quality of Parichha dam reservoir in relation to fisheries in Jhansi (UP) India. *Flora and Fauna* **23** (1) : 95-98.
8. REDDY, M. AND VENKATESHWARALU. P.V. (1985) 'Ecological studies in the paper mill effluents and their impact on river Tungabhadra : Heavy metals and algal'. *Proc. Ind. Acad. Sc. (Plant Sci.),*

1985(3) : 139-146.

9. SANGU, R.P.S., PATHAK. P.D. AND SHARMA, K.D. (1983) 'Monitoring of Yamuna river at Agra'. Proc. of the Nat. Confr. On river Poll. And human health.

10. SAXENA K.K. AND CHAUHAN, R.R.S. (1993) 'Physico-chemical aspects of pollution in river Yamuna at Agra'. *Poll. Res.,* **12** (2) : 101-104.

11. SHAJI, C. AND PATEL, R.J. (1991) 'Chemical and biological evaluation of pollution in the river Sabarmati at Ahemadabad, *Gujrat Phycos'.* **30** : 981-1000.

12. SIDDIQI Z.M., PANESAR, R.S. AND RANI, S. (1994) 'Bio-chemical effect on few sewerage disposal on the water quality of Sutlez river'. *I.J.E.P.,* **14** (10) : 740-743.

13. SINGH J.P., YADAV, P.K. AND SINGH, L. (1988) 'Pollution status on Sangam and its adjoining river before the Kumbh Mela at Allahabad'. *I.J.E.P.,* **8** (11) : 839-842.

14. WHO (1984) 'International Standard for water.' Third Ed. Geneva.