



THE LIMNOLOGICAL STUDY OF GODAVARI RIVER, NEAR SOMESHWAR, NASHIK FOR HUMAN HEALTH SAFETY AND LIVING ORGANISMS

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ABSTRACT:

The present study shows the scope and significance of seasonal variations in physico-chemical parameters such as Temperature, pH, total alkalinity, dissolved oxygen, free carbon dioxide, total dissolved solids and chlorides has been studied during the three seasons summer, monsoon and winter from February 2020 to January 2021. Water quality samples were collected from selected points of river segment near the Someshwar in Nashik. The result of present investigation helps to understand the study of physico-chemical parameters of Godavari River, Nashik (M.S.). This water is used for drinking, agricultural, industrial purposes and remote areas. In this paper we revealed water quality of river as a greater portion of population depends on it. In conclusion the various parameters under investigation are within the permissible range and it is suitable for drinking, irrigation and industrial purposes.

Keywords: Godavari River, Someshwar, Seasonal variations, Limnological study, Physico-chemical parameters.

INTRODUCTION:

Water quality is important for drinking, agriculture and industrial use. The aquatic resources of the country are its national wealth. Water resources need special interest for conservation, development and management for suitable and sustainable utilization. Aquatic ecosystem is progressively coming under the permanent pressure of anthropogenic pollutants. The water constitutes the "trouble spot" of all ecosystems by standard literature like Brandy and Weil². The supply of water quality remains a major challenge for humanity in the 21st century, Schwarzenbach et al.¹⁷. The whole human kind needs water for sustainable life; the provision of safe drinking water supply is high priority issue for safeguarding the health and well-being humans by Standard literature like Van Leeuwen¹⁹ and WHO²⁰ and is an important development issue at national, regional and local level, WHO²⁰.

The Godavari River is a second largest river in India, originating from the hilly ranges of Trimbakeshwar, Nashik District, and

Maharashtra. It flows the states of Maharashtra, Madhya Pradesh, Karnataka, Orissa and Andhra Pradesh. Godavari River does not flow throughout the year. It carries the heavy water along with all sediments during the rainy seasons. With the flowing it makes the area fertile and its water is used for drinking, irrigation, industries and other domestic purposes due to this it worshiped as a holy Dakshin Ganga originates in the Trimbakeshwar, Nashik District and flows through most of the part of Maharashtra, as lifeline of the region and flourishes the floral and faunal diversity. All the aquatic and associated flora and fauna affected due to any alternation of the water quality of river so it is very important that the water parameters should be within the permissible range for all the organisms, the study of these physico-chemical parameter fitness of biotic life can be identified some water parameters were taken to study the Godavari River water near the Someshwar, Nashik where selected for

sampling station which content water throughout the year. Water samples were collected near the Someshwar in Nashik District during period from February 2020 to January 2021. Study reveals that the water is a extensively used all the waste drain directly without treatment into the river. Water of the region has heavy pollution and excessive sand excavation affect the aquatic life of the region. Aim of the present investigation is to find out the pollution level of water due to increased anthropogenic activities in the region as the river water utilized for drinking, irrigation, industrial and domestic purposes. The main purpose was to gain the basic knowledge of the river water for enhancement of physico-chemical parameters that will ultimately lead to the better fishery management and profitable aquaculture of other species. Since Nashik is a pilgrim city. Water quality of Godavari River can affect rich flora and fauna. River water used for irrigation, agriculture and industrial purposes can be polluted.

METHODOLOGY:

Studies of all physico-chemical parameters were collected from Godavari River near Someshwar, District Nashik during February 2020 to January 2021. Temperature was measured directly on field by thermometer; pH measurement was carried out by a pH meter (Elico L1120). The water samples were collected from depth of 5-10 cm below the surface water in acid washed plastic bottles. The samples were collected in every month of first week in the morning hours between 11.00 am to 1.00 pm for analysis of other Physico-chemical parameters including Dissolved oxygen, free carbon dioxide, total alkalinity, total dissolved solids, total hardness, chloride. Biodiversity of aquatic flora and fauna which is commercially important for human beings as a food for consumption as well as for the nature and aquatic ecosystem. The analysis was carried by standard methods were used by APHA¹.

RESULTS AND DISCUSSION:

Monthly Variations in physico-chemical parameters are summarized in Table 1.

Temperature: The temperature is one of the most important physical parameters due to effects on biochemical reaction. Population

fluctuations of water body are seen in the rise of temperature speeds up the biochemical reactions and reduce the solubility of gases and biological activities of aquatic media. In present investigation the maximum temperature was recorded 32°C in the month of May 2020 and minimum temperature 15.5°C in the month of December 2020. Similar fluctuation recorded from Girna River Nashik by Garde⁶. Similar observation recorded by Salve¹³⁻¹⁴, the temperature in the winter in Wanparakalpa reservoir, Nagapur near ParaliVajjnath, District Beed.

pH: The acidic or alkaline nature of water is indicated by pH, which is an important factor for water analysis. Most of the biochemical reactions are influenced by pH. In aquatic ecosystem since most of the organisms have adapted an average pH ranged between 7.3 to 8.4. In a present investigation the maximum pH was observed 8.4 in the month of May 2020 and minimum pH was observed 7.3 in the month of October 2020. Similar observations were recorded by many investigators like Baber³, Kadam⁸, Pawar¹¹, and Sakhare¹⁶.

Dissolved Oxygen: The dissolved oxygen is most important factor of aquatic ecosystem bringing out various biochemical changes and its effects on metabolic activities of organisms. The maximum dissolved oxygen noted 8.6 mg/L in the month of January 2021 may be due to low atmospheric temperature. Minimum dissolved oxygen was recorded 5.2 mg/L in the month of May 2020 due to high metabolic rate of organisms. Similar observations are also made by another investigator like Jindal⁷, Kadam⁸ and Sakhare¹⁶.

Free Carbon dioxide: Carbon dioxide showed considerably variation throughout year. The free carbon dioxide varied from 0.79 mg/L to 3.2mg/L being maximum in the month of August 2020 and minimum in the month of November 2020. The maximum carbon dioxide observed in monsoon season followed by summer season. Nil carbon-dioxide recorded in the winter; this is due to high photosynthetic activity. There was absence of free carbon dioxide from October to March in Ruti dam, Tal-Ashti, Dist. Beed, and Maharashtra. Similar result was obtained by Kamble⁹ and Dwivedi⁵.

Total alkalinity: The total alkalinities were varied from 160 mg/L to 220 mg/L. Minimum in the month of August 2020 and maximum in the month of May 2020. Our result matches with Babar³ and Salve¹³⁻¹⁴.

Total dissolved solids: The total dissolved solids were varied from 150 mg/L to 242 mg/L. Minimum in the month of April 2020 and maximum in the month of October 2020. Similar observation made by Pawar¹¹, Shashtri¹⁸ and Kamble⁹.

Total hardness: Total hardness recorded during the investigation period being maximum 138 mg/L in the month of July 2020 and minimum 122 mg/L in the month of November 2020 and January 2021. Similar observation made by Bhagde⁴ and Sakthivel¹⁵.

Chlorides: The Chlorides concentration depends upon catchment area and chemical composition of various factors. The Chlorides were recorded minimum 14.4 mg/L in the month of August 2020 and maximum 30.2 mg/L in the month of May 2020. The Values of chlorides are not high throughout the study period. Similar investigation matches with other like Kadam⁸, Parpurna¹⁰ and Ravikumar¹².

CONCLUSION:

The result of present investigation indicated that the mean values of temperature, pH were highest in the summer season and lowest in the winter season. Mean values of dissolved oxygen and total dissolved solids were highest during the winter season and lowest during summer season. The mean values of total alkalinity and chlorides were highest during summer season and lowest during monsoon. Mean values of free carbon dioxide and total hardness highest in the monsoon season and lowest in the winter season. In a water sample from Someshwar, Nashik District, the Limnological study indicates that physico-chemical parameters undertaken to assess the water quality were found to be within permissible range authorized by regulating agencies by WHO²⁰. Therefore, river water is suitable for drinking, agricultural and industrial purposes. Hence it is recommended that regular monitoring is needed to maintain the water quality.

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Table 1: Physico-Chemical Values of Water Samples of Godavari River during February 2020 to January 2021.

Physico-Chemical Parameters during February 2020 to January 2021.									
Season	Months	Temperature	PH	DO mg/L	Free CO₂ mg/L	Total Alkalinity mg/L	Total dissolved Solid mg/L	Total hardness mg/L	Chloride mg/L
Summer	Feb.20	24°C	7.3	7.8	0.79	190	185	130	20.9
	Mar.20	30°C	7.4	7.1	0.84	205	160	136	24.7
	Apr.20	31°C	8.4	6.8	1.5	210	150	134	30.1
Monsoon	May.20	32°C	8.4	5.2	1.05	220	160	138	30.2
	Jun.20	25.5°C	7.4	5.3	1.39	200	171	128	22.8
	July.20	22.5°C	7.3	6.1	1.99	180	190	138	18.6
	Aug.20	21°C	7.4	6.9	3.2	160	202	138	14.4
	Sept.20	20.5°C	7.5	7.2	2.02	180	211	140	14.7
Winter	Oct.20	20°C	7.3	8.1	0.79	190	242	128	16.3
	Nov.20	18.5°C	7.4	8.4	0.79	185	226.5	122	16.2
	Dec.20	15.5°C	7.5	8.4	0.89	185	228	128	16.4
	Jan. 21	19.5°C	7.6	8.6	0.97	180	216.5	122	18.8