

PHYSICO-CHEMICAL ANALYSIS OF THE DOKEWADA RESERVOIR BEED DISTRICT OF MAHARASHTRA STATE, INDIA

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ABSTRACT

Study of physico-chemical properties of water is important and very necessary to know its quality. Present study has been carried out to assess the water quality of a freshwater body of studying its physico-chemical characteristics. The analysis of physico-chemical parameters of water is the essential for utilization of water for different purposes. The quality of water usually described according to its physical, chemical and biological characteristics. The study was carried out for the period of one year in 2016 June to May-2017.

13 parameters are analysis in the present study they were air temperature, Water temperature pH, Turbidity, Alkalinity, Calcium, Chloride, Nitrate Sodium, DO, BOD, COD, TDS. All the parameters were permissible level. Parameters of water bodies affect the abundance, species, composition, stability, productivity and physiological condition of aquatic organism populations.

KEYWORDS: *Physico-Chemical*

INTRODUCTION

Freshwater is one of the basic necessities for the sustenance of life. Monitoring of water characteristic, nutrient analysis and biological features are important in the assessment of aquatic ecosystem (Padmanabha & Belagali 2006). Aquatic ecosystem contributes to a large proportion of the planet, about two third of the earth is covered by water.

Freshwater bodies help in regulating cycling of nutrients and water besides providing basic support to food chain. The quality of water is essential and vital for human survival. Reservoirs are one of the important components of freshwater resources either formed naturally constructed; they are highly potential freshwater source. The present investigation was carried out at Dokewada reservoir Beed District of Maharashtra, India. Reservoir is 7 km for from the district place. It is the main source of villagers for domestic source, agricultural purpose. The reservoir was divided into four sites. From the sites samples were collected into seasonal intervals. Study of physico-chemical parameters is useful to know the water quality.

MATERIALS & METHODS

The water samples from Dokewada reservoir were collected from four different sites in the morning hours between 8 to 10 am, in 2L plastic bottles. The samples were collected in seasonal interval from the four sides of Dokewada reservoir. The water samples were immediately brought into laboratory for the estimation of 13 physico-chemical parameters like water, air temperature pH, Turbidity, Alkalinity, Calcium, Chloride, Nitrate Sodium, Do, BOD, COD and TDS.

Water temperature, pH were recorded at the time of sample collection, other parameters were estimated in the laboratory by using standard methods by APHA, after collecting the water samples noted the season, date sample no was recorded.

RESULTS AND DISCUSSION

Air Temperature

Air temperature ranges from 20.92⁰C to 33.26⁰C. The maximum temperature 32.26⁰C is recorded in the summer season and minimum was 20.92⁰C in winter season. Similar kind of work was done by S.A. Manjara et. al. (2010), Wanjari H.V. et.al. (2012), In all there are thirteen physico-chemical parameters of Dokewada reservoir four sites of Dokewada reservoir Beed District of Maharashtra were studied for the period of one year Jun-2016 to May-2017.

Water Temperature

Water temperature ranges from 20.4⁰C to 30.91⁰C. The maximum temperature (30.91⁰C) was recorded at S₄ site in summer season while the minimum temperature was (20.4⁰C) at S₄ site in monsoon seasons. It showed that higher temperature in summer and relatively lower in monsoon.

pH

The pH was ranged from 7.21 to 8.2. The maximum pH was 8.2 was recorded at S₃ & S₂ site in summer season. The minimum pH 7.21 was recorded at S₃ site in winter season. N.R. Prasad and J.M. Patil (2008).

Turbidity

The turbidity was ranged from 5 NTU to 18 NTU. The high value of turbidity recorded at S₂ site in monsoon season. The lower value of turbidity was recorded at S₂ site in winter season.

Alkalinity

The alkalinity was ranged from 172 mg/L to 234 mg/L. The maximum value 234 mg/L was recorded at S₄ sites in summer seasons, the minimum value was 172 mg/L recorded at S₃ site in winter seasons. The minimum value was 172 mg/L recorded at S₃ site in winter seasons.

Calcium

The calcium value ranges from 36.4 mg/L to 46.01 mg/L. The highest value 46.01 was recorded at S₄ site in monsoon season & the minimum calcium value was 36.4 mg/L recorded at S₃ site in winter season.

Chloride

Chloride 67 mg/L to 79 mg/L. The maximum value of chloride 79 mg/L at S₄ site in summer season. The lowest value of chloride 67 mg/L at S₂ site monsoon season.

Nitrate

Nitrate value ranges from 5.10 mg/L to 5.72 mg/L. The maximum value of Nitrate 5.72 mg/L at S₁ site in monsoon season. The minimum value of chloride was (5.10 mg/L) recorded at S₄ site summer season.

Sodium

Sodium value ranges from the 22.1 mg/L to 29.2 mg/L. In the present investigation the maximum value of sodium is 29.2 at S₄ site in summer season. The minimum value is 22.1 mg/L at S₃ site in winter season.

DO

The dissolved oxygen was varied from 4.01 mg/L to 7.9 mg/L. Its highest and lowest values were recorded in winter and summer seasons at S₂ site and lowest at S₃ site. Similar work was done by Sakhare & Joshi (2002).

BOD

BOD ranges from 5.2 mg/L to 9.9 mg/L highest value recorded in summer and lowest value was in winter season. Highest at S₂ site while lowest in S₁ site.

COD

Highest COD value was recorded 94 mg/L at S₂ site in summer season. While lowest COD value was recorded 79 mg/L at S₃ site in winter season.

TDS

The total dissolved solids fluctuate from 220 mg/L to 360 mg/L. Maximum value of TDS was recorded (360 mg/L) in summer season at S₄ sites while minimum value of TDS recorded at 230 at S₁ site in winter seasons. These values are under permissible of drinking water.

CONCLUSION

The present investigation ensures that, all of the water quality parameters like air, water, temperature, pH, Turbidity Alkalinity, Calcium, Chloride, Nitrate, Sodium, DO, BOD, COD, TDS were within the permissible limits recommended by WHO standards. Water quality of Dokewada reservoir was found good quality in relation to physico-chemical characters. Reservoirs are important part of ecosystem, comparatively small in size but it perform significant role in biodiversity. Above study physico-chemical parameters of water varied considerably and showed characteristic change in relation to the seasonal changes, it can be concluded that there is a clear cut seasonal variation in physico-chemical parameters of water body. Parameters were vary at different locations (sites). It is might be due to variation in topography geographical conditions.

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Table 1: Seasonal Variation of Physico-Chemical Analysis in S₁ Site

Sr. No.	Name of Parameters	June 2016 to May 2017		
		Monsoon	Winter	Summer
01	Air Temperature	26.82	24.34	33.26
02	Water Temperature	22.80	24.4	26.32
03	pH	7.42	7.50	8
04	Turbidity	14	9	7
05	Alkalinity	180	182	230
06	Calcium	37.2	45.01	39.4
07	Chloride	73	75	77
08	Nitrate	5.72	5.41	5.64
09	Sodium	24.3	23.1	26.8
10	DO	6.2	7.9	5.5
11	BOD	7.1	5.2	09.9
12	COD	93	80	92
13	TDS	270	230	330

Table 2: Seasonal Variation of Physico-Chemical Analysis in S₂ Site

Sr. No.	Name of Parameters	June 2016 to May 2017		
		Monsoon	Winter	Summer
01	Air Temperature	25.82	23.18	32.13
02	Water Temperature	21.29	23.41	29.18
03	pH	7.24	7.54	8.2
04	Turbidity	18	15	10
05	Alkalinity	186	190	220
06	Calcium	40.1	45.90	41.5
07	Chloride	67	68	73
08	Nitrate	5.71	5.31	5.52
09	Sodium	26.35	24.12	26.90
10	DO	6.1	7.7	5.3
11	BOD	7.5	5.4	9.8
12	COD	94	81	93
13	TDS	280	240	332

Table 3: Seasonal Variation of Physico-Chemical Analysis in S₃ Site

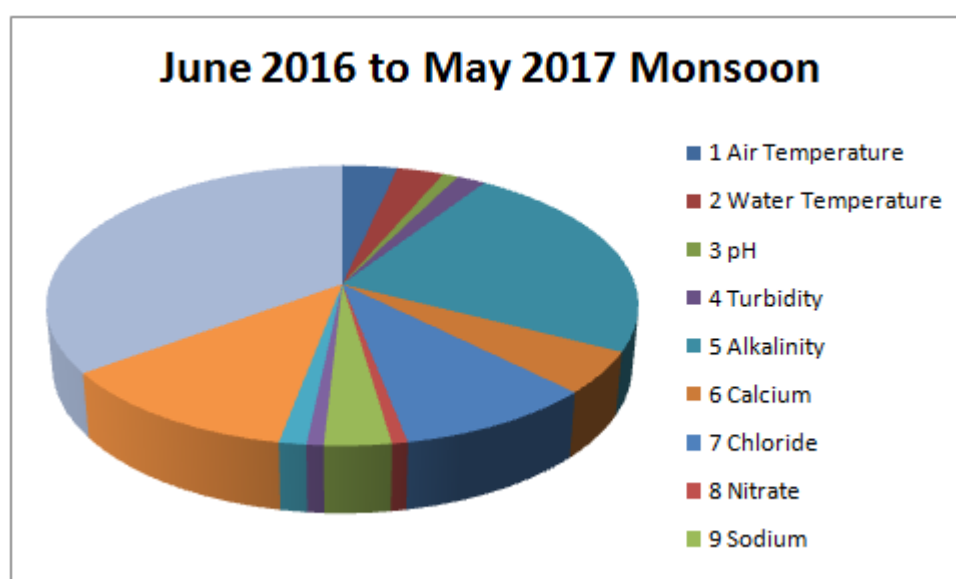
Sr. No.	Name of Parameters	June 2016 to May 2017		
		Monsoon	Winter	Summer
01	Air Temperature	22.19	20.92	32.26
02	Water Temperature	20.1	21.34	29.21
03	pH	7.21	7.30	8.2
04	Turbidity	12	10	06
05	Alkalinity	172	189	231
06	Calcium	36.4	44.01	36.8
07	Chloride	75	77	78
08	Nitrate	5.61	5.32	5.45
09	Sodium	25.4	22.1	25.9
10	DO	5.9	6.8	5.1
11	BOD	7.2	6.1	7.9
12	COD	91	79	90
13	TDS	250	230	320

Table 4: Seasonal Variation of Physico-Chemical Analysis in S₄ Site

Sr. No.	Name of Parameters	June 2016 to May 2017		
		Monsoon	Winter	Summer
01	Air Temperature	26.32	24.1	31.82
02	Water Temperature	20.4	22.14	30.91
03	pH	7.27	7.32	7.91
04	Turbidity	10	9	7
05	Alkalinity	184	187	234
06	Calcium	37.8	46.01	39.4
07	Chloride	74	76	79
08	Nitrate	5.9	5.10	5.52
09	Sodium	26.7	24.1	29.2
10	DO	6.7	7.2	5.9
11	BOD	7.1	6.4	7.9
12	COD	91	82	90
13	TDS	250	220	360

Table 5: Average Values of Physico-Chemical Parameters in Dokewadw Reservoir

Sr. No.	Parameters	Unit	S ₁	S ₂	S ₃	S ₄
01	Air Temperature	(⁰ C)	28.14	27.04	25.12	27.41
02	Water Temperature	(⁰ C)	24.50	24.62	23.55	24.83
03	pH	-	7.64	7.66	7.57	7.5
04	Turbidity	(NTU)	10	14.4	9.3	8.68
05	Alkalinity	(mg/L)	197.3	198.6	197.3	201.69
06	Calcium	(mg/L)	40.53	42.5	39.07	41.07
07	Chloride	(mg/L)	75	69.33	76.66	76.33
08	Nitrate	(mg/L)	5.59	5.51	5.51	5.50
09	Sodium	(mg/L)	24.73	25.79	24.46	26.66
10	DO	(mg/L)	6.54	6.36	5.94	6.6
11	BOD	(mg/L)	7.4	7.56	7.06	7.13
12	COD	(mg/L)	88.33	89.33	86.67	87.66
13	TDS	(mg/L)	276.6	284	266.68	276.7

**Graph 1: Average Values of Physico-Chemical Parameters in Dokewadw Reservoir.**

