



E-ISSN: 2706-8927
P-ISSN: 2706-8919
www.allstudyjournal.com
IJAAS 2023; 5(1): 12-14
Received: 09-10-2022
Accepted: 16-11-2022

Arti Shukla
Research Scholar,
Department of Botany, Govt.
Girls P.G. College, Rewa,
Madhya Pradesh, India

Neeta Singh
Principal, Govt. Girls P.G.
College, Rewa, Madhya
Pradesh, India

Corresponding Author:
Arti Shukla
Research Scholar,
Department of Botany, Govt.
Girls P.G. College, Rewa,
Madhya Pradesh, India

Analysis of water quality using physico-chemical parameters of Bansagar dam in Vindhyan region M.P. India

Arti Shukla and Neeta Singh

DOI: <https://doi.org/10.33545/27068919.2023.v5.i1a.904>

Abstract

Water is a vital resource for human survival. The availability of good quality water is an indispensable feature for prevents diseases and improving quality of life. It is necessary to know details about different physical parameters like color, temperature, Total hardness, pH, sulphate, chloride, DO, BOD, COD and alkalinity used to test water quality. This paper aims to analyze water quality using the Physico-chemical parameters of water samples collected from the Bansagar dam in Vindhyan region of M.P. India.

Keywords: Analysis, water quality, physico-chemical parameters, bansagar dam

Introductions

Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life. Water is one of the most important and abundant compounds in the ecosystem. All living organisms on the earth need water for their survival and growth. Groundwater is used for domestic and industrial water supply and also for irrigation purposes all over the world. In the last few decades, there have been tremendous increases in the demand for freshwater due to the rapid growth of the population and industrialization's accelerated pace. According to the WHO organization, about 80% of all human beings' diseases are caused by water. Once the groundwater is contaminated, its quality cannot be restored quickly, and device ways and means to protect it. Groundwater plays an important role in supplying water to much of the global population for agriculture, drinking water, and industrial purposes.

The Bansagar Dam is one of the biggest and longest Dams, district Shahdol in Central India, covers three different states like Madhya Pradesh, Uttar Pradesh and Bihar. Bansagar or Ban Sagar Dam is a multipurpose river valley built on Sone River situated in the Basin of Ganges in Madhya Pradesh, India envisaging irrigation, fisheries and hydroelectric power generation.

The Bansagar Dam built across the Sone River has been constructed at village Deolond in Shahdol district on the Rewa – Shahdol road, at a distance of 51.4 KM away from Rewa. The project has been started with named as ‘Bansagar’ after Bana Bhatt, the renowned Sanskrit Scholar of 7th Century, who is believed to have hailed from this region in India. Bansagar Dam is located with Latitude 24-11-30 N and Longitude 81-17-15E.

Materials and Methods

The water samples were collected from different stations in the morning hours between 10 to 12 am in Polythene bottle regularly for every month. The water samples were immediately brought into the laboratory to estimate various Physico-chemical parameters like temperature and pH were recorded at the time of sample collection by using a thermometer and Pocket Digital pH Meter. While other parameters such as DO, TDS, Free CO₂, Hardness, Alkalinity, Chlorides, Phosphate, and Nitrate were estimated in the C-MET Laboratory, Pune by using Indian Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) Thermo M5 Model) (Trivedy and Goel,1986, APHA 1985) ^[1-2].

Results and Discussion

Table 1: Physical parameters of water samples of Bansagar dam in Vindhyan region

Month	Temp. K	Turbidity mg/l	TDS mg/l	pH
Jan. 21	294	10.25	210.0	8.06
Feb.21	297	11.61	225.0	8.02
Mar.21	300	14.25	230.2	8.60
Apr.21	309	8.50	166.0	8.50
May.21	316	08.10	130.0	8.10
Jun.21	311	04.30	251.4	7.70
Jul.21	304	07.40	220.0	8.10
Aug.21	302	06.50	130.0	7.69
Sept.21	300	04.30	140.0	7.40
Oct. 21	302	03.70	155.0	7.10
Nov. 21	300	06.70	200.8	7.60
Dec. 21	293	08.20	178.3	8.26

Table 2: Chemical parameters of water samples of Bansagar Dam in the Vindhyan region. (Values are in mg/l)

Month	Free CO ₂	Dissolve Oxygen	Hard ness	Alkalinity	Chlorides	Phosphate	Nitrates
Jan. 21	0.7	9.25	78.8	100.0	21.0	0.9	2.20
Feb.21	0.5	9.00	81.0	105.0	24.0	1.28	2.31
Mar.21	0.9	11.25	94.0	112.0	29.2	1.85	2.80
Apr.21	3.7	12.25	142.0	108.0	30.5	2.90	10.1
May.21	4.5	12.00	136.0	145.0	30.5	1.60	10.5
Jun.21	8.1	14.25	128.0	110.0	30.0	2.90	9.70
Jul.21	8.8	09.30	115.0	115.0	32.0	3.80	8.20
Aug.21	4.4	7.30	105.0	138.0	27.0	5.75	12.8
Sept.21	16.7	8.00	79.0	145.0	29.6	0.75	5.40
Oct. 21	10.7	7.41	97.0	110.0	20.0	0.16	4.50
Nov. 21	14.8	7.15	70.0	103.0	21.0	4.70	5.20
Dec. 21	28.0	8.40	87.0	120.0	29.0	0.85	2.10

Water Temperature

Generally, the weather in the study area is quite cold. However, the water temperature plays a significant role or influences the water body's chemical, bio-chemical characteristics. The maximum temperature of 316K was recorded in May, and a minimum of 293 K was recorded in December in the year 2021. In summer, the water temperature was high due to low water levels, high temperatures, and a clear atmosphere (Gorde and Jadhav, 2013, Shukla & Shukla, 2022) ^[3, 11].

Turbidity

The turbidity of water fluctuates from 3.95 to 14.25 NTU. The maximum value of 14.25 NTU was recorded in March; it may be due to human activities, a decrease in the water level, and presence of suspended particulate matter, and a minimum value of 3.95 NTU in October (Kavitha and Elangovan, 2010 and Mishra and Singh, 2022b) ^[4, 12].

Total Dissolved Solids

The total dissolved solids fluctuate from 140mg/l to 266.4 mg/l. the maximum value (266.4 mg/l) was recorded in June. Due to heavy rainfall and minimum value (140 m/l) in May (Dohare, *et al.* 2014 and Kashyap, 2016) ^[5, 10].

pH

pH was alkaline values ranges from 7.10 to 8.6. The maximum pH value (8.6) was recorded in April (summer), and the pH influences the minimum (7.10) in October, Most of the biochemical and chemical reactions. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates, ultimately responsible for an increase in pH. The low oxygen values coincided with

high temperatures during the summer month. The factors like temperature bring about changes in the pH of water. The higher pH values observed suggest that carbon dioxide and carbonate-bicarbonate equilibrium are affected more due to change in the Physico-chemical condition (Bagde, 2016, Shukla & Shukla, 2022 and Mishra and Singh, 2022b) ^[6, 11, 12].

Dissolved Oxygen

The value of DO fluctuates from 7.15 mg/l to 14.25mg/l. The maximum values (14.25 mg/l) were recorded in June, and minimum values (7.15 mg/l) in November. The high DO in summer is due to an increase in temperature, and the duration of bright sunlight influences the % of soluble gases (O₂ & CO₂). During summer, the long days and intense sunlight seem to accelerate photosynthesis by phytoplankton, utilizing CO₂ and giving off oxygen. This possibly accounts for the greater qualities of O₂ recorded during summer (Mohiuddin, 2015, Mishra and Singh, 2022b) ^[7, 12].

Free Carbon dioxide

The value of free CO₂ ranges from 0.9 mg/l to 28 mg/l. The maximum value (38 mg/l) was recorded in December (winter) and the minimum value (0.9mg/l) in March. This may depend upon the alkalinity and hardness of the water body. The value of CO₂ was high in December (Mohiuddin, 2015, Shukla & Shukla, 2022) ^[7, 11].

Hardness

The value of hardness fluctuates from 78 mg/l to 142 mg/l. The maximum value (142 mg/l) was recorded in April (summer), and the minimum value (78 mg/l) in January was

reported to total hardness was high during summer than monsoon and winter. The high value of hardness during summer can be attributed to a decrease in water volume and an increase in the rate of evaporation of water (Sonawane, 2003 and Mishra and Singh, 2022b) ^[8, 12].

Alkalinity

Total alkalinity ranges from 100 mg/l to 145 mg/l; the maximum value (145 mg/l) was recorded in May (summer) and the minimum value (100 mg/l) in January (winter). The alkalinity was at maximum value in May (summer) due to increased bicarbonates in the water (Sonawane, 2003 and Kashyap, 2016) ^[8, 10].

Chlorides

The values of chlorides range from 21 mg/l to 30.5 mg/l. The maximum value (30.5 mg/l) was recorded in May (summer) and the minimum value (21 mg/l) in January. In the present study maximum value of chloride reaches in summer (Sonawane, 2010 and Mishra and Singh, 2022b) ^[9, 12].

Phosphate

The value of phosphate fluctuates from 0.75 mg/l to 5.75 mg/l. the maximum value (5.75mg/l) was recorded in August (monsoon) and the minimum value in September (winter). The high values of phosphate in August (monsoon) months are mainly due to rain, surface water runoff, agriculture runoff, washerman activity could have also contributed to the inorganic phosphate content (Sonawane, 2003&2010) ^[8, 9].

Nitrates

The values of nitrate range from 2.10 mg/l to 10.5 mg/l. the maximum value (10.5 mg/l) was observed in August, and the minimum (2.10 mg/l) in December (Sonawane, 2003&2010) ^[8, 9].

Acknowledgement

Authors are thankful to the authority of Govt. Girls P.G. College, Rewa (M.P.) to carry out to this work.

References

1. Trivedy RK, Goel PK. Chemical and biological Methods for water pollution studies. Environmental Publications, Karad (India); c1986. p. 1-211.
2. APHA. Standard methods for the examination of water and wastewater. 16th Edn. American Public Health Association, Washington; c1985. p. 1268.
3. Gorde SP, Jadhav MV. Assessment of water quality parameters: a review. Journal of Engineering Research and Applications. 2013;3(6):2029-2035.
4. Kavitha R, Elangovan K. Groundwater quality characteristics at Erode district, Tamil Nadu India. International Journal of Environmental Sciences. 2010;1(2):145.
5. Dohare D, Deshpande S, Kotiya A. Analysis of groundwater quality parameters: A review. Research Journal of Engineering Sciences. 2014;3(5):26-31.
6. Bagde N. Groundwater quality assessment and its impact with special reference to Chhindwara District of Madhya Pradesh, India. International J of Life Sciences. 2016;4(1):116-120.
7. Mohiuddin M. Assessment of groundwater quality in Gokunda Taluka Kinwat of Nanded District,

8. Maharashtra (India). International Recognized Double-Blind Peer Reviewed Multidisciplinary Research Journal; c2015;2(12).
9. Sonawane VY. Physico-Chemical and Metallic Characterization of Industrial Effluent and Nearby Well Water in Pen Region, Dist. Raigad, Maharashtra., Asian J of Chem. 2003;15(3 &4):1883-1886.
10. Sonawane VY. Water Quality of Drinking Waters in Parbhani City: A Case Study. J of Chem. and Pharma. Res. 2010;2(5):104-107.
11. Kashyap, Vinita R. Physico-chemical analysis of various water samples of Rewa district (M.P.) India. International Journal of Applied Research. 2016;2(1):311-313.
12. Shukla, Bramhanand, Shukla, Nidhi. Physicochemical analysis of Mohan Ram Talab of Shahdol (M.P.), International Journal of Advanced Academic Studies. 2022;4(3):189-191.
13. Mishra, Reenu, Singh, Neeta. Assessment of water quality status of major aquatic bodies of Vindhyan region (M.P.) India, International Journal of Advanced Academic Studies. 2022b;4(3):18-22.