IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Assessment Of Physicochemical And Biological Parameters For The Narmada River Water

Rajul Sharma[1], Noor Ahmad[2], O. N. Choubey[3],

1. Research Scholar, Madhyanchal Professional University, Bhopal (M.P.)
2. Professor of Chemistry, Madhyanchal Professional University, Bhopal (M.P.)
3. Professor of Chemistry, Govt. Narmada College, Narmadapuram (M.P.)

Abstract: - Narmada River is the lifeline of Madhya Pradesh, A Study was conducted for the evaluation of Water Quality. Physicochemical and Biological Parameters Such as – pH, TDS, Conductivity, Alkalinity, Total hardness, DO, BOD, and COD, etc., were done according to the Parameters determined by APHA and BIS method. This was observed that the water quality was found to be poor in the All season because this water condition by humans activity.

Keywords: - Narmada River, physicochemical and Biological parameters, APHA, BIS method.

Introduction: - Narmada River is the lifeline of Madhya Pradesh, A Study was conducted for the assessment of the Water quality at Narmadapuram. River Narmada plays an important role in the natural, cultural, and economic aspects of the state of Madhya Pradesh in India. Due to pollution in the past few decades, there have been serious changes in aquatic activities and the environment. In recent times, there have been serious concerns about the safe use of river water for drinking and other purposes. Many pollutants are playing a major role in degrading the quality of water of river Narmada.

Environmental pollution is increasing day by day due to urbanization and industrialization. Water quality is degrading through variation in chemical and microbiological properties at different places along the banks of the Narmada River. The impact of human-induced environmental changes is being evaluated and studied.

Objective

1. Determine various physicochemical and biological parameters for the study of Narmada River water.
2. To determine the physiochemical and biological status of Narmada River.

Work done

1. In the present study, water samples were collected every year from various sites along the Narmada River.
2. The samples were analyzed for 12 different physicochemical attributes like pH, BOD, COD, Total Coliform, Temp, DO, Alkalinity, Chlorides, Calcium, Magnesium, and Hardness as Calcium Carbonate and TDS.
3. The measurement of the water quality index according to WHO were taken into consideration over time.

Methodology

(i) Area of Study

The study was conducted along river Narmada, in the district of Narmadapuram (M.P.),

(ii) Research design

The research has been carried out to define the water quality and analyzed various physicochemical parameters like Temperature, pH, turbidity, DO, BOD, and COD.

The above physicochemical and biological parameters were determined as per the method suggested by APHA. The Temperature pH and DO were recorded immediately after the collection of the sample, other samples were analyzed in a laboratory within 24hrs. The methods adopted for the different parameters are as follows.

Volumetric method

This method was used for the following parameter –

Dissolve oxygen, BOD, COD, Total hardness,

Instrumental Method

This method was used for the following parameter-

Temperature, pH conductivity, turbidity.

Following parameters like, BOD, COD, pH, Turbidity, TDS, and total coliforms values were found to be very high in river water.

(iii) Statistical analysis

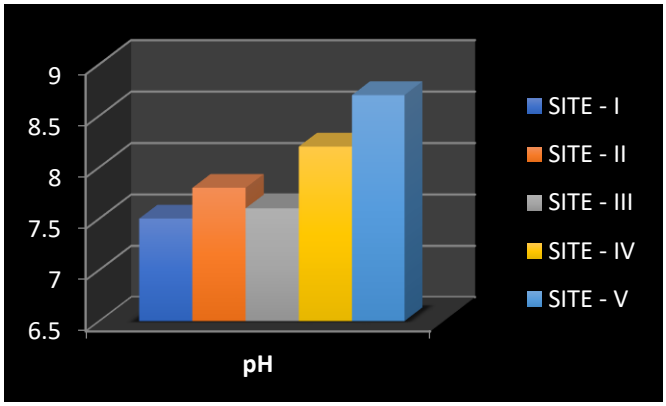
The Statistical analysis was performed for correlation and test. The water quality index will be calculated to check the suitability of water for human consumption.

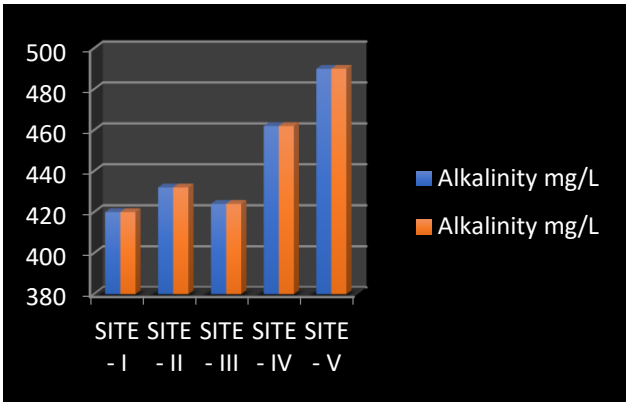
Result: - The present study of various physicochemical and Biological parameters on the water of Narmada River Suggested that the values of different parameters depend upon the hydrochemistry of the study area. The results obtained during the present study are tabulated in Table 1. The results are shown by statistical evaluation as Minimum and Maximum values, Average Values, Standard Deviation, Standard Variance, Standard Error, and 95% Confidence Limit of the parameters for Narmada River water are presented in Table 1. The parameter's value is corrected by the WHO Standard value. The resulting value of the below parameters is poor.

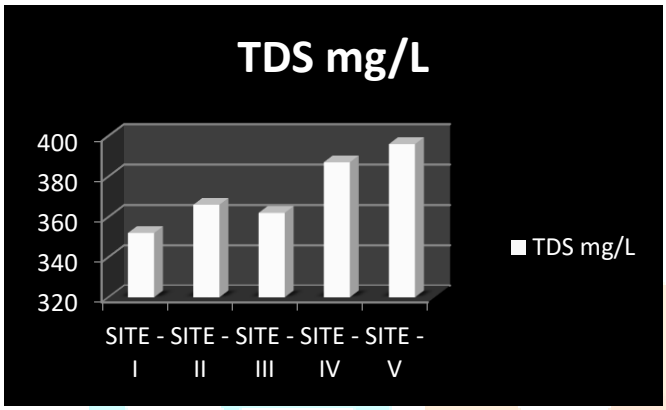
MEAN VALUES OF PHYSICOCHEMICAL & BIOLOGICAL PARAMETERS AT SAMPLING SITES IN THE NARMADA RIVER WATER

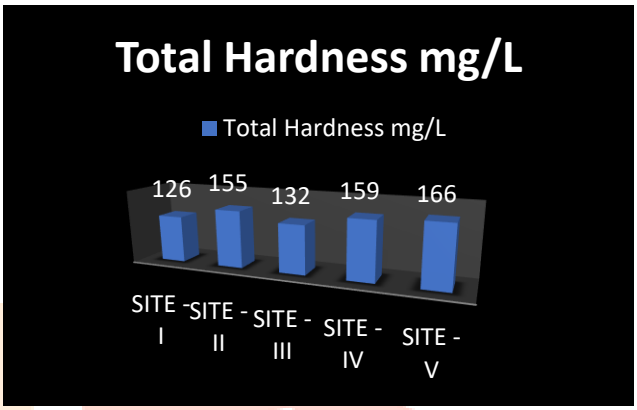
Table – 1

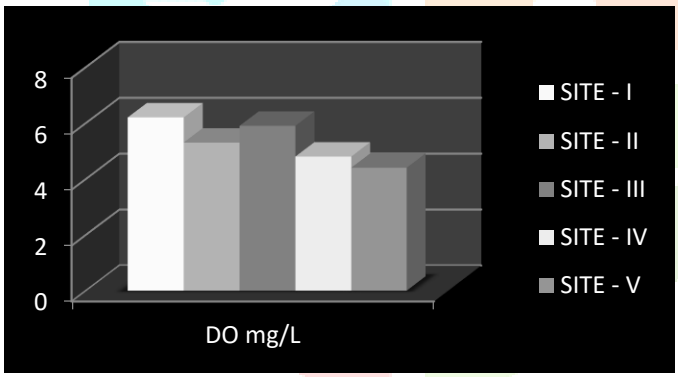
S.No.	PARAMETER	SITE - I	SITE - II	SITE - III	SITE - IV	SITE - V	Standard Value of Water WHO
1	pH	7.5	7.8	7.6	8.2	8.7	7
2	Alkalinity mg/L	420	432	424	462	490	20-200 mg/L
3	TDS mg/L	352	366	362	387	396	50-150 mg/L
4	Total Hardness mg/L	126	155	132	159	166	120-170 mg/L
5	DO mg/L	6.2	5.3	5.9	4.8	4.4	4.5 mg/L
6	BOD mg/L	5.6	4.9	5.3	4.7	4.1	3-5 mg/L
7	COD mg/L	48	69	57	78	92	100-250 mg/L
8	Chloride mg/L	188	198	191	204	209	250-1000
9	Phosphate mg/L	0.7	1.2	0.9	1.9	2.4	3 mg/L
10	Nitrate mg/L	0.6	1.1	0.8	1.2	1.3	10 mg/L
11	Zinc (Zn) mg/L	0.162	0.168	0.166	0.172	0.176	5-15 mg/L
12	Coliform count/ml	3400-28500	4200-67400	3200-26600	3600-28600	4000-75200	10000/100 ml

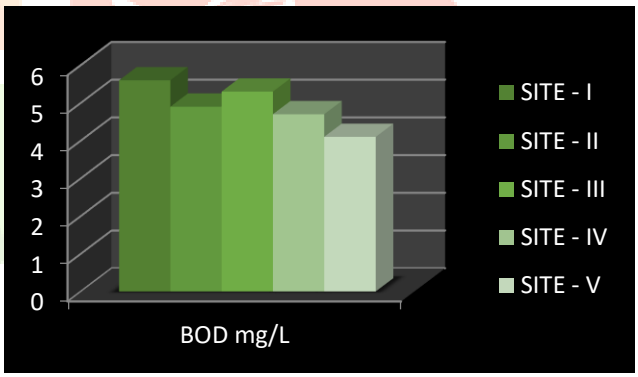

9
8.5
8
7.5
7
6.5
pH
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V

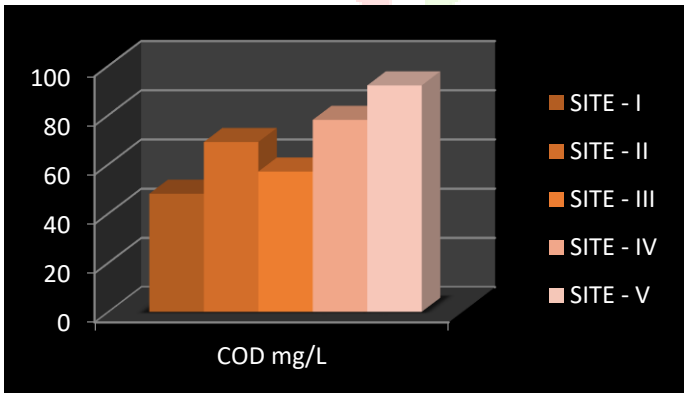

500
480
460
440
420
400
380
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V
Alkalinity mg/L
Alkalinity mg/L

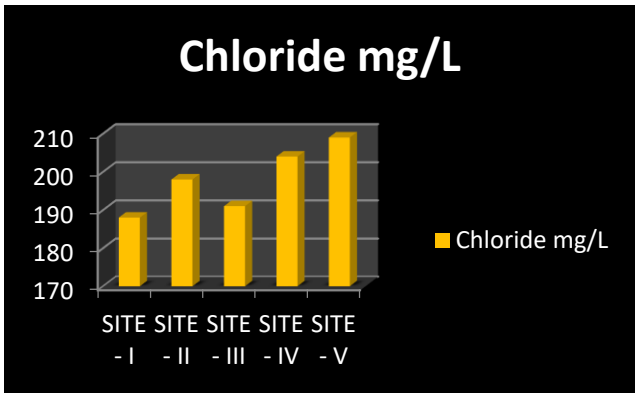

TDS mg/L
400
380
360
340
320
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V
TDS mg/L

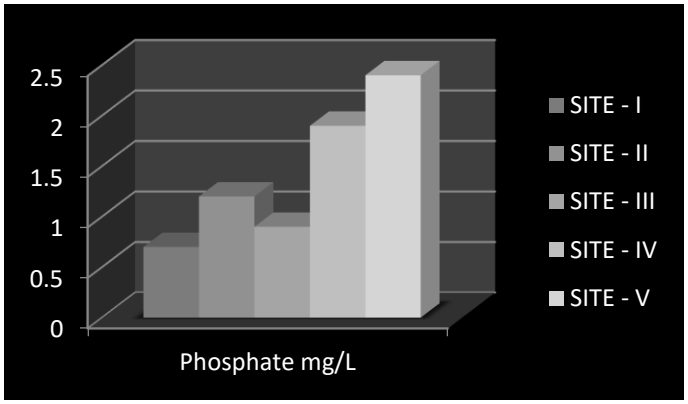

Total Hardness mg/L
Total Hardness mg/L
126
155
132
159
166
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V

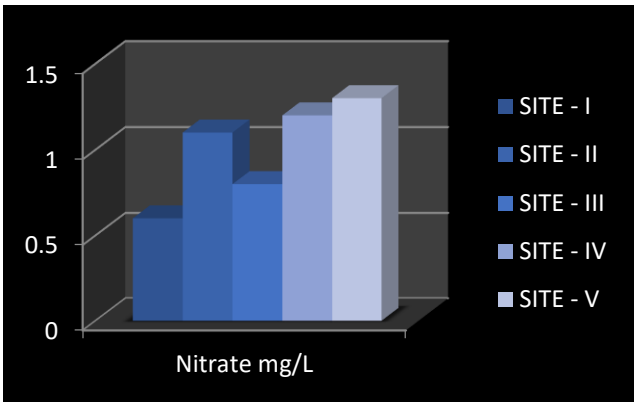

8
6
4
2
0
DO mg/L
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V

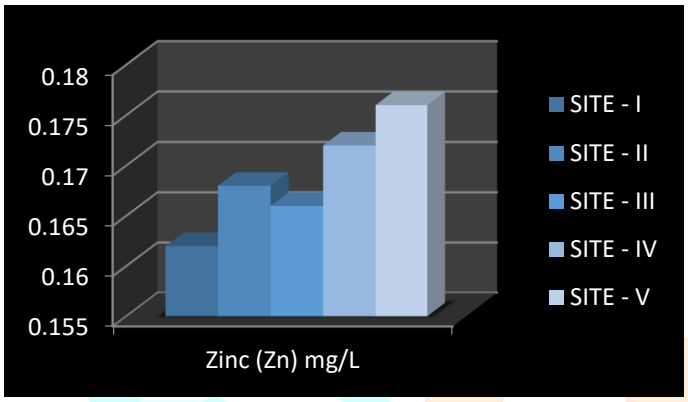

6
5
4
3
2
1
0
BOD mg/L
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V

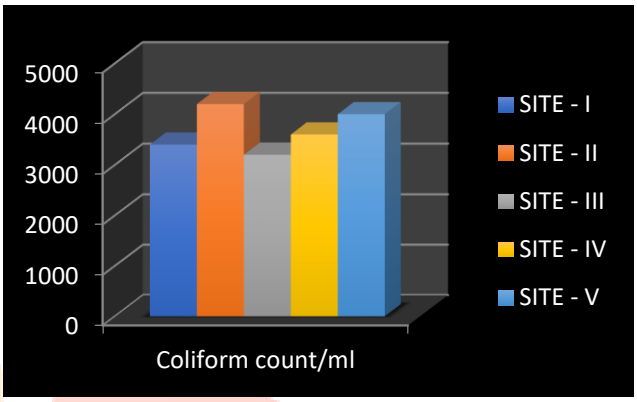

100
80
60
40
20
0
COD mg/L
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V


Chloride mg/L
210
200
190
180
170
SITE - I
SITE - II
SITE - III
SITE - IV
SITE - V
Chloride mg/L









Graphical Presentation of the above Physicochemical and Biological Parameters

Conclusion: - A Study was considered for the assessment of the Water Quality by Physicochemical and Biological Parameters Such as – pH, TDS, Alkalinity, Total hardness, DO, BOD, COD, Chloride, Phosphate, Nitrate, Zinc, Coliform, etc. All the Parameters were determined by APHA and BIS methods.
In the present study we observed that the water quality was found to be poor during all seasons because of this water condition by human activity, and municipal and domestic sewage.

References

1. ASHUTOSH MALVIYA, S.K. DIWAKAR, SUNANDA, O.N. CHOUBEY, "Chemical assessment of Narmada river water at Hoshangabad city and Nemawar as the navel of the river in Central India", Oriental Journal of Chemistry, Vol. 26(1), 319-323 (2010).
2. Sharma et al. "Analysis of Water Pollution Using Different Physicochemical Parameters: A Study of Yamuna River", Frontiers in Environmental Science Volume 8, 581591 (2020).
3. Nidhi Gupta, Pankaj Pandey, Jakir Hussain, "Effect of physicochemical and biological parameters on the quality of river water of Narmada, Madhya Pradesh, India" Water Sci. Vol. 48, 13 (2017).
4. Saurabh Mishra, Amit Kumar, "Estimation of physicochemical characteristics and associated metal contamination risk in the Narmada River, India", Environ. Eng., Vol.26(1), 190521 (2021).
5. Deepak Gupta et al. "Water quality assessment of Narmada River along the different topographical regions of central India" Water Sci. Vol. 34, 202-212 (2020).
6. Nathan Rickards et al. "Understanding Future Water Challenges in a Highly Regulated Indian River Basin—Modelling the Impact of Climate Change on the Hydrology of the Upper Narmada", Water, Vol. 12, 1762 (2020).
7. Sanjeev Gour, Mamta Gour, "Study on Water quality of Narmada River by analyzing physicochemical and biological parameters using random forest model", IJCSE, Vol.7(1), 2347-2693 (2019).
8. Sabyasachi Swain, S. K. Mishra & Ashish Pandey, "A detailed assessment of meteorological drought characteristics using simplified rainfall index over Narmada River Basin, India", Environmental Earth Sciences, Vol.80, 21 (2021).

9. Sanjeev Gour, Shailesh Jaloree and Mamta Gour, "Water Quality Assessment using Association Rule Mining for River Narmada", In. J. of sci. abd Tech., Vol. 9 ISSN 0974-6846 (2016).
10. Krishna Kumar Yadav, Neha Gupta, Vinita Kumar, Sudarshana Sharma, Sandeep Arya, "Water Quality Assessment of Pahuj River using Water Quality Index at Unnao Balaji, M.P., India", In. J. of sci.; basic and Applied Res. Ijsbar ISSN 2307- 4531 (2015).
11. Sanjay Kumar Verma, Dr. Saleem Akhtar, "Assessment of Water Pollution in Lakes of JABALPUR" Int. J of Adv. Rese. In sci. Engi. And Tech. Vol. 2 ISSN: 2350- 0328 (2015).
12. Anjali Chaurasia, Ankit Kumar and Vipin Vyas, "Study on the ecological status of Chandni nalla- A tributary of River Narmada in the central zone, India" Int. J. of Rese. In Envir. Sci. and Tech. ISSN: 2249-9695 (2015).
13. Sumit Dabral, "An Integrated Geochemical and Geospatial Approach for Assessing the Potential Ground Water Recharge Zones in Mahi -Narmada Inter Stream Doab Area, Gujarat, India" J. of Envi. and Earth science Vol. 3 No 2 ISSN 2224 – 3216 (2013).
14. Soni Virendra, Khwaja Salahuddin, and Visavadia Manish, "Preimpoundmental studies on Water Quality of Narmada River of India" Int. Rese. J. of Envior. Sci. Vol 2 (6) 31-38 (2013).