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# Effect of Physico – Chemical Parameter on Phytoplankton Blooms of Water

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**Abstract:**

*Due to over population and urbanization have created serious problems to our water bodies (river, lake, dam etc). Industrial effluents and domestic sewage are directly discharged into water bodies. The Changes in atmosphere temperature, humidity are also impact on river water. Due to this reason, change the physical, chemical and biological parameter of river water. Assess the direct effects of nutrient loading and physical variations in water quality. The results indicate that the river experienced phytoplankton blooms at same sampling site. This paper also focus on Correlation between physical, chemical parameter and phytoplankton population of river.*

**Keyword: Physico** – Chemical Parameter, phytoplankton, Godavari river

## Introduction:

Godavari River contains a wide variety of water resources. The Godavari river arises near the Trimbak in the district of Nasik in the Indian state of Maharashtra. The river is approximately 1,465 km long. It flows in the eastward direction through the state of Maharashtra and joins the Bay of Bengal in Andhra Pradesh. River Godavari is under the serious threat as a result of the growing Urbanization and industrialization especially at Nashik. Physical parameters measured during this study included water temperature, dissolved oxygen, turbidity, conductivity, and pH. The chemical makeup of the water was investigated by measuring the composition of nitrogen and phosphorus in the water. Two biological parameters, COD and BOD, were examined to assess the direct effects of nutrient loading and physical variations in water quality. The results indicate that the river experienced no serious phytoplankton blooms during the monitoring period.

## Material and methods:

Three sampling stations of Godavari River were selected for the collection of water and algal samples during period of study at Nasik city during year 2017. Water samples for analysis were taken from collection sites at monthly intervals. The physical, chemical and biological parameters tests were conducted immediately after collection of samples at the respective sampling stations. Other samples were brought to the laboratory for analysis.

## Discussion:

Water temperature is one of the most important ecological factors which control the physiological behaviour and distribution of organisms. The minimum temperature difference between the atmospheric temperature and water temperature plays a major role in the production biology of shallow water bodies as put forward by Ganpati, (1962); Density of planktonic groups was observed during the period, when the temperature was most suitable for growth and reproduction. Mehta, (1999). During the study at the Godavari river it was observed that all the biotic components studied were temperature dependent and there was a fluctuation in the abundance of biotic components with the variation in temperature. There was a significant

correlation between water temperature and total phytoplankton. In high Turbidity light penetration is lower to be utilized by aquatic plants for photosynthesis. Adebisi, (1981).

Jain and Srivastava, (1989) reported an inverse relationship of dissolved oxygen with temperature. The low oxygen content during summer season may be due to high temperature, low water. Increase in the temp. of water in summer have resulted in decrease of D.O. during this period. Schindler et. al., (1971) also observed an increase in photosynthetic activity causing greater production of oxygen during winter months in Canadian lakes. A decrease in oxygen content that led to poor growth of phytoplanktons. Bhadauriya (2004)

The Godavari river was polluted and water quality was deteriorated during the summer months due to the presence of large loads of organic waste. In monsoon, when natural water enter into water, eutrophication process of water was carried. There was a total shift in algal blooms. In the month of May, June and before rainy season, there is increase in phytoplankton population, which clearly indicates that high temperature is responsible for increased phytoplankton population, it is positively correlated. Physico-chemical parameters such as iron, pH, phosphates, DO, organic matter have significantly influenced phytoplanktons (diatoms) but temperature, pH and DO, BOD were closely related to phytoplankton abundance. (Table No. 1). The total number of phytoplanktons were found maximum in the month of June, July whereas minimum were observed in the month of January and February.

**Table 1 : Co-efficient Correlation between physic- chemical parameter and Phytoplanktons.**

| | Phytoplanktons (org/ml) | | |
|---|---|---|---|
| | Site - A | Site – B | Site – C |
| Temperature (0C) | 0.889 | 0.889 | 0.887 |
| Turbidity (NTU) | 0.786 | 0.815 | 0.802 |
| Conductivity | 0.758 | 0.733 | 0.778 |
| Total Dissolved Solids (mg/lit.) | 0.879 | 0.844 | 0.831 |
| pH | 0.411 | 0.510 | 0.507 |
| Free Carbon-dioxide (mg/lit.) | 0.916 | 0.932 | 0.922 |
| Free Ammonia (mg/lit.) | -0.849 | -0.917 | -0.900 |
| Nitrites (mg/lit.) | -0.066 | 0.068 | 0.030 |
| Sulphates (mg/lit.) | 0.862 | 0.873 | 0.863 |
| Phosphates (mg/lit.) | 0.854 | 0.871 | 0.869 |
| Chlorides (mg/lit.) | 0.941 | 0.924 | 0.918 |
| Total Hardness (mg/lit.) | -0.766 | -0.762 | -0.743 |
| Lead (mg/lit.) | 0.434 | 0.274 | 0.506 |
| Copper (mg/lit.) | 0.636 | 0.738 | 0.525 |
| Zinc (mg/lit. | 0.919 | 0.058 | -0.122 |
| Dissolved oxygen (mg/lit.) | -0.854 | -0.834 | -0.837 |
| BOD (mg/lit.) | 0.911 | 0.910 | 0.896 |
| COD) (mg/lit.) | 0.544 | 0.510 | 0.510 |

**Conclusion:**

The seasonal variations show direct relationship with physico-chemical analysis such as pH, temperature, dissolved oxygen carbon-dioxide phosphates, etc. and it clearly indicates that

there is a direct relationship between phytoplanktons. Zafar (1986). Patil, et al. (2013). In winters, small growth of phytoplanktons may be due to low temperature. During the study period maximum growth was found in summer to rainy season. Sometimes excess rains also affect planktons due to agriculture runoff water, sewage waste. Phytoplanktons were found maximum number at the all site. The pH, temperature, intensity of light penetration and organic matter may be responsible for the phytoplankton production. Agale and Patel (2014):

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