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Studies on seasonal variations in physico-chemical parameters in Pravarasangam segment of Godavari and Pravara river of Newasa Taluka District Ahmednagar (M.S.), India

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Abstract

The present study focused on scope and significance on Seasonal variations of different physico-chemical parameters such as Temperature, pH, total alkalinity, dissolved oxygen, free carbon dioxide, total dissolved solids, and chloride were studied during the three season's summer, monsoon, and winter from February 2018 to January 2019. The result of present investigation reveals to understand the limnological knowledge of Godavari and Pravara river water near Pravarasangam in Newasa Tahsil District Ahmednagar, Maharashtra. This water is used for drinking and agricultural purposes for various villages & remote areas. The local fisherman used fish farming activities. In this paper we have made an effort to assess the water quality of river as a greater portion of population depends on it. Also, many devotes across the country consider it as holly water. For the study of water quality samples were collected from selected points of river segment near the Pravarasangam simultaneously throughout the year (February 2018 to January 2019) in Newasa Tahsil, District. Ahmednagar. After evaluating all the eight parameters it is revealed that even though there are some changes of values of study areas but though there are some changes of values of study areas but though are within the limit of water quality of Bureau of Indian Standards.

Keywords: Pravarasangam segment, Seasonal variations, Fishing activities, Physico- chemical parameters.

Introduction

Water quality is important for drinking, agriculture, aquaculture 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 Weil [1]. The supply of quality water remains a major challenge for humanity in the 21th century. Schwarzenbach *et al.* [2]. The whole human kind needs water for sustaining 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 Leeumen [3]; and WHO [4] and is an important development issue at national, regional and local level, WHO [4].

The Godavari River is a second largest river in India, originating from the hilly ranges of Trimbakeshwar, Nashik District, Maharashtra. It flows the states of Maharashtra, Madhya Pradesh, Karnataka, Orissa and Andhra Pradesh. Godavari River does not flow throughout the year. It carries heavy water along with all sediments during rainy seasons. With the flowing it makes the area fertile and its water is used for drinking, irrigation, for industries and other domestic purposes due to this it worshiped as holy Dakshin Ganga originates in Trambakeshwar, 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 parameters fitness of biotic life can be identified some water parameters were taken to study the Pravarasangam segment of river water were selected for sampling station which content water throughout year. Water samples were collected near Paravarasangam in Newasa Tahsil during period from February 2018 to January. 2019. Study reveals that the water is 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 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, 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 better fishery management and profitable aquaculture of other species.

Methodology

Studies of all physico-chemical parameters were collected from Pravarasangam segment of river water near the Pravarasangam, Tahsil Newasa, District Ahmednagar during February 2018 to January. 2019. Temperature was measured directly on field by thermometer; pH measurement was carried out by a pH meter (Elico LI120). The water samples were collected from depth of 5-10cm below the surface water in acid washed plastic bottles. The samples were collected in every month of first week in 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 are commercially important for human beings using as food for consumption as well as for the nature and aquatic ecosystem. The analysis were carried by standard methods were used by APHA [5].

Results and Discussions

Monthly variations in physico-chemical Parameters are summarized in Table 1.

Temperature:
The temperature is one of the most important physical parameter due to effects on biochemical reaction and population fluctuations of water body are seen the rise

in temperature speed up the biochemical reactions and reduces the solubility of gases and biological activities of aquatic media. In present investigation the maximum temperature was recorded 32.5^{0}C in the month of May 2018 and minimum temperature 15.5^0 C in month of December 2018. Similar fluctuation recorded from Girana River, Nashik by Garde [6], similar observation recorded by Salve [7-8] the temperature in winter in Wanparakalpa reservoir, Nagapur near Parali Vaijnath, District Beed.

pH:

The acidic or alkaline nature of water is indicated pH, which is an important factor for water analysis. Most of the biochemical and chemical reactions are influenced by pH. The aquatic ecosystem since most of the aquatic organisms are adapted to an average pH ranged between 7.3 to 8.4. In present investigation the maximum pH was observed 8.4 in month of May 2018 and minimum pH was observed 7.3 in the month of March 2018. Similar observations were recorded by many workers studied the investigation, Baber [9], Kadam [10],Pawar [11] and Sakhare [12].

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 winter season may be due to low atmospheric temperature. Minimum dissolved oxygen was recorded 5.2 mg/L in summer months due to high metabolic rate of organisms. Similar observations are also made by other investigation like Jindal [13], Kadam [10] and Sakhare [12].

Free Carbon dioxide:

Carbon dioxide showed considerably variation throughout year. The free carbon-dioxide varied from 0.75 mg/L to 3.59 mg/L being the maximum in the month of August 2018 and minimum in the month of December 2018. The maximum carbon dioxide observed in monsoon month followed by summer months. Nil carbon dioxide recorded in winter, this is due to high photosynthetic activity. There was absence of free carbon dioxide from September to March in Ruti dam Tal-Ashti, Dist. Beed, Maharashtra. Similar result was obtained by Kamble [14] and Dwivedi [15]

Table 1: Physico - Chemical Values of Water Samples of Pravarasangam segment of river water during February 2018 to January2019.

Season	Month	Temperature	P^H	DO mg/L	Free CO_2mg/L	Total Alkalinity mg/L	Total dissolved Solids mg/L	Total hardness mg/L	Chlorides mg/L
Summer	**Feb.18**	25^{0}C	7.4	7.9	0.79	190	188	134	20.9
	Mar.18	31^{0}C	7.3	7.2	0.84	205	170	136	24.7
	Apr.18	31^{0}C	8.3	6.6	1.9	210	160	138	30.1
	May.18	32.5^{0}C	8.4	5.2	1.4	220	167	140	30.4
Monsoon	**Jun.18**	26^{0}C	7.3	5.6	1.09	200	176	126	22.8
	July.18	23.5^{0}C	7.4	6.2	2.01	180	218	140	18.6
	Aug.18	20.5^{0}C	7.3	6.8	3.59	165	223	142	13.4
	Sept.18	21.5^{0}C	7.5	6.3	0.75	180	228	140	14.7
Winter	**Oct.18**	20.5^{0}C	7.3	7.9	0.75	190	245	120	16.3
	Nov.18	17.5^{0}C	7.4	8.0	0.76	185	228.5	124	16.2
	Dec.18	15.5^{0}C	7.6	8.3	0.75	185	230	124	16.4
	Jan.19	20.5^{0}C	7.6	8.6	0.75	180	215	130	18.8

Total Alkalinity:
The total alkalinity varied from the study period being maximum 220 mg/L in the month of May 2018 and minimum 165 mg/L during month of August 2018. Our result matches with Baber [9] and Salve [8], similar findings trends were occur in the water bodies.

Total dissolved Solids:
The total dissolved solids were varied from 160 mg/L to 245 mg/L minimum in the months of April 2018 and maximum 245 mg/L in the month of October 2018. Similar observation made by Pawar [11] and Kamble [14].

Total Hardness:
Total Hardness recorded during the investigation period being maximum 142 mg/L during in the month August 2018 and minimum 120 mg/L in the month of October 2018 Similar observation made by Bhagde [16].

Chlorides:
The Chlorides concentration depends upon in catchment area and chemical composition of various factors. The chlorides were recorded minimum 13.4 mg/L in the month of August 2018, and maximum 30.4 mg/L in the months of May 2018. The values of chlorides are not high throughout the study period. Similar matches with other like Kadam [10] and Ravikumar [17].

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 solid were highest during the winter season and lowest during summer season. The mean values of total alkalinity and chloride 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 Pravarasangam of river water in Newasa taluka, Ahmednagar district. The study indicated that physico-chemical parameters undertaken to assess the water quality of Godavari and Pravarariver water near Pravarasangam of Ahmednagar district were found to be below the permissible limit set by regulating agencies by WHO [4]. Therefore this study indicates that the water of river is suitable for drinking, irrigation and industrial purposes. Hence it is recommended that regular monitoring is needed to maintain water quality.

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