

Analysis Of Physico-chemical Properties of Pond In Reference to Getalsud Dam And Dhurwa Dam In Ranchi City

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ABSTRACT

The motivation behind this examination is to examine water quality corresponding to Getalsud and Dhurwa dam in Ranchi city as far as physico-chemical boundaries of pond water. To achieve the aim of the present study following major aim is to study the physio-chemical analysis of pond, physical and chemical characteristics of pond water and to analysis the physicochemical properties of Water samples of Getalsud and Dhurwa dam. The examination was picked for the assortment and protection of the Getalsud and Dhurwa Dam situated in Ranchi territory. In the year i.e. 2017-18 the pH value ranged from 7.1 to 8.5 for all the three sites which indicate that the samples were alkaline in nature.

Keywords: Water, Pond, Physicochemical, Ranchi city, Getalsud Dam, Dhurwa Dam

INTRODUCTION

Water is one of earth's main wellsprings of life. This additionally does exceptional and significant errands in biodiversity, biosphere, and biogeochemical cycles on earth. Great quality water thusly is additionally an unquestionable requirement for living beings.

Water is one of the most widely recognized materials on earth, occupying around three-fourths of the outside of the planet. The heft of water found on earth is acidic in nature; as new water, there is just a restricted sum. Due to over-abuse and contamination new water has become a scant product (1).

In spite of the fact that Dhurwa dam is known as Hatia Dam, it is really situated in Ranchi's Dhurwa area, covering and spreading 7 sq. Kms. Aside from being a well known tourist destination, the dam water supplies an enormous populace in the zone. The city is around 15 kms away. On one side, the dam has gazebos, where one can unwind and appreciate the dam's cool wind. The dam slop has stones set on the ground that give solid footing as it drops down to the dam's waters. And it is a most loved spot for swimming effectively, or in any event, for boating. Indeed, even the dam is appropriate for dusk sees.

In this investigation we center around analyzing pond as far as physico-chemical boundaries of Getalsud

Dam pond water and Dhurwa Dam in Jharkhand Ranchi town.

Kumar, A., Sinha, D. K., and Mishra, J. B. (2019) Adequate gracefully of new and clean drinking water is a center need for all individuals. As respects open and ecological wellbeing, it is significant that water supplies be free for sound drinking purposes from any physical, chemical and pathogenic organisms. In India, Jharkhand has a populace of more than 32 million with roughly 54 percent living underneath the destitution line and a large portion of them are legitimately reliant on surface water for their every day works, for example, bathing , washing and drinking. The main wellspring of surface water in Ranchi is rainfall, it is around 1316 mm which produces surface water here and is likewise found in the type of surface runoff and stale water. In this examination article, for four months from the long stretch of March to June 2019, we firmly monitored the surface water in Hatia area to be specific Basargarh pond Hatia.

Kumar and Sharma (2014) investigated the effect of water quality on hydropower supply discharges from green house gases. In site I and site II of Nigeria's Oyun store, they examined temperature, DO, COD, TDS, pH, TP, nitrite, phosphate, total alkalinity and conductivity; CO₂ emanations from the repository

were seen as mainly influenced by pH, alkalinity, and DO.

Munsiet, Canoe. Al. (2013) worked in Kashmir on the water science of the Hazratbal Basin of Dal Lake. Their information demonstrated that there was a fast eutrophication of the world-popular Dal Lake because of contamination brought about by agrarian exercises in the catchment region.

2. METHODOLOGY

2.1 Study area

There are several Dam in and around Ranchi city. Various urban ponds of Ranchi city were surveyed during the study period, but for this study only two ponds were selected i.e. Getalsud and Dhurwa dam. Getalsud Dam was subjected to detailed analysis, as site wise anthropogenic activities and its possible impact was recorded for only this Dam. It is a Dam which is utilized by surrounding inhabitants for various activities such as bathing, washing clothes, cleaning vegetables as well as vehicle washing and dumping sewage etc. Compared to other Dam of Ranchi city Getalsud and Dhurwa Dam are more under the influence of urbanization, in future the situation may worsen and thus these two ponds were selected for study. The point of Getalsud Dam is to meet the drinking water necessities of the inhabitants of Ranchi. It is likewise utilized for industrial and power age purposes, aside from that. The dam slop has stones put on the ground which give strong footing as it tumbles down to the waters of the dam. And it is a most loved spot for swimming effectively, or in any event, for boating. Indeed, even the dam is appropriate for dusk sees.

2.2 Sample collection:

The examination was picked for the assortment and conservation of the Getalsud and Dhurwa Dam situated in Ranchi territory. Pond water will be handled using a one liter size glass container. Until assortment, the jug must clean, and then rinse with water from the tank. Assortments were made with an interval of one month. The obtained pond water test would be utilized for examination of physicochemical boundaries to be moved to the laboratory.

2.3 Physico-Chemical Analysis:

The gathered models will be dismembered for different physico-chemical cutoff points, for example Temperature , pH, Electrical Conductivity, TDS, Alkalinity, Free Co₂, Chloride, DO, BOD , COD, Total Hardness, Ca Hardness, Calcium , Magnesium, according to standard APHA (5) procedures, and the outcomes will be diverged from the Indian Requirements (ICMR) for drinking water. The limits that are available in the water test can be determined by using various procedures. It will utilize a pH meter (Model No LI 127, Elico) to check the pH of all water tests to gauge electrical conductivity using a conductivity measure. The chloride, calcium, magnesium, and total hardness were assessed by standard water techniques.

2.4 Statistical Analysis:

Appropriate statistical analysis of the results was performed. The coefficient of correlation is commonly used for establishing the relationship between independent and dependent variables To know the relationship between and among the parameters, a correlation coefficient (r) was calculated.

3. RESULTS

3.1 Water Quality Parameters of Getalsud Dam:

In the first year i.e. 2017-18 the pH value ranged from 7.1 to 8.5 for all the three sites which indicate that the samples were alkaline in nature. In the subsequent year, for example 2018-19, the greatest pH esteem was accounted for at site1 and site-3 during the late spring months, and the minimum qualities were seen at site-1 and site-2 in winter and storm individually (Table 1). Over the total estimation time frame the surface water temperature vacillates from 18 ° C to 30 ° C. In September, the most noteworthy temperature esteem was recorded in 2018, while in February the least temperature esteem was 18 ° C (Table-1), which mirrors the occasional varieties. Site 1's most extreme and minimum temperatures (9.4 - 21.6 ° C) were estimated on all the locales in 2019 during the long periods of August.

The alkalinity went from 122 to 134 mg/1 in 2019, and

the most elevated alkalinity esteems were accounted for at all locales in the storm season (Table-4.4 to 4.6, Fig-4.5). The Dissolved Oxygen (DO) ran from 6.0 mg/l to 8.5 mg/l in first year. The estimation of DO went from 6.0 to 8.4 mg/l in the subsequent year and the most noteworthy estimation of DO was seen at site-1 and site-2 in winter and at site-3 in storm while at site-3 in winter

(Table 1) the least was watched.

Nitrate levels in the primary year differed somewhere in the range of 0.10 and 0.19 mg/l. In the subsequent year, a similar range extended from 0.10 to 0.20 mg/l and was accounted for as the greatest in the late spring and early rainstorm months at all locales (Table 1).

Table 1: Physico- Chemical parameters in Site-1 (2017-2018)

Month	Parameter						
	Temperature (°C)	pH	DO (mg/l)	Free CO ₂ (mg/l)	Alkalinity (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)
August	20.5	7.8	7.4	1.7	111	0.11	0.018
September	19.4	7.2	7.2	1.9	118	0.17	0.011
October	16.3	8.1	7.1	1.9	123	0.19	0.019
November	14.2	7.1	7.0	2.0	130	0.21	0.017
December	10.2	7.5	6.5	2.3	135	0.13	0.020
January	9.4	7.4	6.1	2.5	120	0.18	0.028
March	14.6	8.3	7.7	1.5	120	0.13	0.017
April	17.4	8.5	8.0	1.0	130	0.15	0.020

Table 2: Physico- Chemical parameters in Site-1(2018-2019)

Month	Parameter						
	Temperature (°C)	pH	DO (mg/l)	Free CO ₂ (mg/l)	Alkalinity (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)
August	21.6	7.9	7.5	1.8	115	0.10	0.019
September	20.1	7.3	7.3	1.9	119	0.18	0.012
October	17.3	8.2	7.1	1.9	124	0.18	0.020
November	14.7	7.2	7.2	2.1	131	0.18	0.018
December	10.9	7.5	6.6	2.4	136	0.13	0.019
January	9.8	7.5	6.0	2.6	122	0.19	0.027
March	15.4	8.4	7.6	1.6	123	0.14	0.017
April	18.6	8.6	8.1	1.3	134	0.17	0.020

In first year (2017-2018) positive significant correlation was observed between alkalinity and Total Phosphorus. Inverse significant relationship was observed between Total Hardness and alkalinity. Notwithstanding, the most minimal positive relationship among temperature and DO is noted in current perceptions. Due to trophic level interactions, supplements like phosphates and

nitrate delivered show a growing example every year, except negative relationship between these. For Total Phosphorus and Total Hardness the most elevated positive affiliation was seen at all three areas. Acridity shows a solid relationship to most different boundaries of Total Hardness and nitrate and a negative connection.

Table- 3: Results of Pearson's correlation for the year Nov.2017-Oct.2018 of certain physico-chemical parameters of the Getalsud Dam (site-

	pH	Temp	Aci	Alk	Chl	TH	TS	DO	Nit	PO4 ⁻
pH		0.47	-0.32	0.61	0.20	-0.40	0.24	0.54	-0.39	0.30
Temp			-0.06	0.06	-0.12	0.12	0.30	0.07	0.43	0.33
Aci				-0.80	-0.21	0.43	-0.23	-0.07	0.25	-0.48
Alk					0.31	-0.73	0.41	0.28	-0.18	0.65
Chl						-0.56	0.37	0.30	-0.28	0.70
TH							-0.32	-0.37	-0.09	-0.71
TS								0.23	-0.30	0.63
DO									-0.37	0.59
Nit										-0.18

3.2 Water Quality Parameters of Dhurwa Dam:

The pH remained alkaline throughout the study period (Fig 4.16). Its value ranged from 7.1-8.5. During the study period the temperature fluctuated from 9°C to 20.5°C. The alkalinity ranged from 112mg/l to 135mg/l which reflects good

productivity of water body. Its minimum value was found in winter and maximum in summer. The value of DO ranged from 7-8 mg/l with highest concentration in June (8.1) and lowest in December (6.5) (Table-4, 5).

Table 4: Physico- Chemical parameters in Site 1 (2017-2018)

Month	Parameter						
	Temperature (°C)	pH	DO (mg/l)	Free CO ₂ (mg/l)	Alkalinity (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)
August	20.5	7.8	7.4	1.7	112	0.11	0.017
September	19.4	7.2	7.1	1.8	116	0.17	0.013
October	16.3	8.2	7.1	1.8	121	0.18	0.019
November	14.2	7.1	7.0	2.1	130	0.17	0.019
December	10.2	7.4	6.5	2.3	135	0.13	0.021
January	9.4	7.4	6.5	2.4	124	0.18	0.027
March	14.6	8.2	7.7	1.6	120	0.14	0.018
April	17.4	8.3	8.1	1.1	127	0.15	0.021

Table 4: Physico- Chemical parameters in Site 1 (2017-2018)

Month	Parameter						
	Temperature (°C)	pH	DO (mg/l)	Free CO ₂ (mg/l)	Alkalinity (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)
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January	9.4	7.4	6.5	2.4	124	0.18	0.027
March	14.6	8.2	7.7	1.6	120	0.14	0.018
April	17.4	8.3	8.1	1.1	127	0.15	0.021

Table 5: Physico-Chemical parameters in Site (2018-2019)

Month	Parameter						
	Temperature (°C)	pH	DO (mg/l)	Free CO ₂ (mg/l)	Alkalinity (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)
August	21.6	7.8	7.3	1.7	115	0.12	0.018
September	20.1	7.3	7.0	1.9	118	0.18	0.014
October	17.3	8.3	7.2	1.8	123	0.17	0.019
November	14.7	7.2	7.2	2.2	132	0.18	0.019
December	10.9	7.5	6.7	2.4	138	0.14	0.020
January	9.8	7.5	6.4	2.3	125	0.18	0.026
March	15.4	8.3	7.8	1.7	123	0.15	0.018
April	18.6	8.4	8.2	1.2	129	0.17	0.023

Positive correlation of higher magnitude has been observed between pH and acidity. Temperature showed negative correlation with DO and also with most of the parameters. Acidity was negative with

total solids and phosphorus and positive with most boundaries. Alkalinity showed strong positive correlation with TH and nitrate.

Table-6: Results of Pearson's correlation of some physico-chemical parameters of the Dhurwa Dam for the year Oct.2018-Nov.2019

	pH	Temp	Aci	Alk	Chl	TH	TS	DO	Nit	PO4 ⁻
pH		-0.19	0.86	0.79	0.34	0.51	-0.21	0.34	0.67	-0.45
Temp			-0.54	-0.21	-0.15	-0.30	0.15	-0.28	0.22	-0.05
Aci				0.80	0.28	0.65	-0.31	0.23	0.54	-0.36
Alk					0.41	0.63	-0.49	0.24	0.78	-0.26
Chl						0.45	-0.25	0.50	0.21	0.45
TH							-0.20	0.29	0.55	0.19
TS								0.21	-0.19	0.16
DO									0.11	0.22
Nit										-0.21

4. DISCUSSION

According to Wetzel (1975), the efficiency of amphibian conditions is influenced by (7) water temperature, lucidity, pH, alkalinity, broken down gases (oxygen, carbon dioxide) and supplements (smelling salts, nitrate, phosphorus, silicate, calcium and magnesium). Thusly, during the test time, the diverse water quality boundaries were normally monitored for relative analysis in every single exploratory pond and to understand the occasional difference and fluctuation from pond to pond. By regulating chemical and metabolic responses (8, 9), the water temperature incredibly influences the organic practicality of the ponds. A low temperature diminishes life forms' metabolic action (10). Changes in water internal heat level can influence the velocity and way of natural issue deterioration (11).

5. CONCLUSION

In the first year i.e. 2017-18 the pH value ranged from 7.1 to 8.5 for all the three sites which indicate that the samples were alkaline in nature. In the subsequent year, for example 2018-19, the most extreme pH esteem was accounted for at site1 and

site-3 during the late spring months, and the minimum qualities were seen at site-1 and site-2 in winter and storm individually. Over the total estimation time frame the surface water temperature vacillates from 18 ° C to 30 ° C. In September, the most noteworthy temperature esteem was recorded in 2018, while in February the least temperature esteem was 18 ° C, which mirrors the occasional varieties. Site 1's most extreme and minimum temperatures were estimated on all the locales in 2019 during the long stretches of August.

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