

# Preliminary Physicochemical Analysis Of Various Pond Water In Raipur City, Chhattisgarh, India''

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## Abstract

Water is an essential component of all living organisms. Portable water is essential to humans, animals, plants and other life forms despite providing no calories and no organic nutrients. Water is helping the growth and development of living organisms. Water is also used for all types of daily routines. The present study is on the preliminary physicochemical analysis of pond water in the Raipur area. The samples were taken from the various places of Raipur city ponds, such as Aama Talab, Bhanpuri, Datrega, Daldal Seoni, Urla ponds for preliminary analysis of physicochemical. The collected samples were analyzed for the parameters like Temperature, pH, TDS, Chloride, Alkalinity, Hardness, Ca, Mg, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Dissolved Oxygen (DO). The comparative investigation of physicochemical characteristics of water samples with the BIS standard parameters shows that the improvement of water quality parameters should be carried out periodically to develop the water sources.

**Keyword:** Physicochemical analysis of pond water

## Introduction

Water is the most common component of the living world, vital to all life forms. It is the dispersion medium for all biochemical reactions of the living process and takes part in many of these reactions. Water is the wellspring of vitality and represents the advancement and elements of the universe on the earth. Water, the most crucial need of life, is 97.3% of the world's water, i.e. 1.45 billion cubic Kms. Ocean water is salty and can't be utilized for agricultural, residential and mechanical purposes. Just 13x10<sup>6</sup> cubic Kilometers of water is accessible as a stream, lakes, wells, and tube wells, i.e. 0.6%, 8.5x10<sup>15</sup> m<sup>3</sup> is groundwater, happens in the profundity of 80-135 m beneath the ground surface as water levels diminish step by step. We need to take action to save natural water resources. [5]

Raipur is a faster-growing city in central India. It is located at 21.21° N, 81.38° E and is spread over 269.45 km. Raipur city is the capital of Chhattisgarh. It is located on the main Howrah–Mumbai rail line and National Highway 53. Climate is pleasant and mild in the winter (minimum temperature

10°C, 50°F). There are medium rains in the monsoon season. The summers are sweltering and dry, with a maximum temperature of 48°C (118.4°F) and minimum humidity.[2]

Due to modernization and urbanization, the pollution level increases day by day in Raipur city. The different types of pollutants produced by industries and domestic wastes affect the natural and traditional water sources. [3] These pollutants affect our natural water resources like; a river, ponds, springs etc.

Ponds are the primary source of water in rural as well as urban areas also. Many rural people are dependent on pond water sources for their daily life household works. For example, the people of the village use the water of the pond to bathe the animals and clean the vehicles and other work is also done in the same pond. [4]

### **Material and Methods:**

#### **Study Area:**

Present investigation was carried out for five different pond water located in Raipur city. Raipur is a fast developing city in Chhattisgarh, in eastern central India. The sample was collected from Raipur city are located within the city, ponds are located in about 20 kms of the Raipur city. Near the villages, different industries are located, and their polluted water affects the pond water sources. Villages also connected directly to the city there for domestic wastes also affect the ponds water sources. [6]

#### **Sample Collection:**

Water samples were collected from the 5 location near the Raipur city (Aama Talab, Bhanpuri, Datrega, Daldal Seoni, Urla) ponds in March and April 2019. The pond water was collected in a sterilized glass bottle, taken at temperature during the collection, and then transported to the laboratory MATS University Raipur for physicochemical analysis. [7]

#### **Physicochemical Analysis:**

The pond water sample collected was analyzed for different physicochemical parameters such as Temperature, pH, TDS, Alkalinity, Chloride, Total hardness, calcium, and magnesium was analyzed standard method.[8] The results were compared as per the standard methods of BIS for potable water. The pH determine by pH electrode, TDS was determine by TDS meter, Total hardness, calcium, and magnesium was analyzed by EDTA method, Alkalinity and Chloride analyzed by titration method Therefore, the parameters present in the water sample can be calculated by using various standard methods of BIS. [9]

### **Results & Discussion:**

The physical and chemical analysis of 5 pounds of water located near Raipur city was carried out in different physicochemical parameters summarized in table 2, compression analysis from BIS standard parameter table 1, and data has been interpreted with the help of the statistical tool. [10]

The Temperature range of pond water 28.25 °C TO 32.02 °C (Table 2 & Fig No 1), pH range of pond water 5.6 – 7.95 (Table 2 & Fig No 2), TDS range of pond water 154- 205 mg/l (Table 2 & Fig No 3), Chloride range of pond water 39.9 – 99.91 mg/l (Table 2 & Fig No 4), Alkalinity range of pond water 35- 87 mg/l (Table 2 & Fig No 5), Calcium range of pond water 125-158 mg/l (Table 2

& Fig No 6), Total Hardness range of pond water 139 -252mg/l (Table 2 & Fig No 7), Magnesium range of pond water 3.88 – 16.15 mg/l (Table 2 & Fig No 8), BOD 54- 185 mg/l (Table 2 & Fig No 9), COD 0.21-0.36 (Table 2 & Fig No 10) and DO 2.6 – 8.1 mg/l (Table 2 & Fig No 11) and Compare the observed data with BIS standards.[1]

### Conclusion

Water quality is as important since it is the main factor determining the suitability of water for drinking, domestic, agricultural and industrial purposes. Many villagers depend on the open water source for all daily reties work, as well as some time use for drinking purpose also may cause different type skin or gastrointestinal disease. The present analysis concludes that the quality of water samples subjected to study was hard, slightly alkaline, and unhealthy for drinking. The BOD, COD, D.O. values were found to be high. This is primarily because of nearby areas due to excessive fecal contamination and human-animal unhygienic habits like washing and other activity. Thus the water from the pond near the industrial areas is not good for health also not to be used for cooking and drinking purposes as well as other activities.

### References: -

- [1] V. Jena, S. Dixit, R. Shrivastava, and S. Gupta, “Study of Pond Water Quality by The Assessment of Physicochemical Icfai University Raipur India Central Institute of Technology Raipur India Email : jenavinod02@gmail.com,” pp. 47–52, 2012.
- [2] B. P. M. and N. R. B. M.R.Mahananda, “Physico-Chemical Analysis of Surface and Ground Water of Bargarh District , Orissa , India,” *Ijrras2(3)*, vol. 2, no. March, pp. 284–295, 2010.
- [3] J. K. Manoj, D. Poonam, and T. Ruchi, “Testing and Analysis of Drinking Water Quality of Underground Water located near Rural Area of Risali Chhattisgarh , India,” vol. 3, no. 5, pp. 44–47, 2014.
- [4] A. Chauhan, S. Naz, and B. Pandey, “Physiochemical And Microbial Study of Water Quality of Non- Reserved Ponds of Bhilai- DurG,” vol. 13, no. 2, pp. 172–177, 2017.
- [5] P. Kerketta, S. L. Baxla, R. H. Gora, S. Kumari, and R. K. Roushan, “Analysis of physico-chemical properties and heavy metals in drinking water from different sources in and around ranchi, jharkhand, India,” *Vet. World*, vol. 6, no. 7, pp. 370–375, 2013, doi: 10.5455/vetworld.2013.370-375.
- [6] A. Yadav, P. K. Sahu, S. Chakradhari, and K. P. Rajhans, “Urban Pond Water Contamination in India,” no. January, pp. 52–59, 2016.
- [7] P. Sciences *et al.*, “To Analyse the Water Sample of Pond Located Near Nandani Mines in Durg District Chhattisgarh, India,” *Curr. World Environ.*, vol. 4, no. 1, pp. 97–107, 2016, doi: 10.5923/j.re.20120203.01.
- [8] R. Chhattisgarh, “Physico-Chemical Assessment of Pond Water , Municipal Sewage and Industrial Effluent of,” vol. 4, no. 6, pp. 1549–1557, 2015.
- [9] M. Bhavan, B. Shah, and Z. Marg, “B U R E a U O F I N D I a N S T a N D a R D S,” no. May, 2012.
- [10] I. J. Modn, R. Revs, N. Jothivel, and V. I. Paul, “International Journal of Modern Research and Reviews Original Article Comparative Physico-Chemical Profiling of Two Coastal Water Bodies From South East Coast of India With Special Reference To Their Pollution Status,”

2014.

**Table: 01 Stander Characters of Water as per BIS**

Sr No	Name of Test	Stander Values as per BIS
1	Temperature	-
2	pH	6 to 8.5
3	TDS	500 mg/l
4	Chloride	200 Mg/l
5	Alkalinity	200 Mg/l
6	Calcium	75 Mg/l
7	Total Hardness	300 mg/l
8	Magnesium	30 Mg/l
9	BOD	-
10	COD	-
11	DO	-

**Table 02: Parameter obtain of Various Pond Water in Raipur Area (March and April 2019)**

Ponds	Parameters										
	Temperat ure	pH	TD S	Chlori de	Alkalini ty	Calciu m	Total Hardne ss	Magnesi um	BO D	CO D	D O
Ama Talab	28.25	7.0 2	154	39.9	35	129	185	16.15	87	0.32	2. 7
Bhanpu ri	30.02	6.3 4	205	49.86	62	155	252	12.08	78	0.21	3. 3
Datreg a	29	6.7	197	69.78	82	141	168	5.88	54	0.31	2. 6
Daldal Seoni	32.03	5.6	188	99.91	54	125	167	3.88	64	0.33	6. 1
Urla	28.80	7.9 5	180	89.1	87	158	139	6.9	185	0.36	8. 1

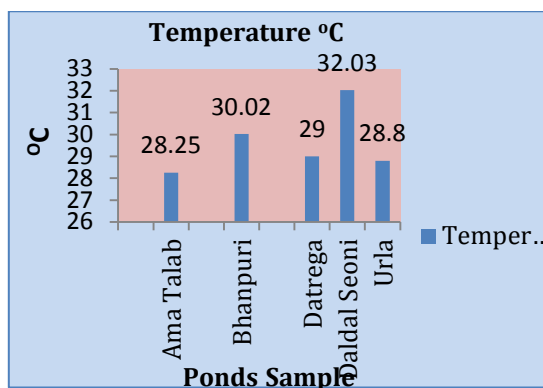


Fig No. 1 Temperature of 5 Pond Water Raipur , March – April 2019

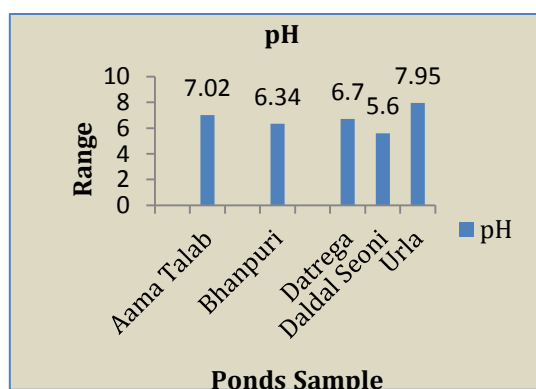


Fig No. 2 pH of 5 Pond Water Raipur, March – April 2019

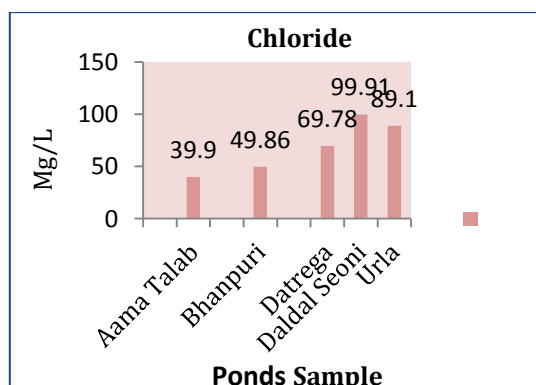


Fig No. 3 Chloride of 5 Pond Water Raipur, March – April 2019

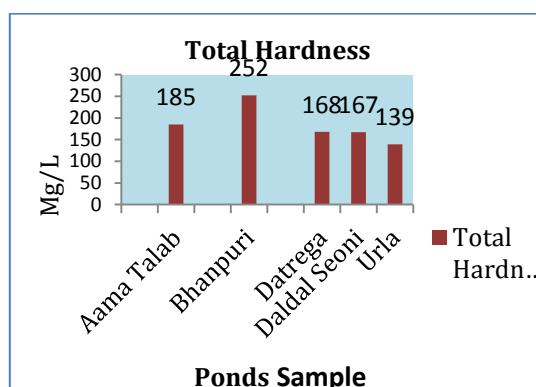


Fig No. 4 Total Hardness of 6 Pond Water Raipur March – April 2019

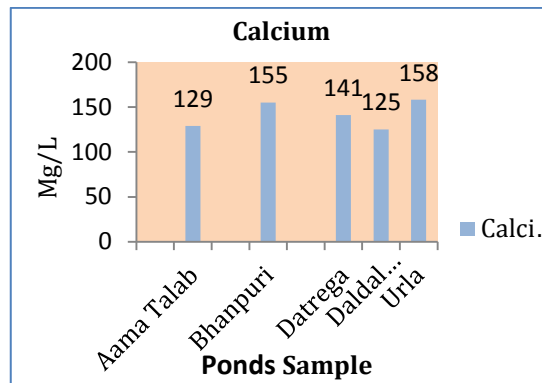


Fig No. 5 Calcium of 5 Pond Water Raipur, March – April 2019

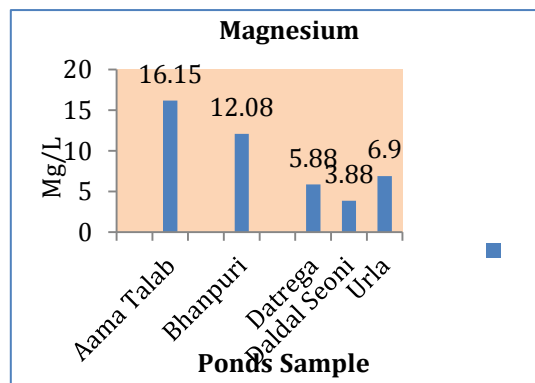


Fig No. 6 Calcium of 5 Pond Water Raipur, March – April 2019

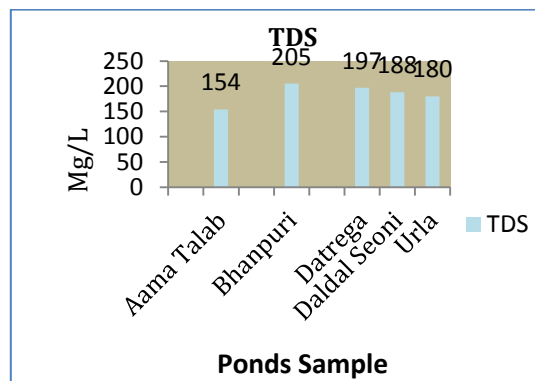


Fig No. 7 TDS of 5 Pond Water Raipur, March – April 2019

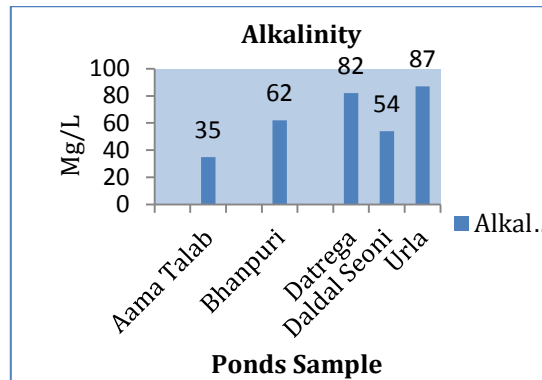


Fig No. 8 Alkalinity of 5 Pond Water Raipur , March – April 2019

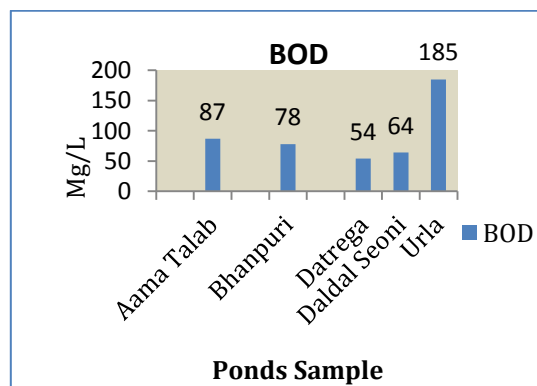


Fig No. 9 BOD of 5 Pond Water Raipur , March – April 2019

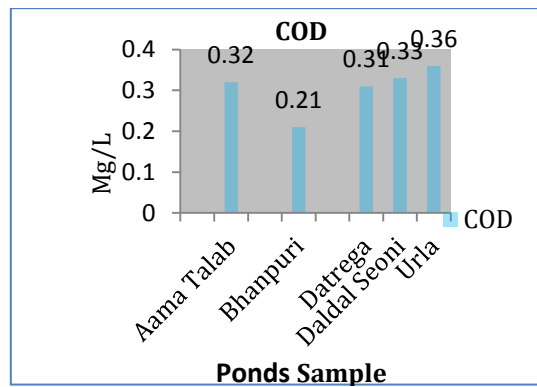


Fig No. 10 COD of 5 Pond Water Raipur , March – April 2019

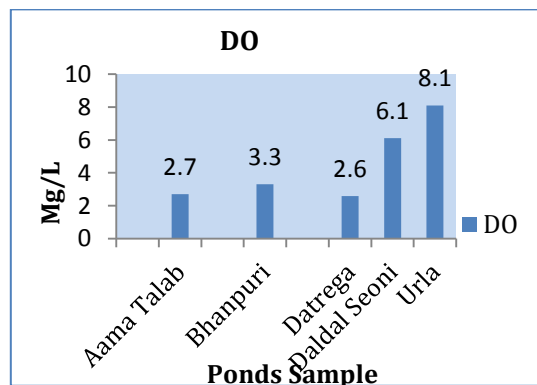


Fig No.11 DO of 5 Pond Water Raipur, March – April 2019