Jr. of Industrial Pollution Control 24 (1)(2008) pp 1-8

COMPARATIVE STUDIES OF D.O, B.O.D AND C.O.D OF GODAVARI RIVER AT NANDED AND RAJAHMUNDRY

V. SRINIVASARAO AND A.M.KHAN*

Department of Chemistry, Aditya College, Kakinada (A.P), India
Department of Chemistry, Science College, Nanded, M.S., India

Key words : Sewage pollution, River water quality, D.O, BOD and COD.

ABSTRACT

The result of chemical characteristics such as Dissolved Oxygen, Biochemical Oxygen Demand and Chemical Oxygen demand during the period of Jan 2000 to Dec 2000 at Nanded (Maharastra) and Rajahmundry (A.P) & was presented and the investigation reveal that Godavari River at Nanded was more polluted than Rajahmundry. This is the first report of this kind

INTRODUCTION

The rivers, which are the lifelines of our culture and economy, are dying because of severe pollution .In India all the 14 major rivers and their tributaries have been polluted. Nearly 70%of water is polluted due to rapid Industrialization and domestic sewage etc. The Godavari River is also contaminated with the discharge of industrial effluents and domestic sewage. Therefore, the present study was under taken to ascertain the quality of Godavari River water at Nanded and Rajahmundry cities. It was observed that Godavari River at Nanded stations was more polluted than Rajahmundry due to the presence of industrial effluents and domestic sewage. The physico-chemical characteristics of various rivers has been studied by many co-workers like Chakraborty *et al.* 1959; Rai, 1974; Chetana Suverna, 1997 and Bhargava Nandan, 1996. Determination of dissolved oxygen is a measure of oxygen present in water. B.O.D is measure of oxygen required to oxidize the organic matter through microscopic organism where as chemical oxygen demand is a measure of oxygen required to oxidize the organic matter by strong oxidant. In a healthy river sufficient oxygen for microbial degradation of organic matter is essential to sustain its water quality. Insufficient oxygen availability will lead to anaerobic break down of organic matter producing foul smell and consequent impact on water quality and biodiversity. Present study was under taken to monitor the three key parameters of lotic ecosystem i.e. D.O, B.O.D and C.O.D at three stations in Rajahmundry, Andhra Pradesh during the period January 2000 to December 2000.

Locations of sampling points

Godavari river often described as Dakshin (Deccan) Ganga at Rajahmundry was denoted as SN and SR. Three sampling points were named as SR1 (Dowleswaram located 10 kms away from Rajahmundry), SR2 (Pushkar Ghat, Rajahmundry) and SR3 (Kumardevam located 10-15 kms away from Rajahmundry) respectively. Nanded station was denoted as SN and three sampling points were taken at Nanded and named as SN1, SN2 and SN3 respectively.

Author for correspondence : V. Srinivasarao ; Email - pavancnu@rediffmail.com

MATERIALS AND METHODS

Water samples were collected from each point once in a month for a period of one year i.e., January to December 2000 between 8 to 10 am at monthly intervals. Dissolved Oxygen (DO) of water was analyzed by Winkler's Method (APHA 1989). To determine the B.O.D samples were incubated at 20^o C for 5 days and C.O.D was carried out according to standard methods (APHA, 1989).

RESULTS AND DISCUSSION

In the present investigation, the range of Dissolved Oxygen over a Period of one year from Jan 2000 to Dec 2000 was found to be high at Rajahmundry stations when compared to Nanded stations shown inTable 1. Dissolved Oxygen content was found to be minimum during the summer season and maximum in winter seasons. It was observed at all six stations. The low values of Dissolved Oxygen at Nanded stations are due to high temperature, low solubility of gases and also mainly due to organic matter, Industrial wastes, run off agricultural lands etc. The oxygen balance of an aquatic environment plays an important role in pollution. It was observed that increase of chlorophyceae in summer season at both stations, but it has a positive correlation with D.O but the chlorophyceae content is less in winter. Due to heavy pollution Singh *et al.* 1999, recorded high values of C.O.D. Boyd (1973) showed that the B.O.D values were positively related to C.O.D. which was mainly due to increase in organic matter and Industrial effluents. At Nanded station High values of B.O.D. was recorded in the summer season. This may be because of high pollution load and reduced water flow. Upadhyay and Rana, 1991 observed the similar trend in the river Jamuna at Mathura in Uttar Pradesh, India. Bandela *et al.* (2002) reported the values of B.O.D. were maximum (11.1 ppm) in the monsoon and minimum (3.2 ppm) in the winter. The C.O.D values also were found to be maximum in summer season. The COD is linked with heavy pollution from paper industries, domestic sewage, Industrial effluents on the bank of the river and reduced water flow in summer. Present observations are in agreement with earlier studies as reported by Singh *et al.* (1991) and Surve, *et al.* (2005). The C.O.D values were also found to be maximum at Nanded stations than Rajahmundry stations. It is due to the presence of strong alkali, domestic sewage, Industrial effluents and reduced water flow. This was in accordance with the observation recorded by Singh et.al., 1991. Comparing the observations with the permissible limits (BIS & WHO 1982), it is noted that the Godavari river water is permissible for drinking, bathing and even survival of aquatic life.

To summarise, the studies indicate that the river water quality along Rajamundry city is in permissible limits due to high level DO and consequent low B.O.D and C.O.D values.

Table 1. The results of chemical characteristics in mg/L (2000)

Parameters	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
D.O	SN1	8.6	6.8	6.8	6.1	6	6.0	6.6	7	7.4	8	7.4	7.6
	SN2	3.2	2.9	2.8	2.6	2.4	3.0	3.4	3.9	4.1	3.6	3.9	4.1
	SN3	3	2.8	2.7	2.5	2.2	2.8	3.2	3.7	4.0	3.2	4.2	3.6
	SR1	7.8	7.9	7.7	6.2	6.1	6.5	6.9	8.0	7.2	7.1	7.2	7.7
	SR2	8.3	8.0	7.5	6.6	6.1	6.6	6.8	7.9	7.5	7.8	7.4	7.2
	SR3	7.6	7.5	8.5	6.2	6.1	6.9	7	7.6	7.6	7.5	7.7	7.8
B.O.D	SN1	5	5.3	6.0	6.4	4.4	3.8	4.6	5.8	5.0	4.8	5.0	5.3
	SN2	50	54	60	60	61	52	53	60	52	49	49	52
	SN3	45	56	60	64	67	55	54	62	54	50	50	49
	SR1	4.0	4.6	4.5	4.9	7.0	6.9	6.0	6.5	8.0	5.8	5.7	6.8
	SR2	4.6	4.5	4.2	4.1	4.1	4.3	4.6	5.2	6.8	6.8	5.2	6.0
	SR3	3.8	3.4	3.0	4.0	5.8	10.8	9.0	5.0	4.1	3.6	3.9	4.0
C.O.D	SN1	31.6	39.8	43.8	40.8	135	43.4	25.6	30	36.1	36	38	34.2
	SN2	84	56.1	95.8	102	238	108	58	53	57.4	65	68	78
	SN3	90	61	103.6	145	249	112	61	55	69.8	66	76.6	85
	SR1	10.2	10.5	8.4	6.1	7.1	8.4	8.5	7.6	7.5	9.1	10.2	11.6
	SR2	12.2	11.8	9.5	8.8	8.1	8.0	6.4	9.5	9.0	8.5	7.9	6.8
	SR3	9.6	9.4	7.0	5.0	7.0	7.1	8.4	8.2	7.8	7.2	8.5	8.2

REFERENCES

Ahmad, A. and Alam M. 2003. Physico-chemical andtoxicological studies of industrial effluents in and around Delhi and groundwater quality of some areas in Delhi city. *Cheml Environ Res.* 12 (1& 2) : 5-13.

Charu, P., Savita, D. and Rajnish Shrivastava, 2006. Seasonal variations in Physico-chemical characteristics in upper lake of Bhopal *Asian J. Exp. Sci.* 20 (2) : 297-302.

Chakrabarthy, R.D., Ray, P. and Singh, S.B. 1959. A quantitative study of the plankton and the physico-chemical condition of the river Jamuna at Allahabad in 1954-1955. *Indian J. Fish.* 6 (1) : 186-203.

Dey Kallol, Mohapatra, S.C. 2005. Assessment of water quality parameters of the river Brahmani at Rourkela. *J Indl Polln Contl.* 21 (2) : 265-270.

Rai, H. 1974a. Limnological studies on the river Yamuna at Delhi, India Part I. Relation between the chemistry and the state of pollution in the river Yamuna. *Arch. Hydrobiol.* 73 (3) : 369-393.

Saksena, D.H. and Mishra, S.R. 1988. Characteristic of waters from industrial complex of Birlanagar, Gwalior. *I.A.W.P.C. Tech. Annual.* 15 : 163-167.

Saxena, K.L., Khijani, S.D. and Ramkrishnan, S.K. 1978. Setting studies on pulp and paper mill waste waters. *Indian J. Environ. Hlth.* 20 (3) : 273-283

Surve, P.R, Ambore, N.E. and Pulle, J.S. 2005. Study of physico-chemical characteristics of Derla dam water, district Nanded, M.S., *India. Ecol envir Conserv.* 11 (1) : 87-90.

Singh, J.P., Yadav, P.K., Singh, Sakun, Prasad, S.C. 1991. BOD contamination in Kali river at Sadhu Ashram in Aligarh. *Indian J Environ Prot.* 11 (5) : 325-326.

Somshekhar, R.K. 1984. Studies of water pollution of river Cauvery physico-chemical characteristics. Intern. *J. Environ. Studies.* 23 (3) : 209-216.

Upadhyay, R.K.and Rana, K.S. 1991. Pollutional status of river Jamuna at Mathura. *Nat. Enviro.* 8 : 33-37.