



Evaluation of Physicochemical Parameters of Godavari River From Kopargaon Tahasil, Dist- Ahmednagar, India

KEYWORDS

Physicochemical parameter, Godavari River, Kopargaon Tahasil

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ABSTRACT Godavari River worshiped as holy Dakshin Ganga which origin in Nashik District at Trambekshwar and flows through most of the part of Maharashtra, as lifeline of the region and flourishes the floral and faunal diversity. Study of physicochemical parameter is the litmus paper test to know the health of aquatic water body. Water samples were collected from Kopargaon Tahasil during the period of one year from June 2013 to May 2014. Here with the study of physicochemical parameter we come to know the health of freshwater ecosystem at Kopargaon Tahasil, District Ahmednagar. 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 utilizes for drinking, irrigation, industrial and several domestic purpose.

INTRODUCTION: From ancient day's human civilization started at bank of rivers, from past to till extra burden on riverine ecosystem has been increases extensively and natural resources from river have been exploited to alarming level. River Godavari' originates at 'Triambakeshwar' in Nasik & empties in Bay of Bengal. The Godavari River is a major waterway in India, next to Ganges and Indus rivers. It is seasonal river; the color of the river is turbid yellow during the monsoons, while in the rest of the seasons the water is clear and greenish. The river has Holy importance. It is regarded one of the most religious rivers due to religious significance of 'Kumbh Mela'. Along its flow there are important cities, industrial centers, important bridges, and dams like Jaikwadi project.

Godavari River in Maharashtra is over exploited which automatically affect the health of the river. In early decades river flows continues throughout the year but now a days it only flows in rainy season and threatening entire flora and fauna inhabit along the river. From past some year's river stop flowing in winter and in summer very few water bodies visible which harbor the aquatic plants and animals. This is due to improper Sewage disposal, Industrial waste, excessive use for irrigation, over exploitation of river water for several purposes, formation of KT ware after regular interval, over sand excavation in river bed. River flourishes the freshwater ecosystem which occupies small area in comparison to marine water. In past few decades there has been tremendous concern on the quality of freshwater as influenced by anthropogenic activities. The studies of physico-chemical parameters of various water bodies have been performed in different countries (Habib et al., 1997). Almost 200 million people in india do not have access to safe and clean drinking water and 90% of the country's water resources are polluted (Easton et al., 1995)

The present investigation has been undertaken to measure physicochemical analysis of Godavari river at Kopargaon. Physicochemical water analysis is the prime consideration to assess the quality of water for the best usage drinking, bathing, irrigation, fishing, industrial processing and other domestic purposes. The physicochemical water parameters are very much important from ecological point of view. So the present data gives an idea regarding the health of freshwater of Godavari river at Kopargaon region.

MATERIALS AND METHODS:

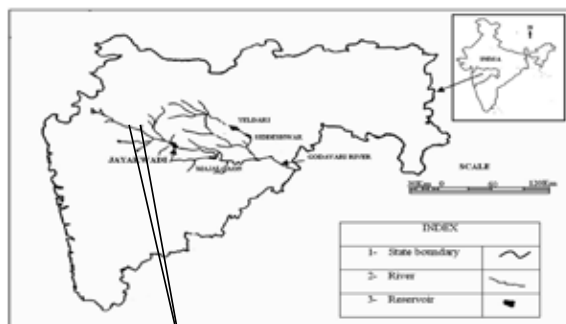


Figure:1 River area selected for the study of water parameters

Water samples were collected from Kopargaon Tahasil, District Ahmednagar over a period of one year from June 2013 to May 2014 for physico-chemical analysis such as Temperature, P^H, DO, Electric Conductivity, TDS and Hardness. The water parameter investigation sites have been shown in Figure:1. The water samples were collected in sterile plastic bottle of 2 liters capacity from the stations. At the collection site Temperature and P^H were measured with mercury based Thermameter and pocket size P^H meter respectively, for rest of the analysis water immediately taken in to laboratory. All the samples were analysed as per the standard methods of APHA (1995).

Results and Discussion:

| Parameter → Month ↓ | Temperature (°C) | P ^H | DO (mg / l) | Electric Conductivity (µmhos/cm) | TDS (mg / l) | Hardness (mg / l) |
|------------------------|------------------|----------------|-------------|----------------------------------|--------------|-------------------|
| June | 21 | 7.8 | 6.1 | 341 | 270 | 160 |
| July | 22 | 7.3 | 5.6 | 339 | 265 | 176 |
| August | 24 | 7.5 | 6.2 | 351 | 254 | 180 |
| September | 25 | 7.9 | 6.9 | 365 | 257 | 175 |
| October | 27 | 8.2 | 6.4 | 384 | 249 | 166 |
| November | 24 | 7.6 | 7.1 | 393 | 230 | 170 |
| December | 22 | 7.5 | 6.8 | 378 | 239 | 162 |
| January | 20 | 7.4 | 6.6 | 369 | 251 | 153 |

| | | | | | | |
|----------|----|-----|-----|-----|-----|-----|
| February | 23 | 7.6 | 6.2 | 356 | 247 | 155 |
| March | 26 | 7.8 | 5.8 | 351 | 260 | 160 |
| April | 28 | 8.1 | 5.4 | 348 | 267 | 157 |
| May | 29 | 8.0 | 5.1 | 343 | 271 | 150 |

Table:1

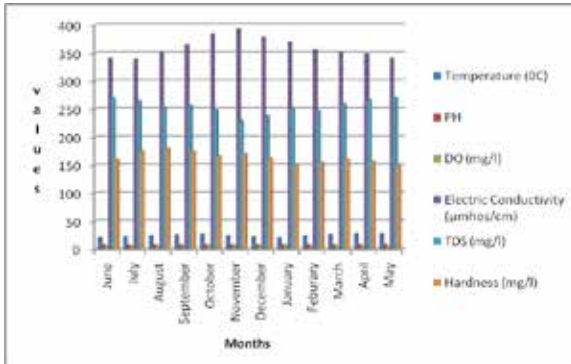


Figure:2

Temperature: Temperature of water plays an important role in physicochemical, metabolic and physiological behavior of aquatic ecosystem. At higher temperature solubility of oxygen and other gases decreases and water becomes tasteless. During summer the water temperature was higher because of low water level, low velocity, clear atmosphere and greater solar radiation. Minimum water temperature in rainy and winter months can be explained on the basis frequent clouds, high percentage of humidity, high current velocity and high water level. An important physical relationship exists between the amount of dissolved oxygen in water body and its temperature simply, "warmer the water, less the dissolve oxygen and vice versa." Respiration of organisms is temperature related; respiration rates can increase by 10% or more per 1°C temperature rise. Therefore, increased temperature not only reduced oxygen availability, but also increases oxygen demand, which can add to physiological stress to fishes, phytoplankton and zooplankton (Desai 1995, Sharma and Selvaraj 2000). The temperature of freshwater of the region was maximum (29°C) in May and minimum (20°C) in January.

pH: P^H of the water affects the toxicity of the substances, As P^H falls (solution becomes more acidic) many insoluble substances become more soluble and thus available for absorption. P^H of freshwater of Godavari river in the Kopargaon region was maximum (8.2) in October and minimum (7.3) in July

DO: Dissolved oxygen (DO) refers to the volume of oxygen that water contains, Adequate dissolved oxygen is necessary for good water quality. Oxygen is necessary element to all forms of life (Shivkumar et al., 2000). Natural stream purification processes requires adequate oxygen level in order to provide for aerobic life forms. Lower the concentration the greater the stress. An adequate supply of dissolved oxygen gas is essential for the survival of aquatic organisms (Smith, 1990). Dissolved oxygen of the Godavari river water in Kopargaon Tahasil was maximum (7.1) in November and minimum (5.1) in May.

EC: Electric Conductivity is one way to measure of the inorganic materials including calcium, bicarbonate, nitrogen, phosphorus, iron, sulphur and other ions dissolved in a water body. It is measured by placing a conductivity probe in the sample and measuring the flow of electricity between the electrodes. Electric Conductivity of water was maximum (393) in November and minimum (341) in June in the selected region of the Godavari river.

TDS: Concentration of Total dissolved solids from natural sources have been found to vary from less than 30 mg/l to as much as 6000mg/l depending on the solubility of minerals in different geographical regions. A constant level of these Total Dissolved Solids is essential for the maintenance of aquatic life, because the density Total Dissolved Solids determines flow of water in and out of an organism's cell (osmosis). Total Dissolved Solids in Godavari river water was maximum (271) in May and minimum (230) in November at Kopargaon

Hardness: Total hardness is the sum of calcium and magnesium hardness, in mg/L as CaCO₃. High levels of hard-water ions such as Ca²⁺ and Mg²⁺ can cause scaly deposits in plumbing, appliances, and boilers. These two ions also combine chemically with soap molecules, resulting in decreased cleansing action. The American Water Works Association indicates that ideal quality water should not contain more than 80 mg/L of total hardness as CaCO₃. High levels of total hardness are not considered a health concern. On the contrary, calcium is an important component of cell walls of aquatic plants, and of the bones or shells of aquatic organisms. Magnesium is an essential nutrient for plants, and is a component of chlorophyll. Total Hardness which includes calcium and magnesium of water was maximum (180) in August and minimum (150) in May in the selected region of Kopargaon Tahasil.

Conclusion: The physico-chemical parameter of measured in Kopargaon tahasil shows some fluctuation with significant variation in different seasons from Monsoon to Summer. Though increased anthropogenic activity, industrial pollution, domestic uses pressurize the freshwater of river in the region, with some precautionary measures like proper STP (Sewage Treatment Plant), ETP (Effluent Treatment Plant), limited use for irrigation and other domestic purpose may increase the water quality in the region. Due to over sand excavation, siltation the river get almost dry in the summer which adversely affect the aquatic ecosystem and concentration of pollutants increases but with rain in rainy season it starts to flow and pollutants get diluted.

However the health of freshwater of the river in the region is not worst but it is alarming that immediate steps should be taken to improve the water quality.

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REFERENCE

- APHA (1995): Standards Methods for Examination of water and waste water, American public Health Association, Washington, D.C. 19th Edn. | Desai P.V. (1995): Water quality of Dudhsagar river of Dudhsagar (Goa), India Poll Res. 14 (4): 377-382. | Eaton, A.D., L.S. Clesceri and A.E. Greenberg, eds., 1995. Standard Methods for the Examination of Water and Waste Water, 19th ed., Washington DC: American Public Health Association (APHA). | Habib, O.A. R. Tippett and K.J. Murphy (1997): Seasonal changes in Phytoplankton community structure in relation to physico-chemical factors in Loch Polland. Scotland. Hydrobiologia 35: 63-79. | Sharma M.S. and Selvaraj N., (2000): Heavy metal toxicity of freshwater zooplankton in relation to temperature variations. Poll Res. 19 (1): 159-163. | Shivkumar R., Mohanraj R., and Azeez P.A. (2000): Physico-chemical analysis of water sources of Ooty, South India. Poll Res. 19 (1): 143-146. | Smith R.L. (1990): Ecology and Field Biology. Fourth Ed. Harper Collins Publishers, New York. | <http://www.tvdsb.ca/uploads/ScienceProbeware/totalwaterhardness.pdf> |