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SHORT COMMUNICATION

Study of Physicochemical Parameters in Khadakwasla Dam

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ABSTRACT
Most urban cities polluted, depleted, destroyed the water resources like river, lake, dam, pond and tank. This is due to rapid increase in population, urbanization and industrialization. Pune city is one of them. With the rapid increase in the population of the city and the increasing demands and to fulfil the needs of humans, industrial consumption, over use of fertilizers, the available water resources of the city are getting depleted and the water quality has deteriorated. The Khadakwasla Dam is a main source of water ofPune city. Present investigation was undertaken to study the level of pollution in Khadakwasla Dam Pune from 5 different sampling stations and estimated Physio-chemical parameters like pH, BOD, Turbidity, DO, Temperature from Jan 2022 to Dec 2022.And the result indicates the higher level of pollution which affects the fishes, planktons and other aquatic diversity.
Keywords: *-pH, BOD, Turbidity, DO, Temperature, Khadakwasla Dam.*

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INTRODUCTION

Water is the most essential abiotic component of the world which is necessary for survival of living organisms and also many non-living things requires water. It is known that water bodies have played a crucial role in growth and development of human society. Most of the fresh water bodies on the earth get polluted due to human intervention so it's very important to study the quality of the water changing day by day [11]. Many Physicochemical parameters of the water changes as per the different seasons which impact on the diversity of aquatic organisms like phytoplankton, zooplanktons, fishes and other aquatic life [7, 4]. Increasing urbanization and industrialization simultaneously, during the past few decades are depleting the water ecosystem goods and services irreparably in Pune City, as indicated by high LPI (Living Planet Index) [12,13].

There are many researchers worked on Physicochemical changes of various water bodies like Kumar [16], Walia, Ruttner [10], Dr. R.R. Jadhav [02]. D.G. Kanase *et al* [8] studied the physicochemical characteristics of major River of Pune city in 2005. They studied and analysed the Pawana &Mula and Mutha River.

Chandanshive Navnath Eknath et al [01] also did the analysis on Mula Mutha River in 2013. Their paper describes the impact of pollution level on aquatic life. Gantaloo Uma Sukaiya [15], Ms.Ashwiniet.al [3].

A.B. More, C.S. Chavan et al [09] carried out the analysis of MulaMutha River in 2014 different pollutant like solid waste, chemical waste, organic &inorganic waste pollute the different stations and found some stations are highly polluted. Pali Sahu *et al* [05] studied "Physicochemical Analysis of MulaMutha River Pune" Mula-Mutha River in Pune (India). Patil. P.N *et al* [06] studied "Physico-chemical parameters for testing of water".

The present study was undertaken in Khadakwasla Dam for a year 2022 (January to December) to know the level of pollution by studying different five parameters like pH, BOD, Turbidity, DO, Temperature. Result shows that according to seasonal change, the water quality, pollution level fluctuates. Some parameters directly, some are indirectly affecting the aquatic life. To study the physicochemical parameters of Khadakwasla Dam and to analyse the pollution level according to the season.

MATERIAL AND METHODS

Study Area

A village situated about 21 km from Pune known as Khadakwasla and is mainly known for a dam on the river Mutha. Khadakwasla Dam is one of the most important water resources of the Pune city. The dam created a reservoir known as Khadakwasla Lake. There is well known National Defense Academy (NDA) and Central Water and Power Research Station (CWPRS). In 1879 the British was first built the dam on small canal running parallel to the Mutha River. The dam was later rebuilt after blown out of Khadakwasla Dam and Panset Dam overflowed in 1961. Khadakwasla Dam is situated in the area between longitude 73.7671°E,and latitude 18.4423° N.

Sample Collection

The water sample of KhadakwaslaDam collected from the different sampling stations of the dam by seasonal interval for the period of one year. The temperature was recorded on the site. To assess the water quality of Khadakwasla Dam, five sampling locations-1) Beginning of dam,2) Agricultural side,3)Road side,4)Industrial waste release side,5)Dam wall side were selected. The samples were collected in two-liter plastic bottles during morning time and the collected samples were labelled properly and immediately taken to the laboratory for analysis of 05 different physicochemical parameters. By using the standard method given APHA [14].The parameters studied include: -

1)pH- It was measured by using the Electrometric method (IS 3025-Part 11).
2)Biological Oxygen Demand (BOD)- It was measured by using the Bio- assay procedure (IS 3025Part-44).
3)Turbidity-It was measured by using the Turbidity meter (IS 3025-Part-10).
4)Dissolved Oxygen (DO)- It was measured by using the Winkler method (IS 3025-Part-38).
5)Temperature- It was measured by using the Thermometer (IS 3025-Part-9).

RESULTS AND DISCUSSION

Table 1 Shows the result obtain physicochemical parameters analysed the water quality of the dam during the study.

1) pH: -The pH maximum 10.2 alkaline in summer season (Dam wall side), minimum 7.1 almost neutral in Rainy season (Dam wall side), moderate in winter season and the mean is 8.55.

2) BOD: - Biological oxygen demand is an Oxygen used by microorganism to decomposition of waste.Ms.Ashwiniet.al [03]. Indicates the level of organic pollution in the water body. Increased BOD shows the high pollution which is recorded maximum 28.5 mg/l in summer season (Agricultural side), minimum 2.9 mg/l in rainy season (Dam wall side) and the mean is 12.43 mg/l.

3)Turbidity: -Turbidity maximum 8 NTU in summer and winter season (Road side and Dam wall side respectively), minimum 1.5 NTU in rainy season (Agricultural side) and the mean is 5.45 NTU. It is affected due to discharge of domestic and agricultural wastes.

Table 1: Concentration of Physicochemical parameters in water of Khadakwasla Damfrom Jan 2022 to Dec 2022.

Sampling Station	seasons	Parameters				
		pH	BOD (mg/l)	Turbidity(NTU)	DO (mg/l)	Temp (°C)
1.Beginning of dam	summer	9.6	26.0	5.5	4.1	29.6
	Rainy	8.1	3.8	2.9	5.2	25.1
	winter	8.2	8.0	7.5	5.4	23.0
2.Agricultural side	summer	10	28.5	6.9	4.4	30.2
	Rainy	7.8	3.6	1.5	4.6	24.8
	winter	8.0	8.0	7.0	5.2	24.5
3.Road side	summer	9.3	24.0	8.0	4.0	28.4
	Rainy	7.3	3.9	2.2	4.2	24.2
	winter	8.9	8.2	6.8	5.9	23.9
4.Industrial waste release side	summer	9.9	27.6	6.9	5.0	27.0
	Rainy	8.3	4.0	3.02	5.2	23.9
	winter	7.9	7.9	7.2	6.0	23.6
5.Dam wall side	summer	10.2	22.4	6.5	3.2	28.3
	Rainy	7.1	2.9	1.9	4.8	24.0
	winter	7.7	7.7	8.0	7.0	22.0
Mean		8.55	12.43	5.45	4.94	25.5

4) Dissolved Oxygen: - Aquatic organism require minimum 4ppm oxygen for survival. Ms.Ashwiniet.al [03]. So, it is important to study the DO present in the dam. The DO maximum 7 mg/l in winter season (Dam wall side), 3.2 mg/l in summer season (Dam wall side), moderate in rainy season and the mean is 4.94 mg/l.

5)Temperature: - Temperature is a basic parameter that can be easily measured with the help of thermometer while collecting the sample. The water temperature shows higher during summer season. Biodegradation of organic wastes also increase the water temperature. The temperature was recorded low 22°C (Dam wall side) in winter and high 30.2°C (Agricultural side) in summer, moderate in rainy season and the mean is 25.5°C.

CONCLUSION

- The quality of water is dependent on the type of pollutant added.
- Khadakwasla Dam water quality is poorer in summer season than winter and Rainy Season.
- Due to discharge of waste water from the agriculture, industries, municipal waste water in large quantity decreased the water quality of the water.
- Sources of pollutants varies the physicochemical parameters of the water.
- Human should take care of the natural resources and the water bodies which are depleting in theirquality due to changes in the anthropological activities.
- Study of the physicochemical parameters of the water have to be carry on for the upcoming years to be an updated regarding the quality of water and the difficulties facing by the aquatic organisms.

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