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Physico-Chemical Analysis of Water Quality of Shivana-Takali Dam, Kannad, Dist.-Aurangabad

Atish R. Mehetre1*, Vilas V. Thakare2, Prabhakar Kute3, Kailash R. Borude4

[1*]Department of Chemistry, Shivaji Arts, Commerce and Science College, Kannad, Maharashtra, India
[2]Department of Botany, Arts, Science and Commerce College Rahuri, Maharashtra, India
[3]Department of Chemistry, Pratishthan Mahavidyalaya Paithan, Maharashtra, India
[4]Department of Chemistry, KKM College Manvat, Maharashtra, India

ABSTRACT

Water quality of Shivana-Takali dam of Kannad, Dist- Aurangabad (MH) has been analyzed seasonally by using various physico-chemical parameters like pH, water temperature, alkalinity, dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), chloride, sulphate, phosphorous etc. during 2021-2022 and the results obtained varied seasonally. Maximum value of TDS was recorded during monsoon season. In case of some physico-chemical parameters like COD and BOD maximum values were recorded during winter season while maximum values of pH, water temperature, alkalinity, DO, chlorides, sulphate and phosphorus were recorded during summer season. Most of the physico-chemical parameters showed their maximum values in the summer season followed by winter and monsoon season.

KEYWORDS-Water Quality, DO, BOD, COD, TDS, Physico-Chemical Parameter.

I. INTRODUCTION

The study of fresh water contained within continental boundaries is known as limnology (Roberto Bertoni; 2011). Shivana-Takali dam is constructed across the Shivana river in Kannad Tehsil of Aurangabad district, Maharashtra for different purposes like irrigation, domestic water supply, fish farming as well as industrial purposes. This water reservoir is getting polluted due to increased man made activities in the dam, use of fertilizers in agriculture which affected the water quality of the Shivana-Takali dam very badly and decrease in number of aquatic organisms also observed. Therefore, it is necessary to check the water quality of selected water reservoir seasonally.

Various researchers carried out the limnological study of fresh water including Kadam *et al.,* (2007), Salve and Hiware (2008), Mahor (2011), Khan *et al.,* (2012), Mule *et al.,* (2019) etc.

The study area selected for Shivana-Takali dam which is situated on the Shivna river near Kannad, Dist.-Aurangabad, Maharashtra. In present investigation, an attempt has been made to study seasonal water quality of Shivana-Takali dam by using various physico-chemical parameters during 2021-22.

II. MATERIAL AND METHODS

i. COLLECTION OF WATER SAMPLES-

The water samples were collected from 03 different stations of Shivana-Takali dam in plastic transparent bottles in the morning hours between 9 to 11 am regularly during monsoon, winter and summer seasons. The collected water samples were brought to the laboratory to study various physico-chemical parameters. Some physical parameters such as pH and water temperature were recorded on the collection sites of 03 different stations by using pH paper and thermometer respectively.

ii. PHYSICO-CHEMICAL ANALYSIS

Various physico-chemical parameters like pH, water temperature, alkalinity, dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), chloride, sulphate and phosphorous were studied as per standard procedures (APHA; 2005) for water quality analysis.

III. RESULTS AND DISCUSSION

The water quality analysis by using some physico-chemical parameters was carried out seasonally during June 2021 to May 2022 and the results obtained are summarized in table-1.

3.1. pH

pH can affect most of the chemical and biochemical reactions. During monsoon season maximum pH value 7.7 was observed in the month of July while the minimum pH value 7.3 was recorded in the month of September.
During present study, maximum pH value 8.2 was recorded in the month of May during summer season while the minimum pH value 7.2 was recorded in the month of October during winter season. It was observed that the pH values observed higher in summer season. Similar type of study was carried out by Kamble *et al.,* (2009).

3.2. Water temperature

The chemical, biochemical and biological characteristics of the water reservoir are determined by water temperature. During monsoon season the maximum water temperature 33.5^{0}C was recorded in the month of June while minimum temperature 31.3^{0}C was observed in the month of September.
During present investigation, the maximum temperature 36.5^{0}C was observed in the month of May during summer season while minimum temperature 25^{0}C was recorded in the month of January during winter season.

3.3. Alkalinity

During monsoon season the maximum alkalinity recorded was 158 mg/L in the month of July while the minimum alkalinity 138 mg/L was observed in the month of August. During present study, maximum alkalinity 172 mg/L was recorded in the month of May during summer season while minimum alkalinity 134 mg/L was observed in the month of November during winter season.

3.4. Dissolved Oxygen (DO)

During monsoon season maximum DO 5.5 mg/L was observed in the month of June while minimum DO 4.5 mg/L was recorded in the month of August. During present investigation maximum DO 6.5 mg/L was recorded

in the month of May during summer season while the minimum DO 4.1 mg/L was observed in the month of November. Kadam *et al.,* (2007) carried out similar study.

3.5. Biological oxygen demand (BOD)

Maximum BOD value was recorded 3.60 mg/L in the month of December during winter season while minimum value was recorded 2.25 mg/L in the month of April during summer season.

3.6. Chemical oxygen demand (COD)

Maximum COD value was recorded 39 mg/L in the month of January during winter season while minimum value 29 mg/L was recorded in the month of July during monsoon season.

3.7. Total Dissolved Solids (TDS)

During present study maximum TDS value 133 mg/L was observed in the month of June during monsoon season while minimum TDS value 111 mg/L was recorded in the month of April during summer season.

3.8. Chloride

Maximum value 34 mg/L was recorded in the month of April during summer season while minimum value 23 mg/L was observed in the month of November during winter season.

3.9. Sulphate

Maximum value 179 mg/L was observed in the month of May during summer season while minimum value 129 mg/L was recorded in the month of November during winter season.

3.10.Phosphorus

Maximum value 1.3 mg/L was observed in the month of May during summer season while minimum value 0.6 mg/L was recorded in the month of July during monsoon season.

Table-1: Physico-Chemical Parameters of Seasonal Water Quality Analysis of Shivana-Takali Dam.

Parameter	Monsoon				Winter				Summer			
	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
pH	7.5	7.7	7.4	7.3	7.2	7.6	7.7	7.8	7.7	8.0	7.9	8.2
Water Temp. (^{0}C)	33.5	32	31.4	31.3	32.2	28.5	28	25	26	31	34	36.5
Alkalinity (mg/L)	148	158	138	143	149	134	139	144	150	170	158	172
DO (mg/L)	5.5	4.7	4.5	4.8	5.0	4.1	5.3	5.8	6.0	6.4	6.3	6.5
BOD (mg/L)	2.65	2.75	2.80	2.85	2.90	3.0	3.60	3.40	2.70	2.60	2.25	2.40
COD (mg/L)	30	29	31	32.5	35	37	36	39	33	33.5	34	34.5
TDS (mg/L)	133	121	127	131	125	126	118	115	120	116	111	113
Chloride (mg/L)	30.5	30	29	31	24	23	26	25	33	33.7	34	33.9
Sulphate (mg/L)	159	149	144	139	134	129	139	144	159	164	174	179
Phosphorus (mg/L)	0.8	0.6	0.9	1.1	1	0.9	1	0.9	0.7	0.9	1.2	1.3

IV. CONCLUSION

In the present investigation, maximum value of TDS was recorded during monsoon season. In case of some physico-chemical parameters like COD and BOD maximum values were recorded during winter season while maximum values of pH, water temperature, alkalinity, DO, chlorides, sulphate and phosphorus were recorded during summer season.

During present investigation, most of the physico-chemical parameters showed their maximum values in the summer season followed by winter and monsoon season.

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