

# To Study the Effect of Turbidity on Physicochemical Parameters and to Study the Correlation Between Turbidity and Hardness

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**Abstract:-** Godavari River is the second largest river in India. In the present work some physicochemical parameter was studied for the analysis of Godavari River. The attempt has been made by selecting the six sampling locations along the stretch of 18Km long of Godavari River in Nashik City. Through the analysis it has been found that for the restricted study area, the strongest positive correlation exists between turbidity and Hardness ( $R^2=0.92$ ) and Turbidity and Total Solids ( $R^2=0.95$ )

This results will be applicable for monitoring and maintaining the quality of river water as well as for forecasting the status of Pollution due to various causes. The above relationship will be helpful for the real time prediction of hardness and total solids with an instant determination of turbidity. This results will be widely applicable for textile and sugar industries.

**Keywords:-** correlation, Godavari River, Total solids, Total Dissolved Solids, Total suspended solids, Turbidity.

## I. INTRODUCTION

Unregulated growth of urban areas, particularly over two decades, without providing infrastructure services for proper collection, transportation, treatment and disposal of domestic waste led to increased pollution and health hazards. The municipal and local authorities are unable to control the pollution of Godavari river due to various points of discharge along the river which has an alarming situations and needs to be focused for the necessary actions. In India all 15 major rivers have become polluted. *Ganga, Godavari, Gomati, Knavery, Narmada and Mahi* all are facing pollution problems. The Ganga from *Haridwar* to *Kolkata* is infect an unending sever fit only to carry urban liquid waste, half burnt dead bodies, pesticides and other waste. The chief sources of water pollution are sewage and other waste, Industrial effluents, Agricultural discharges and Industrial waste from chemical industries, fossil fuel plants

## II. OBJECTIVES

- To find out correlation between turbidity and hardness of water sample taken from Godavari river.

- To perform the physio-chemical analysis on the collected samples for various parameters.
- To check the turbidity concentration with hardness concentration, to predict total solids concentration within short period in Godavari River at Nasik.

## III. MATERIAL AND METHODS

For the completion of this project within stipulated time following methodology has been adopted during the project standard procedures and precaution have been Implemented as per, IS 3205(part 15) – reaffirmed 2003 for determination of TS, IS 3025(Part 10) 2002 for determination of turbidity, IS3025 (Part 21) for determination of hardness.

Authority	HDL	MPL
BIS	5 NTU	10 NTU
GOI	2.5 JTU	10 JTU
WHO	5Mg/liter	2.5 Mg/liter

Table 1. Standard Recommendations for Turbidity

For Drinking Water In, (Mg/Liter As Caco3)

Authority	HDL	MPL
BIS	300	600
GOI	200	600
WHO	100	500

Table 2. Standards Recommendations For Hardness

## IV. METHODOLOGY

- Fixed the sampling location along the main stream of river by considering different location as per development like agriculture, industrial, commercial, residential and public area and their sanitary outlet points.

- Coded the sampling points as A1, A2, A3, A4, A5, and A6 along main stream starting from BalajiMandir to Pushapk Nagar.
- planned the sampling date and considering sampling locations.
- Tagged the sampled at location with GPS for accuracy and uniformity in sampling seasonal variation TABLE I
- Lab tested for collected samples as per standard procedure and by following standard precaution for pH, Turbidity, stream flow, Total solid, Total dissolved solid, Total suspended solid, Dissolved oxygen and temperature .as per planned dates and schedule.
- Interpretation of physical observation and graph along with correlation.

letter A1, A2, A3.... A6. In the study area sample collection carried out following region respectively

Sample	Location	Latitude	Longitude
A1	BALAJI MANDIR	20° 01' 45.89" N	73° 43' 25.17" E
A2	SOMESHWAR	20° 1' 23.04" N	73° 43' 42.59" E
A3	BAPU PULL	20° 1' 16.73" N	73° 45' 16.64" E
A4	RAMWADI	20° 00' 32.24" N	73° 46' 56.26" E
A5	TAPOWAN	19° 59' 59.72" N	73° 48' 46.64" E
A6	PUSHAPK NAGAR	19° 59' 24.02" N	73° 49' 20.2" E

Table 3. Gps Coordinate of Sampling Locations

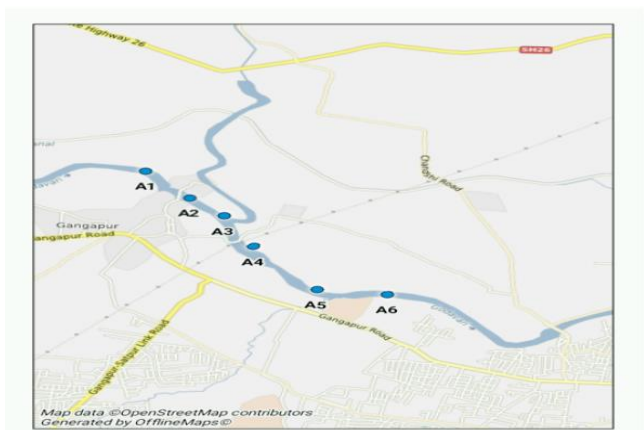


Fig 1:- Map of Locations

Above map shows the various sampling location within the study area for analysis of Godavari river in Nashik city. Main stream sample along the river design by

**V. RESULTS**

During the sampling and testing following results were obtained.

SAMPLE NO.	TEMP .	pH	TURBIDITY (NTU)	DO (Mg/lit)	T.S. (Mg/lit)	T.D.S. (Mg/lit)	HARDNESS (Mg/lit)
A1	27°	8.1	87.0	6.9	120	120	136
A2	27°	8.05	75.5	6.8	120	120	164
A3	27°	8.05	72.2	6.8	150	40	208
A4	27°	7.92	67.7	6.7	230	80	284
A5	27°	7.88	65.5	6.7	280	40	292
A6	27°	7.87	62.9	6.5	320	160	308

Table 4. Test Resultsof Sampling No.1

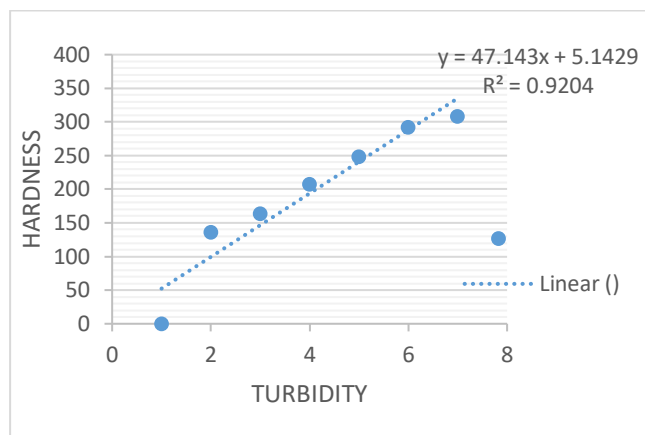


Fig 2:- Correlation Between Turbidity And Hardness

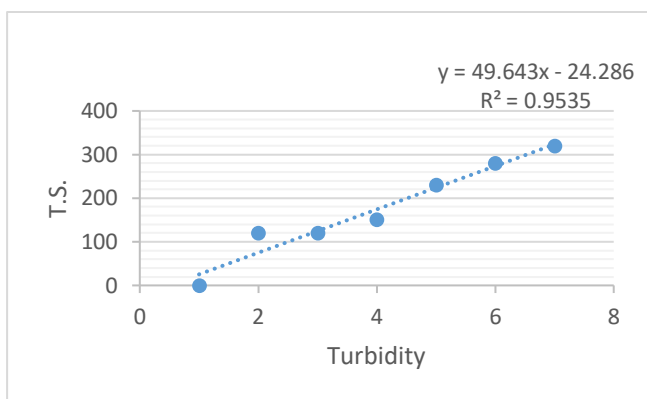


Fig 3:- Correlation Between Turbidity And T.S.

## VI. RESULT ANALYSIS

From the test results in table no.1 it has been found that hardness over on increasing turbidity level ( $R^2=0.92$ ). the above results are applicable in predicting probable hardness within permissible limit laid down by BIS, and also this results will be applicable for industrial application where the accuracy in determination of hardness is not expected. Although the established correlation will be applicable only for the sample stream and need to be enhanced further for more detailed prediction of hardness or many factors will be affect's to results like pH, Temperature, addition of stream and eutrophication. also the sampling knowing the turbidity result will be able to predict possible hardness which is an indication of enrichment of water bodies with nutrient which further leads to eutrophication. So if we know the turbidity we will able to predict possible hardness and possible occurrence of eutrophication effects.

## VII. CONCLUSION

From this study the strong relation was established between turbidity and hardness & turbidity and total solids which can be enhanced with maximum number of sampling and can be studied over seasonal variation.

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