Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4625 - 4629
Received 20 January 2021; Accepted 08 February 2021.

Physico-Chemical Parametersanalysis of Water Samples Collected from Gandigudem and Kistareddypet Water Bodies Hyderabad, Telangana, India.

Vidyullatha. G[1], Prof. NirmalaBabu Rao[1], Dr. O. Padmaja[2]

1. Department of Environmental Science, University College of Science, Osmania University, Tarnaka, Secunderabad, Telangana, India
2. Department of Botany, TARA Degree College, Sangareddy, Telangana, India.

ABSTRACT:

After the water samples were obtained, some physico-chemical properties of the water were determined at the sampling locations, such as water temperature, pH, BOD, COD, DO, TDS, total hardness, chlorides, nitrate, phosphate and total alkalinity. All samples were transported in ice cartons to the lab for analysis. They were sampled and then analysed within a certain time frame. The anthropogenic activities such as disposal of sewage and industrial effluent, recreational activities, excess fertilization of land and the use of pesticides have threatened environmental health of surface water. Deterioration of water quality and the fast depletion of water resources is the main challenge which needs an immediate solution. It not just goes about as an enhancement to the physico-chemical qualities, yet additionally gives valuable data about the general soundness of a water body.Temperature values between 20°C and 40°C, pH 0.16 to 8.4, BOD values 2 to 220 mg/l, COD values 4 to 841 mg/l, DO values 1 to 11 mg/l , TDS 430 to 6622 mg/l, , Total hardness 221 to 1702 mg/L, chlorides 115 to 2914 mg/L, nitrate 2 to 50 mg/L, Phosphate 0.1 to 10 mg/L and Total alkalinity 93 to 1452 mg/L.

Keywords: Deterioration of water quality,Soundness of a water body,Pesticides,Sewage water

INTRODUCTION:

Of all the natural resources, water is unarguably the most fundamental and valuable. It is the solution of life, a valuable endowment of nature to humankind and a huge number of different species living on the earth. Life started in water and life is sustained with water. It is a widespread solvent and as a solvent it gives the ionic equalization and nutrients, which bolster all types of life (Biswajit, 1998). Water of good drinking quality is of fundamental significance to human physiology andman's proceeded with presence relies especially upon its accessibility. Water is likewise fundamental for farming, industry and human presence. The solid amphibian environment is relied upon the physico-chemical attributes of water (Venkatesharaju et al 2010). Great nature of water resources relies upon an enormous number of physico-chemical parameters qualities. During the most recent couple of hundreds of years the relationship of man with the environment radically changed. Quick industrialization influences the environment everyonce in a while (Vikal and Tyagi, 2007; Panda et al., 2009). Water pollution is a significant worldwide issue. It happens when poisons are released straightforwardly or in a roundabout way into water bodies without satisfactory treatment to evacuate unsafe mixes. Physico-chemical investigations of water give a decent indicator of the chemical nature of the oceanic system. It not just goes about as an enhancement to the physico-chemical yet additionally gives valuable data about the general soundness of a water body.

MATERIALS AND METHODS:

The present investigation was made for the assessment of physico-chemical characteristics of Gandigudem tank and Kistareddypet tank at Hyderabad, Telangana, India. The study was conducted during January 2014 to December 2014.

Physico-chemical Parameters

1. Temperature - Temperature of Tank water was recorded by means of Celsius thermometer at the time of sampling and expressed in degree centigrade (0C).

2. pH- By pH meter

3. Alkalinity - Titration method was used to estimate the dissolved alkalinity of water samples. 100 ml of sample is taken in two conical flasks. 0.5 ml of phenolphthalein indicator is added to one flask, other flask being control. If the sample becomes pink, titrate it with N/50 H2SO4 until the pink colour just disappears. Add two drops of methyl orange indicator in both the conical flasks and titrate one with N/50 H2SO4. The end point is orange (compared with control). Record the ml of acid used both in phenolphthalein and methyl orange titration.

Total Alkalinity (mg/l) = No. of ml of N/50 H2SO4 consumed X 1000
ml of sample

4. Dissolved Oxygen (DO) - Titration method was used to estimate the dissolved oxygen. Manganesesulphate (1 ml) and alkaline iodide (1 ml) reagent mixed to the 100 ml sample bottle. A flocculent precipitate formed. 1.0 ml of conc.H2SO4 added to dissolve the precipitate. 50 ml of this solution is transferred to a conical flask and titrated by 0.025 N Na2S2O3 till the colour turns pale yellow. Then added starch solution (1 ml) to give a blue colour and the titration is completed by turning it colourless.

Dissolved Oxygen (mg/l) = No. of ml of Na2S2O3 solution X 4

5. Biological Oxygen Demand (BOD) - BOD is the amount of oxygen taken up by microorganisms that decompose organic waste matter

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4625 - 4629
Received 20 January 2021; Accepted 08 February 2021.

in water. It is, therefore, used as a measure of the amount of certain types of organic pollutant in water. Standard BOD determination is done by incubating samples for 5 days at 200C.

BOD (mg/l) = DO (initial) – DO (5 days)

Decimal fraction of dilution

6. Chemical Oxygen Demand (COD) – The COD of the water represents the amount of oxygen required to oxidize all the organic matter both biodegradable and non-biodegradable by a strong chemical oxidant (KMnO4).

50 ml of water sample and 50 ml of distilled water (blank) taken in conical flask and 5 ml of KMnO4 is added to both flasks. Both the flasks were heated on a waterbath at boiling point for one hour. After cooling 5 ml of potassium iodide (10%) and 10 ml of H2SO4 (25% v/v) were added to both flasks. Both flasks titrated with 0.1 N sodium thiosulphate using starch as indicator.

COD (mg/l) = (B-S) X N X 8 X 1000

Sample volume in ml

B = Volume of titrant used in blank

S = Volume of titrant used in sample

N = Strength of the titrant

7. Chloride – Mohr's method was applied for the determination of the chloride present in the sample water. The water was titrated with silver nitrate using potassium chromate as an indicator. The chloride content was calculated using the following formula

Chloride (mg/l) = (a-b) X N X 35.45 X 100

ml sample

a = volume of AgNO3 used for the sample

b = volume of AgNO3 used for the blank

N = normality of AgNO3 (0.0141 N)

8. Phosphate – 50 ml of the sample taken and 2 ml of acid- ammonium molybdate reagent added. Then added 2 drop of stannous chloride, and waited for 5 minutes and the blue colour developed is matched with standards prepared in phosphate free distilled water.

Phosphate (mg/l) = No of ml of standard phosphate X 0.01 X 20

9. Nitrate – The phenol disulphonic acid method was applied for the analysis of nitrate-nitrogen. The steam dried water samples were dissolved in phenol disulphonic acid (2 ml). The alkaline medium was made by adding ammonium hydroxide (10 ml). The development of yellow colour denoted presence of nitrate-nitrogen. The colour intensity was proportional to the amount of nitrate-nitrogen and was measured with the help of colorimeter at 410 nm in terms of optical density. The final calculations were made with the help of standard graph.

10. Total Dissolved Solids- Presence of total dissolved solids in the sample water was estimated by evaporation dish at 103o c. The amount of total dissolved solid was calculated by determining residue. The calculation was carried 49 out by the following formula –

Wt. of residue X 1000 Total Dissolved solids (mg/lit.) = ml. of Sample

11.Total Hardness- Hardness of water was determined by EDTA method as described in APHA (1989). The pH of the sample was increased to 10 with the help of ammonium with the buffer solution. Erichrome Black T indicator was added in this alkaline water sample, which forms a winered complex of calcium and magnesium. The solution was titrated with std. EDTA solution. The EDTA breaks the complex and forms blue colored complex. The end point was permanent blue color. The amount of EDTA solution required was noted. The hardness of water sample was calculated by using following formula.

Total hardness as $CaCO_3$ (mg/l) = (B X 1000) / V

TABLE 1: PHYSICO- CHEMICAL PARAMETERS OF GANDIGUDEM TANK

	JAN-2014	FEB-2014	MAR-2014	APR-2014	MAY-2014	JUN-2014	JULY-2014	AUG-2014	SEP-2014	OCT-2014	NOV-2014	DEC-2014
Water Temp. (^OC)	25	25	29	30	35	40	33	31	25	25	31	26
DO (mg/L)	6	5.2	5	4.6	4.5	5	3.3	4	5	4	6	11
pH	8	7.9	8.6	8	7.86	8	8.1	7.5	6.8	7.5	0.16	7.2
BOD (mg/L)	2	3	5	7	9	13	70	71	2	18	15	22
Nitrate-N (mg/L)	5	7	6	7	8	11	5	7	2	7	7	6
Total Alk. (mg/L)	200	410	470	280	340	420	123	185	124	---	161	93
Chloride (mg/L)	610	590	530	865	1045	1882	1050	871	115	921	1060	1030

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4625 - 4629
Received 20 January 2021; Accepted 08 February 2021.

COD (mg/L)	5	20	40	50	63	70	176	190	9	123	19	190
Hardness (mg/L)	479	621	570	690	830	1022	742	911	221	821	843	875
TDS (mg/L)	1552	1631	2180	2240	2711	3340	2619	2868	430	2595	2688	3970
Phosphate (mg/L)	0.2	0.3	0.3	0.1	0.5	0.32	0.5	0.2	BDL	BDL	6	10

TABLE 2: PHYSICO-CHEMICAL PARAMETERS OF KISTAREDDYPET TANK

	JAN-2014	**FEB-2014**	**MAR-2014**	**APR-2014**	**MAY-2014**	**JUN-2014**	**JULY-2014**	**AUG-2014**	**SEP-2014**	**OCT-2014**	**NOV-2014**	**DEC-2014**
Water Temp. (^{O}C)	25	26	32	30	35	33	31	30	21	26	29	26
DO (mg/L)	2.3	1.9	2	0	Nil	Nil	Nil	Nil	0	1	10	9
pH	7.8	7.6	8	7.8	8	8.4	7.3	7.4	7	7.6	8.1	8.2
BOD (mg/L)	36	80	111	145	220	212	100	82	70	66	20	12
Nitrate-N (mg/L)	26	25	50	41	40	35	11	9	8	15	6.1	7.21
Total Alk. (mg/L)	742	300	460	1284	1452	1350	363	321	155	1402	382	375
Chloride (mg/L)	930	250	422	1820	2052	2914	2366	1891	162	1341	1242	1820
COD (mg/L)	121	298	412	522	841	812	310	22	21	4	109	19
Hardness (mg/L)	862	886	1370	1490	1685	1570	1702	1692	1482	1216	1351	1252
TDS (mg/L)	2671	2942	4715	4640	5241	4880	5691	5182	4542	4437	4692	6622
Phosphate (mg/L)	0.2	1.02	1.2	1	0.9	0.81	0.8	0.7	0.4	6	7	9

DISCUSSION ON TABLES:

1.WATER TEMPRATURE: Temperature is an important factor regulating Physico-chemical operations in the aquatic environment. water temperature range from 25°C to 40°C at tank-1.Water samples from tank-2 found the temperature to be varied, From 21°C to 35°C. The water temperature has changed seasonally. Water temprature value are given in(Table -1,2).

2.pH (APHA 1998): The pH values ranged from 7.0 to 8.5, where most samples were found to be within the permissible pH range of values, which were recommended by various health and pollution control agencies, such as WHO, CPCB, BIS i.e 6.5 to 8.5, at both locations, tested in the study. During the study period the pH of the water was alkaline in all two sites. In most raw water sources the pH tank-1 is between 0.16 to 7.9 pH value (Table n.o-1), tank-2 ranges from 7.0 to 8.4 (Table n.o-2).

3.Biological Oxygen Demand (BOD): A measure of the amount of oxygen in water required by aerobic organisms is known as the Biological Oxygen Demand (BOD) measurement. The biodegradation of organic materials results in an increase in oxygen tension in the water, as well as an increase in the biochemical oxygen requirement (Abida, 2008. The biological oxygen demand (BOD) is the amount of oxygen required by living organisms engaged in the utilization, destruction, or stabilization of organic water at the end of the process (Hawkes 1993). BOD value at tank-1 ranges from 2 to 71 mg/l, tank-2 ranges from 12 to 220 mg/l.(Table n.o-1,2).

4.Chemical oxygen demand (COD): Chemical oxygen demand the measuring of the oxidation of the reduced chemical in water. Chemical oxygen demand (COD). The amount of biological compounds in water is commonly measured indirectly. The COD measurement determines the amount of organic matter found in water. This makes COD an indicator of organic surface water pollution useful (King et al., 2003 and Faith, 2006).The COD measurement determines the amount of organic matter found in water. This makes COD an indicator of organic surface water pollution useful. COD value at tank-1 ranges from 5 to 190 mg/l, tank-2 ranges from 4 to 841.(Table n.o-1,2)

5.Dissolved oxygen (DO): Dissolved oxygen is a major contributor to the health of the stream. Due to bioaccumulation and biomagnification, this failure affects the river ecosystem directly.The oxygen content of water samples depends on various processes of physics, chemistry, biology and microbiology. The lateral, spatial and seasonal changes in DO values are also shown in accordance with industrial, human and thermal activity.DO value at tank-1 ranges from 3.3 to 11, tank-2 ranges from 1to 10 (Table n.o-1,2,)

6.TOTAL DISSOLVED SOLIDS (TDS): The concentration of dissolved oxygen in water indicates the presence of physical and biological processes, and it is an important factor in determining whether aerobic or anaerobic organisms are responsible for biological

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4625 - 4629
Received 20 January 2021; Accepted 08 February 2021.

changes (Gangwar RK). Photosynthetic organisms (Kumar A and Bahadur Y) can produce water oxygen by dissolving oxygen from the air. The natural water consists primarily of carbonate, bicarbonate, chloride, sulphate, phosphate, nitrate, Ca, Mg, Na, K, Fe, Mn, etc., total dissolved solid (TDS) (Esmaeili and Johal,2005). Samples of lake water with high total dissolved solids showed a higher ionic concentration, which is less potable and can cause adverse physical chemical effects in the consumer.Samples of tank water with high total dissolved solids showed a higher ionic concentration, which is less potable and can cause adverse physical chemical effects in the consumer. TDS value at tank-1 ranges from 430 to 3970, tank-2 ranges from 2671 to 6622. (Table n.o-1,2)

7. Total hardness: The total hardness in tank-1 ranged between 221 to 1022 mg/L and in tank-2 ranged between 862 to 1702 mg/L(Table No. 1,2). The total hardness showed maximum values during winter season and minimum value during rainy season. The values of total hardness were moderate during summer months.

8. Chloride: Chloride exists in all natural waters, in fresh waters the sources include soil and rock formations, sea spray and waste discharges. Sewage contains large amounts of chloride, as do some industrial effluents. During the period of investigation chlorides in the tank-1 was ranged between 115 to 1882 mg/L. In tank-2 it was ranged between 162 to 2914 mg/L (Table No. 1,2). During rainy season higher values were recorded where as in winter and summer season less chloride content were detected.

9. Nitrate Relatively little of the nitrate found in natural waters is of mineral origin, most coming from organic and inorganic sources. The observed level of Nitrate in the study area in tank-1 ranged from 2 to 11 mg/lit and in tank-2 the values ranged between 6.1 to 50 mg/lit.

10. Phosphate Phosphorus occurs widely in nature in plants, in micro-organisms, in animal wastes and so on. It is widely used as an agricultural fertiliser and as a major constituent of detergents, particularly those for domestic use. Run-off and sewage discharges are thus important contributors of phosphorus to surface waters. The observed level of Phosphate in study area in tank-1 ranged from 0.1 mg/lit to 10 mg/lit and in water tank-2 was ranged between 0.2 to 9 mg/L (Table No. 1,2)

11. Total Alkalinity (TA) Total alkalinity is the total concentration of the bases in water expressed as part per million (ppm) or milligrams per liter (mg/lit) of calcium carbonate (CaCO3). Total alkalinity of tank-1 water ranged from 93 mg/lit to 470 mg/lit , Whereas in the tank-2 total alkalinity was found in the range of 155 mg/lit to 1452mg/lit.

CONCLUSION:

In the current study, the physico and chemical properties of the Gandigudem and Kistareddypet from the sampling sites selected were analyzed. The following parameters have been determined by the samples water Temperature values between 20°C and 40°C, pH 0.16 to 8.4, BOD values 2 to 220 mg/l, COD values 4 to 841 mg/l, DO values 1 to 11 mg/l , TDS 430 to 6622 mg/l, , Total hardness 221 to 1702 mg/L, chlorides 115 to 2914 mg/L, nitrate 2 to 50 mg/L, Phosphate 0.1 to 10 mg/L and Total alkalinity 93 to 1452 mg/L.

The same samples of alkalinity, total dissolved solids and total hardness were found beyond the allowable WHO limit (1984). The temperature, pH of all samples has been identified aboveWHO's allowable limit. The conclusion is that the water of the water bodies are polluted.

REFERENCES:

1. Duran., Mustafa, and Menderes, S. (2007).Utilization of both benthic macroinvertebrates and physicochemical parameters for evaluating water quality of the stream Cekerek (Tokat, Turkey). *Journal of Environmental Biolology*.28, 231-236 .
2. Jindal, R. and Singh, H. (2006).ecological surveillance of river Beas. Proc. Symp. New Trends in Life Sciences, pp 122-129.
3. Karr, J.R. &Benke, A.C. (2000). River conservation in the United States and Canada. In: P.J. Boon, B.R. Davies and G.E. Petts (Eds), *Global pers*
4. Kowsalya, R., Uma, A., Meena, S., Saravanabava, K., Karrunakaran, C.M. and Raman, M.D. (2010). Assessment of water quality and pollution of Porur Double Lake (Erettaieri), Chennai, *Journal of Industrial Pollution Control.* 26(1), 61-69.
5. Meitei, N.S., V. Bhargava and P.M. (2004). Patil: Water quality of Purnariver in Purna town, Maharastra state. *Journal Aquatic Biolojy*.19, 77-78
6. Panda, R.B., Pradhan, D. and Panda, L.K., (2009).Water quality of Brahmani River an analytical study upstream,midstream International Science Congress Association and downstream at effluent discharge point of Talcher industrial complex, *Journal of Industrial Pollution Control*. 25(1), 37-42.
7. Patil P.R., Patil, S.K., Dhande, A.D. and Pawar, N.S. (2003). Water quality of river Tapti at Bhusawal town, *Indian Journal of Environmental Protection.* 23(6), 620-625.
8. Variya., (2010). Impact of Ganesh Idol Immersion on Tapi River at UmaraOvara. M.Sc. dissertation, Veer Narmad South Gujarat University, Surat.
9. Varsani. (2010). Impact of Ganesh Idol Immersion on Tapi River at Ashwani Kumar Ovara . M.Sc. dissertation, Veer Narmad South Gujarat University, Surat.
10. Venkatesharaju, K., Ravikumar, P., Somashekar, R.K. and Prakash, K.L. (2010). Physicochemical and bacteriological investigation on the river Cauvery of Kollegal stretch in Karnataka. *Katm. University. journal of Science, Engineering and Technology.* 6(1): 50-59.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 2, 2021, Pages. 4625 - 4629
Received 20 January 2021; Accepted 08 February 2021.

11. Vikal, P. &Tyagi, S. (2007). Assessment of water quality of lake pichhola before and after rains in August, 2005 in Udaipur, Rajasthan, *Pollution Research.* 26 (2), 249-252.