iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VII **Month of publication:** July 2021

DOI: https://doi.org/10.22214/ijraset.2021.37039

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

Study of Drinking Water Quality Parameters of Jaykwadi Dam

Ramesh M Naval
PG Department of Analytical Chemistry, Jijamata College of Science and Arts, Bhende, INDIA

***Abstract:** This study is restricted in terms of water quality for drinking purpose. Various Physico-chemical Parameters like pH, conductivity. TDS are measured in laboratory by using digital pH meter, digital conductivity meter and TDS recording kit. By sung standard laboratory methods the Parameters Such as sodium, and potassium by Flame photometry. Calcium, Magnesium, Sodium, Potassium, Sulphate, Nitrate, and Iron were estimated in the Laboratory. Total dissolved solids, TDS, was measured by evaporation method. Biochemical oxygen demand, BOD, represents the amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic (in presence of oxygen) conditions at a specified temperature. BOD was measured by sodium thiosulphate titration method. Chemical oxygen demand, COD, was measured by titration of potassium dichromate and sodium thiosulphate.*
***Keywords:** Water, Quality, BOD, COD, Physico-chemical Properties.*

I. INTRODUCTION

This document is a template. To irrigate land for agriculture in the drought prone Marathwada region of Maharashtra state the largest earthen dam is constructed in 1976 on Godavari River at the site of Jayakwadi village. This is located in Paithan Tahasil in District of Aurangabad, Maharashtra, India. It is the largest project in the state of Maharashtra. This project is not only to irrigate agriculture land but it also fulfills the requirement of water required for industrial areas located in Aurangabad and Jalana districts. It also provides water for drinking to nearby towns and villages and to some of the municipalities of Ahmednagar, Aurangabad and Jalana districts. Nath-Sagar Jalashaya is the name of the reservoir formed by Jayakwadi Dam. Fed by the Godavari and Pravara rivers the reservoir is about 55 km long and 27 km wide and spans over 350 km2. Total submergence area due to the reservoir is approximate 36,000 hectares.

This study is restricted in terms of water quality for drinking purpose. WHO recommends permissible limits for various parameters for drinking water. WHO reports that approximately 36% of urban and 65% of rural Indian population has no access of safe drinking water [1],[2],[3]. Different studies ware given the limits of various parameters found in drinking water, Manoj Kumar and Avinash Puri reviewed permissible limits of drinking water [4]. Arivoli Appavu et al., studied physico-chemical parameters, such as temperature, pH, electrical conductivity, hardness, chlorides, alkalinity, DO, BOD5, COD, phosphate and sulphate of water samples from Cauvery River in Erode, they found that Cauvery river water is contaminated by effluents from small scale industries and dumping of wastages from markets and domestic use wastages [5]. Venkatachalapathy and Karthikeyan also reported the pollution of drinking water due to disposal of Sewage, Industrial wastes and other human activities [6]. Begum et al found that the pathogen, toxic metal, chemical compounds such as pesticides, herbicides and other industrial waste are the major contributors for the pollution of drinking water [7]. Mishra et al evaluated physico-chemical properties, carbon dioxide, dissolve oxygen and total dissolved solid content in the water of chilika Lagoon [8].

All physico-chemical parameters are important for the human health, Nyamangara et al shown that the high phosphate level causes muscle damage, problem with breathing and kidney failure [9]. Chang studied the dissolved oxygen as an important environmental parameter that decides ecological health of stream and protect aquatic life [10]. According to Gurunathan the landscape alteration and human interfere has an extensive influence on watershed hydrology. [11]

II. MATERIALS AND METHODS

For water sample collection, the locations ware selected in such a way that the samples should be representative of drinking water supplied from the Jayakwadi Dam. Drinking water supply projects are established in the backwater area of the Jayakwadi dam. The Water Samples were collected in the Morning Hours between 8 Hrs to 10 Hrs. All samples are stored and packed at the site in sterilized glass bottles. Each bottle is marked with sample number, area code, date and time of sampling. Temperature of water sample is recorded immediately after collection of sample at sight with the help of mercury thermometer. Various Physico-chemical Parameters like pH, conductivity.

©IJRASET: All Rights are Reserved

TDS are measured in laboratory by using digital pH meter, digital conductivity meter and TDS recording kit. By sung standard laboratory methods the Parameters Such as sodium, and potassium by Flame photometry. Calcium, Magnesium, Sodium, Potassium, Sulphate, Nitrate, and Iron were estimated in the Laboratory. Total dissolved solids, TDS, was measured by evaporation method. Biochemical oxygen demand, BOD, represents the amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic (in presence of oxygen) conditions at a specified temperature. BOD was measured by sodium thiosulphate titration method. Chemical oxygen demand, COD, was measured by titration of potassium dichromate and sodium thiosulphate.

III.RESULTS AND DISCUSSION

Different physico-chemical parameters were studied for the collected water samples.

A. Temperature

It is important parameter for safe drinking water. By measuring temperature of water sample we can see the characteristics of the water sample for possible health effects. Temperature of water is an important factor in determining whether a body of water is acceptable for human consumption and use. Temperature can have profound effects on dissolved oxygen (DO) and biological oxygen demand (BOD). The fluctuation in river water temperature usually depends on the season, geographic location, sampling time and temperature of effluents entering the stream [12]. The temperature of water sample is recorded at the time of sampling at the location where the sample is collected so that it can represent the temperature of the water in the sample location. It was found that the minimum and maximum temperature range is 25.8°C to 29.9°C measured with good-grade mercury-filled Celsius thermometer. The increase in temperature of the water increases the rate of evaporation of the water.

B. pH

The pH values of the samples ranged from 7 to 8.5, where most of the water samples at different location tested in the study were found to be in the permissible range of pH value recommended by several health and pollution control organizations.

C. Electrical Conductivity

Electrical conductivity can tell you how much dissolved substances, chemicals, and minerals are present in the water. Electric conductivity is varying in the range of 210 µS/cm to 320 µS/cm for various samples.

D. Total Dissolved Solids (TDS)

TDS values showed a considerable variability ranging from 150 mg/L to 245 mg/L. But this range is safe for drinking purpose as per various standard norms.

E. Biological Oxygen Demand (BOD)

The biodegradation of organic materials exerts oxygen tension in the water and increases the biochemical oxygen demand [13]. The value for BOD was found to be maximum 32 mg/L and minimum 25 mg/L.

F. Chemical Oxygen Demand (COD)

COD determines the quantities of organic matter found in water. This makes COD useful as an indicator of organic pollution in surface water [14]. The COD varies in the range of 130 mg/L to 322 mg/L.

All physico-chemical properties are studied by reported methods and are summarized in Table I and Table II.

Table I
Physico-chemical Parameters

	pH*	Electrical Conductivity* µS/cm	TDS* mg/L	Temperature* °C	BOD* mg/L	COD* mg/L
Sample A	7.5	260	190	27.0	27	322
Sample B	7.2	230	170	25.8	25	280
Sample C	8.5	210	245	26.0	30	130
Sample D	7	320	150	29.9	32	200
Standard	6.8	290	95	30	--	--

* Mean of 10 samples of each location

©IJRASET: All Rights are Reserved

Table II
Chemical Parameters

	Sample A* mg/L	Sample B* mg/L	Sample C* mg/L	Sample D* mg/L	Standard mg/L
Calcium	92	73	88	95	99
Magnesium	73	78	78	75	140
Sodium	95	82	82	78	82
Potassium	85	78	88	75	75
Sulphate	145	190	155	175	170
Nitrate	42	45	42	42	41
Iron	0.73	0.85	0.91	0.82	0.92

* Mean of 10 samples of each location

IV. CONCLUSIONS

Amounts of minerals such as calcium, magnesium, sodium, potassium, sulphate, nitrate and iron were present below than WHO recommended level. From the study it can be concluded that the water is safe for drinking purposes from the point of view of levels of pH, EC, TDS, and all other physico-chemical parameters.

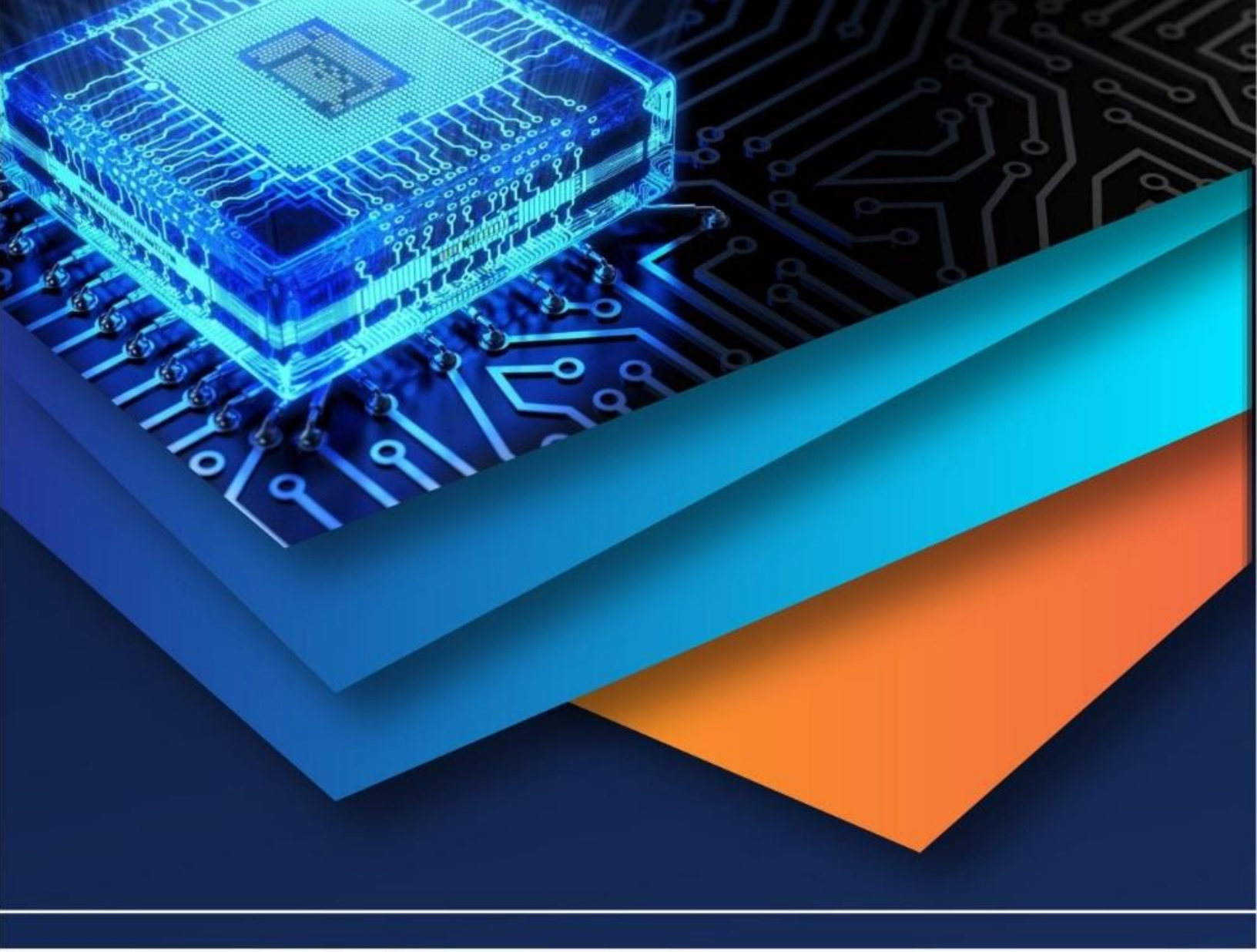
V. ACKNOWLEDGMENT

Author is thankful to Management, Shri Marutrao Ghule Patil Shikshan Sanstha, Dnyaneshwarnagar, Bhende and Principal, Jijamata College of Science and Arts, Bhende, Maharashtra, INDIA, for providing necessary laboratory facilities.

REFERENCES

[1] WHO, Water Health and Human Rights, World Water Day. http://www.worldwaterday.org/thematic/hmnrights.html#n4, 2001.
[2] WHO, Guidelines for Drinking Water Quality, Geneva, Report No: WHO/SDE/WSH 03.04, 2003.
[3] WHO, Guidelines for Drinking Water Quality, Geneva, Report No: WHO/SDE/WSH 06.07, 2006.
[4] Manoj Kumar and Avinash Puri, A Review of Permissible Limits of Drinking Water, Indian J Occup Environ Med. Jan-Apr, 16(1) 40-44, doi 10.4103/0019-5278.99696, 2012.
[5] Arivoli Appavu et al., Study of water quality parameters of Cauvery River water in Erode region, Journal of Global Biosciences, Volume 5, Number 9 pp. 4556-4567, 2016.
[6] Venkatachalapathy, R.and Karthikeyan,P, Physical, Chemical and Environmental Studies on Cauvery River in Parts of Tamil Nadu (Mettur and Bhavani), Universal Journal of Environmental Research and Technology, (3), 3: 415-422, 2013.
[7] Begum, A., and Harikrishna, Study on the quality of water in some streams of Cauvery river, Journal of Chemistry, (5), 377-384, 2008.
[8] Mishra S. and Lingaraj P, Evaluation of physico-chemical property- carbon dioxide, dissolve oxygen and total dissolved solid content in the water of chilika Lagoon. J. Global Biosci. 4(2):1543- 1550, 2015.
[9] Nyamangara J., Jeke N. and Rurinda J, Long term nitrate and phosphate loading river water in the Upper Manyame catchment, Zimbabwe water SA, 39(5):637-642, 2013.
[10] Chang H, Spatial and temporal variations of water quality in the river and its tributaries, Seoul, Korea, 1993-2002 Water Air Soil Pollut, 161, 267-284, 2002.
[11] Gurunathan, A, Shanmugam, C.R, Customary Rights and their Relevance in Modern Tank Management: Select Cases in Tamil Nadu, Paper prepared for the workshop entitled 'Water, Law and the Commons' organized in Delhi, 2006.
[12] Ahipathi M V and Puttaiah E T, Ecological Characteristics of Vrishabhavathi River in Bangalore (India), Environmental Geology, 49: 1217-1222, 2006.
[13] Abida B. and Harikrishna, Study on the Quality of Water in Some Streams of Cauvery River, E-Journal of Chemistry, 5, (2): 377-384, 2008.
[14] King, J. M., Scheepers, A.C.T., Fisher, R.C., Reinecke, M.K. & Smith, L.B., River Rehabilitation: Literature Review, Case studies and Emerging Principles, WRC Report No. 1161/1/03, 2003.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)