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COMPARATIVE STUDY OF WATER QUALITY CHERKA AND BANDHA POND WATER AT RAIPUR CHHATTISGARH INDIA

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ABSTRACT
Surface Water is an important source of water which is commonly used for multiple uses such as in agriculture, drinking purposes, small scale industrial application, and for household works. Due to rapid industrial growth, population explosion, and increased fertilizer application the surface and ground water have been continuously polluted, water pollution is caused by textile industry is mainly by release of waste stream coming out from wet processing operations line scouring bleaching dyeing and painting etc. Due to this chemical pollution the normal functioning of cell is disturbed and this is turn may cause alternation in physiology and biochemical mechanism. In the present study, monitoring and assessment of some physiochemical parameter of different pond water of Raipur area has been carried out to decipher the pollution load in the fresh water ecosystem. Several physiochemical parameters such as turbidity, salinity, total hardness, TDS, DO, BOD, COD, water samples were Analysed for 5 metal Mo, Co, Zn, Fe, Cr.

KEYWORDS: Water quality, Pond water, Agricultural runoff, Urban discharge, Fertilizer release.

INTRODUCTION
Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life. Ground water is used for domestic and industrial water supply and also for irrigation purposes in all over the world. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and the accelerated peace of industrialization.

According to WHO organization, about 80% of all the diseases in human beings are caused by water. Once the groundwater is contaminated, The water quality of freshwater resources is worsening to and alarming extent Anthropogenic activities, land use development, Industrialization, and urbanization severely affect their water quality and in danger the habitat of aquatic organisms.

EXPERIMENTAL ANALYSIS Study Area
Raipur district is located in the centre of the Chhattisgarh state and is bounded by East longitude 8*32’05‖ &. 82*59’05‖ and by North latitudes 19*46’35‖ & 21*53’00‖

We are study at CHHERKA POND, and BANDHA POND, in two different areas in Raipur District of Chhattisgarh and sample was collected by 23/5/2017 at 390C, are one of the largest pond (30.25 ha.) among total 6125/7986 (GROUND WATER BROCHURE OF RAIPUR DISTRICT 2016-2017 PONDS present in the Raipur city, it receives domestic waste and sewage and also used for cloth washing, animal bathing and therefore water quality is fast deteriorating.

MATERIAL AND METHADOLOGY
Sample were collected from POND WATER in plastic bottles and transported immediately to the lab. The temperature of water at site was 380C in the site. The observed values of water sample ere compared with standard values commended by World Health Organization (WHO) and Indian standard: 12500 -2016 for drinking purpose.

It is very essential and important to test the water before it is used to for drinking domestic, agricultural or industrial purpose. Water must be tested with different physical and chemical parameters. Selection of parameters for testing of water is solely depends upon for what purpose we going t use that water and what extent we need its quantity and purity.

Some physical test should be performed for testing of its physical appearance such as temperature, colour, odour, pH, Turbidity, TDS etc., while chemical tests should be performing for its BOD, COD, dissolved oxygen, alkalinity, hardness and other characters. For obtaining more and more quality and purity water.

S.NO	Name of Parameter	Methods of analysis used
1.	PH	Digital PH meter, PH paper
2	Alkalinity	Titration
3	BOD	Microbiological titration/BOD meter
4	COD	Chemical oxidation-reduction, open reflux, closed reflux, COD Disaster
5	Hardness	Titration aa
6	Odour, Colour and Test	Visual verification

Total Dissolve Solid

The term total dissolve solid refers to materials that are completely dissolve in water. Total dissolved solid in water pond was 325 mg/l during rainy season, 385 mg/l during winter season and 487 mg/l during summer season. the concertation is high which may be due to addition of solids from runoffwater. Sewage, municipal effluents and other domestic effluents directly to the pond (Jain et al 1996).

It can be determined by evaporating an aliquot (100 ml) of the filtered sample to dryness and further heating the residue to constant weight at 110+- 10 c after cooling (in desiccator) the dis in weighted.

Total dissolved solid present in 100 ml of water = weight of (dish + residue) - weight of empty dish= w (gms.) TDS (in ppm=

Dissolved oxygen is determined by Winker's method. It is based on the fact that dissolve oxygen oxidizes potassium iodide (KI) to iodine. The liberated iodine is titrated against standard thiosulphate solution (also known as hyposolution) using starch as indicator. Since can't oxidize KI so manganese hydroxide generated by the action of KOH on magnesium sulphate is used as an oxygen carrier to bring reaction between KI and oxygen. Manganese hydroxide, in turn is obtained by the action of KOH on manganese sulphate.

RESULT AND CONCLUSION

S. No	Water Quality Parameters	Water Sample From Different Pond		BIS permissible Values (Requirement desirable limit) as per is 10500-2016	Indian standard
		Cherka Pond	2.Bandha Pond		
1	Taste	Taste less	Taste less	Agreeable	
2	Colour	Light Yellow	Greenish	Transparent	5 Hazan unit
3	Odour	----	----	Unobjectionable	---
4	Temperature	38 C	38 C	----	----
5	Ph	6.7	6.8	6.5 –- 8.5	6.5-8.5
6	Solid	120 ppm	160 ppm		
7	Alkalinity	32 ppm	160 ppm		
8	DO	7.4 ppm	6.72 ppm		
9	COD	0.014 ppm	0.038 ppm		
10	Hardness	304 ppm	326 ppm		300 ppm
11	Chlorine ion concentration	269.8 ppm	127.8 ppm	-----	----

Physical Parameter

Odour, colour and Test

Odour, colour and test of pond water is different because various type if algae, bacteria, fungi, micro- organism and different type of particle and pollutant is present in surface are. colour, Odour and test is depended upon different type of soil particle pond Atmosphere.

PH

The average ph value of the lake water was 7.9 during rainy season, 7,5 during winter season and 7,8 during summer season. The pH of water was relatively high in the summer season and low in monsoon and winter season. However, when the average values for three seasons are taken into account the water body was found to be slightly alkaline. In the present investigation ph values were within the ICMR standards.

Temperature of water

Samples of water were collected from different areas and for each samples the temperature were determined with the help of water analysis kit. The temperature of water sample collected in the month of January and February falls in the range 23 to 25^{0}C it is increasing to know that salinity of water collected from Chherka pond Raipur. Raipur is highest where as it is lowest in the water collected from central Bandha pond Raipur.

Conductivity and Total dissolved solid(TDS)

Water samples were collected from different areas and for each samples the conductivity and T.D.S were determined with the help of water analysis kit. There is variation in conductivity of water collected from five different places. Similarity there is a variation in the value of T.D.S. in all the five samples. I t is interesting to note that when the T.D.S. is highest, the value of

conductivity is also highest and similarly when T.D.S. is lowest the conductivity is also lowest.

In order to find out relationship between these two parameters the co rrleation coefficient was calculated using the following formula Taking value of x_i and y_i from table. The correlation coefficient obtained as 0.96.

Salinity of water
Samples of water were collected from different areas and for each samples the salinity contact where determine with the help of water analysis kit.

Perusal of data given in table reveals that in the water sample salinity is quit low and varies from 0.60 to 0.92 ppt.

Turbidity of Water
Samples of water were collected form different areas and for each samples the turbidity content were determined with the help of water analysis kit perusal of data given in table revels that water sample collected from Bandha pond has lowest (32 NTU) Turbidity whereas the water sample collected from Bandha pond has highest value (52.85 NTU) of turbidity.

The turbidity value of 3 samples are varies in the range 38.11 to 47.51 NTU.

Chloride
Samples of water were collected from different areas and for each samples the chloride contents were determined with the help of water analysis kit.

There is a large various in the chloride ion content of water in 5 sample.

In other hand the waters collected form Bandha pond has the lowest value of chloride ion content which is 35.5 mg/lit to highest value of chloride ion content in water sample content collected form Chherka pond this is 86.90 mg/lit.

Table1: Physio-chemical parameters of measured water samples from different pond water.

S.NO.	Sampling station	Temperature C	PH	Conductivity (mS)	TDS	Salinity (mg/lit)	Turbidity	Chloride
1	Bandha pond	23	7.40	4.04	177	0.61	32	63.90
2	Chherka pond	23.9	7.45	5.94	326	0.74	40.01	86.90

Table 2: Total hardness and total alkalify of measured water samples.

S.NO.	Sampling station	Hardness mg/lit	Calcium mg/lit	Magnesium mg/lit	Total Alkalinity mg/lit
1	Bandha Pond	320	96	46.5	72.5
2	Chherka pond	240	66	45.5	180

Total Hardness
Samples of water were collected from different areas and for each samples the hardness, calcium contents and magnesium content were determined by EDTA titration.

Using the procedure given in below table.

The total hardness of water collected from different places varies in the range 240 mg/lit to 480 mg/lit.

The highest being in the water collected from pond and the lowest pond from Chherka pond, except for samples of Bandha pond the Mg content of water is more or less same.

However, there us variation in calcium content in all the samples.

The measured concentration of total alkalinity in water samples were in the range of 72.5 to 180 mg/lit. The lowest total hardness of 72.5 mg/lit, was found in Bandha pond water and highest concentration of 180 mg/lit was observed for Chherka pond. Table 2

Dissolved Oxygen (DO) and biological oxygen demand (BOD)
Samples of water were collected from different areas and for each samples the DO and BOD contents were determined by WINKLERS method using the procedure given below in table 3.

The DO varies from 2.8 mg/lit to 5.2 mg/lit where as BOD varies from 1.2 mg/lit to 2.7 mg/lit.

Chemical Oxygen Demand (COD)
Samples of water were collected from different areas and for each samples the COD contents were determined by REFLUX method.

Table 3: Shows that DO, BOD and COD values for the measure water samples.

S No	Sampling Station	DO mg/lit	Bod mg/lit	COD mg/lit
1	Bandha pond	5.2	1.2	6.8
2	Chherka pond	3.2	1.4	16

METAL ION
Metal ions contamination in pond water is mainly due to the minerals weathering, sewage discharge agriculture fertilizers and from waste water effluent. Some heaving metals, ions that is Zn and Cu are extremely essential to

human life, but if present in large quantity may cause physiological disorder.

Cd, chromium and lead are highly toxic in trace concentration.

The average heavy metals concentrations in pond water were found to be exceeding the permissible limit as mentioned by central pollution control board.

Table 4: Shows the average metal ions concentration in different pond water.

The main sources of contamination include soil weathering, municipal waste water, urban runoff and industrial wastewaters.

S BI	SAMPLING STATION	METAL IONS				
		Cd	Cu	Pb	Cr	Zn
1	Bandha pond	0.45	0.87	0.50	1.48	1.34
2	Chherka pond	0.57	0.82	1.12	0.98	2,6

CONCLUSION

In the present study line the analysis of water of some ponds at Raipur has chosen in view of their water quality. It is well known fact that takes like chherka and Bandha ponds are being used by the locations for bating, washing and other domestic purposes around the pond and it has become the post of their routine.

These activities eventually leads to the pollution of ponds and if no major steps are then to control these particles then it may be disasters.

The pollutants like soaps and detergents harms the water bodies to a very large extent. It is also observed that people throw the refuges from their kitchen as well as polyethene bags in the ponds as a result of which after some time the water wills not be fit for domestic use and the ponds will dry.

The results are given above and for convenience the ponds. It is observed that the water of bandha pond is more alkaline as compared to Chherka pond whose Ph are respectively.

The concentration of DO in bandha pond and cherks pond is high i.e 2.6 ppm this type of water is not fit for the survival of aquatic animals and plants, there water bodies die to ponds of oxygen there by polluting the water to a larger extent as in this situation the bacterial growth predominates. Such water if consumed by human beings may give rise to water borne diseases which may be fatal.

The total hardness of all the ponds lie within the range. These data depict that the water of these lakes require proper treatment for maintaining the quality of water for public use. Awareness programmes should also be organized so that the ultimately contribute to the better environment.

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