SSRG International Journal of Chemical Engineering Research
ISSN: 2394 – 5370 /doi:10.14445/23945370/IJCER-V7I3P101

Volume 7 Issue 3, 1-3, Sep-Dec 2020

Analysis of Water Quality using Physico-chemical Parameters of Vishnupuri Dam in Nanded District, Maharashtra

Vilas Y Sonawane

Department of Chemistry
B. Raghunath Arts, Commerce and Science College, Parbhani, 431401, Maharashtra, India

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 Vishnupuri dam in Nanded district, Maharashtra, India.

Keywords *Analysis, Water quality, Physico-chemical parameters, Vishnupuri dam*

I. INTRODUCTION

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.

II. 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 CO_2, 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 M5Model) (Trivedy and Goel,1986, APHA 1985).

III. Results and Discussion

TABLE1. Physical parameters of water samples of Vishnupuri Dam in Nanded district

Month	Temp.K	Turbidity mg/l	TDS mg /l	P^H
Jan-2019	294	10.25	210.0	8.06
Feb-2019	297	11.61	225.0	8.02
Mar-2019	300	14.25	230.2	8.60
Apr-2019	309	8.50	166.0	8.50
May-2019	316	08.10	130.0	8.10
Jun-2019	311	04.30	251.4	7.70
Jul-2019	304	07.40	220.0	8.10
Aug-2019	302	06.50	130.0	7.69
Sep-2019	300	04.30	140.0	7.40
Oct-2019	302	03.70	155.0	7.10
Nov -2019	300	06.70	200.8	7.60
Dec-2019	293	08.20	178.3	8.26

Table2. Chemical parameters of water samples of Vishnupuri Dam in the Nanded District. (Values are in mg/l)

Month	Free CO_2	Dissolve Oxygen	Hardness	Alkalinity	Chlorides	Phosphate	Nitrates
Jan-2019	0.7	9.25	78.8	100.0	21.0	0.9	2.20
Feb-2019	0.5	9.00	81.0	105.0	24.0	1.28	2.31
Mar-2019	0.9	11.25	94.0	112.0	29.2	1.85	2.80
Apr-2019	3.7	12.25	142.0	108.0	30.5	2.90	10.1
May-2019	4.5	12.00	136.0	145.0	30.5	1.60	10.5
Jun-2019	8.1	14.25	128.0	110.0	30.0	2.90	9.70
Jul-2019	8.8	09.30	115.0	115.0	32.0	3.80	8.20
Aug-2019	4.4	7.30	105.0	138.0	27.0	5.75	12.8
Sep-2019	16.7	8.00	79.0	145.0	29.6.	0.75	5.40
Oct-2019	10.7	7.41	97.0	110.0	20.0	0.16	4.50
Nov-2019	14.8	7.15	70.0	103.0	21.0	4.70	5.20
Dec-2019	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 2019. In summer, the water temperature was high due to low water levels, high temperatures, and a clear atmosphere [1].

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[2].

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 [3].

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 [4].

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 (O_2& CO_2). During summer, the long days and intense sunlight seem to accelerate photosynthesis by phytoplankton, utilizing $CO_2$and giving off oxygen. This possibly accounts for the greater qualities of O_2recorded during summer [5].

Free Carbon dioxide

The value of free CO_2 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 CO_2 was high in December[5].

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 [6].

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 [6].

Chlorides

The values of chlorides range from 21 mg/l to30.5 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 [7].

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 [6,7].

Nitrates

The values of nitrate range from 2.10 mg/l to10.5 mg/l. the maximum value (10.5 mg/l) was observed in August, and the minimum (2.10 mg/l) in December [6, 7].

REFERENCES

[1] S.P. G*orde . And MV, Jadhav .,* "Assessment of water quality parameters: a review". Journal of Engineering Research and Applications, 3(6), pp2029-2035., 2013.

[2] R.Kavitha . and Elangovan K., *"Groundwater quality characteristics at Erode district, Tamilnadu India*". International Journal of Environmental Sciences, 1(2), pp145., 2010.

[3] D. Dohare ., Deshpande S. and Kotiya A., "*Analysis of groundwater quality parameters: a review*". Research Journal of Engineering Sciences, 3(5), pp26-31., 2014.

[4] N.Bagde. "*Groundwater quality assessment and its impact with special reference to Chhindwara District of Madhya Pradesh, India".* International J. of Life Sciences,4(1), pp116-120., 2016.

[5] M**.**Mohiuddin., "*Assessment of groundwater quality in Gokunda Taluka Kinwat of Nanded District, Maharashtra (India*)". International Recognized Double-Blind Peer Reviewed Multidisciplinary Research Journal,2(12)., 2015.

[6] VY. Sonawane ., "*Physico–Chemical and Metallic Characterization of Industrial Effluent and Nearby Well Water in Pen Region*", Dist.-Raigad, Maharashtra., Asian J. of Chem., 15 (3 &4), pp1883-1886.,2003.

[7] VY. Sonawane ., "*Water Quality of Drinking Waters in Parbhani City: A Case Study*"., J. of Chem. and Pharma. Res., Vol.2 (5), pp104-107., 2010.