CORRELATION STUDY OF WATER QUALITY OF GODAVARI RIVER, NASIK

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Abstract:

In this paper study has determined water quality assessment on the basis of physico-chemical and biological analysis such as pH, Conductivity, Turbidity ,Total Dissolved Solids, Total Hardness, Chloride, Sulphate , Dissolved Oxygen, BOD, COD,Phytoplanktons and Zooplanktons etc., using a statistical method. There is a relationship between two variables which shows that one variable actually reason changes in another variable. In this paper, the various water sample data is analysis by the coefficient correlation method. This analysis compare to the set standard

Keyword: Co-efficient correlation, Water Quality, Godavari River

Introduction

This paper a discussion of the physical, chemical, and biological water quality parameters measured of Godavari River during monitoring period. Water has been one of the most important strategic natural resources. The water of the rivers polluted mainly due to discharged waste water from residential areas, industries, use of agricultural pesticides. In fresh water, the optimum temperature for majority of algae is between20-25^{0}C. The maximum temperature was recorded in summer in the month of May and minimum in the month of January. Water temperature was positively correlated with turbidity and conductivity. There exists positive correlations different parameters and a combined effect of their inter-related indicates the water quality. Water quality is measuring the concentration of some physico-chemical parameters and comparing them with drinking water standards the creating correlation coefficients can be successfully used to estimate the concentration of other parameter. A study of correlation of the water quality parameters not only helps to assess the overall water quality but also to quantify relative concentration of various pollutants in water and provide necessary cue for implementation of rapid water quality management programs

Materials and methods

The report present is Godavari River was designed for selecting three stations. A systematic study has been carried in out 2014 of Godavari River in terms of its sources and degree of pollution. The three stations covering a distance of approximately 12 km were selected for periodical collection of water samples. Their analysis was carried out in terms of physico-chemical, microbiological and biological parameters. 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.

Co-efficient correlation

Coefficient correlation is finding the strength between the two variable. The coefficient correlation is developed by the karl Pearson

The mathematical formula for computing ***r*** is

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} A \sqrt{n(y^2) - (\sum y)^2}}$$

If the value of the *r* such that -1 $\leq r \leq$ +1. The sign + and – is Positive and negative correlation respectively. If the *x* and *y* is positive correlation, *r* is close to +1 and it's indicate strong positive correlation. If the *x* and *y* is negative correlation, *r* is -1 and it's indicate that *x* increase and *y* decrease. If there is no linear correlation or a weak linear correlation, *r* is close to 0. A correlation greater than 0.8 is generally described as strong, whereas a correlation less than 0.5 is generally described as weak.

Results and discussion

The co-efficient correlation ('r' value) between different pairs of parameters for few possible correlations are computed and are listed following Table. The temperature is known to play a prime role in the productivity of water by influencing the abundance of primary producers on which the primary consumers depend for food source. Shukla *et.al.* 1991). Prasad, (1956). However, in the present work maximum number of planktons were recorded during summer season. The zooplanktons showed a positive correlation with temperature. The phytoplankton also had a positive correlation with temperature. George, (1966). Maximum density of phytoplanktons during the summer season was also reported by Shukla *et.al.* (1991).

The water temperature was also positively correlated with conductivity and total dissolved solids.In the present investigation the pH of the river water showed alkaline range, which favored the plankton growth. Dissolved oxygen was minimum in summer season which may be due to high temperature and death and decay of macro vegetation. Khalaf and MacDonald, (1975) observed a negative correlation of water temperature with dissolved oxygen. An inverse correlation between zooplankton numbers and dissolved oxygen was reported by Khan*et.al.*, (1985). Free carbon-dioxide is an important parameter after dissolved oxygen. It showed positive correlation with temperature.

The maximum temperature was recorded in summer in the month of May and minimum in the month of January. Water temperature was positively correlated with turbidity and conductivity. Mohammad el al (2013). Total dissolved solids found to be positively correlated with the temperature and turbidity. The physico-chemical factors influence phyto and zooplanktons population. Compared to the zooplankton

population, phytoplanktons were found in more number at the three stations. The pH, temperature, intensity of light penetration and organic matter may be responsible for the phytoplankton production. Nutrients like phosphates and sulphates show direct correlation with phytoplanktons and zooplanktons. Turbidity positively correlates with dissolved solids. Nitrates and ammonia showed direct relationship with dissolved oxygen.

Table: Co-efficient Correlation.

Parameters	Sample A	Sample B	Sample C
Nitrates and Dissolved Oxygen (DO)	0.7928	0.7959	0.8173
Turbidity and Total Dissolved Solids	0.7009	0.8067	0.6721
Temperature and Conductivity	0.8681	0.8730	0.8680
Temperature and pH	0.6635	0.5627	0.6189
Temperature and Chlorides	0.9384	0.9544	0.9509
Temperature and BOD	0.8518	0.8491	0.8519
Temperature and COD	0.5520	0.5324	0.5757
Temperature and Phytoplanktons	0.8967	0.8954	0.8959
Temperature and Zooplanktons	0.8426	0.8561	0.8477
Sulphates and phytoplanktons	0.8612	0.8732	0.8635
Sulphates and Zooplanktons	0.8833	0.8993	0.8939
Phosphates and phytoplanktons	0.8740	0.8746	0.8699
Phosphates and Zooplanktons	0.9341	0.9248	0.9278

Conclusion

The physico-chemical parameters selected for analysis were temperature, turbidity, conductivity total dissolved solids, pH, carbon-dioxide, ammonia, nitrites, nitrates, sulphates, phosphates, chlorides, total hardness, metals and heavy metals, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, and biological parameters exhibited certain interesting relationship with each other. Water temperature is positively correlated with TDS, conductivity, pH, chlorides, BOD, COD and biotic

components like phytoplanktons and zooplanktons. Nutrients like phosphates and sulphates show direct correlation with phytoplanktons and zooplanktons enriching the Godavari River with biomass. Jothivenkatachalam el.al. (2010). Turbidity positively correlates with dissolved solids. Nitrates and ammonia showed direct relationship with dissolved oxygen

References

Adholia, U.N. and Vyas, A. (1992): Correlation between copepods and limnochemistry of Mansarovar reservoir Bhopal.

Agrawal, S.S. (1980): A study on the correlation between the diurnal variation in the physico-chemical conditions of water and the plankton contents and primary productivity of Jankal tank pp. 14 -19 in K.M.

Das, S.M., Daftaris, S., Singh, H., Akhtar, S., Choudhary, S. And Ahmed, N. (1969): Studies on organic pollution on high AltitudeLake of India. Part-I: The general ecology of zooplankton of Kashmir lakes, Kounsarng and Alpather, with correlation of plankton volume, pH and temperature of Dal lake Kashmir

Jothivenkatachalam, A. Nithya and S. Chandra Mohan (2010): Correlation analysis of drinking water quality in and around perur block of Coimbatore district, Tamilnadu, India

Khalaf and Mac Donald, (1975, Physicochemical conditions in temporary ponds in the New Forest

Mathew, P.M. (1978):Limnological investigations on the plankton of Govindgarh lake and its correlation with physico-chemical factors.

Mohammad el al (2013): Correlation Study and Regression Analysis of Drinking Water Quality in Kashan City, Iran

Shukla, Suresh C., Kant, Rajani and Tripathi, B.D. (1989): Ecological investigation on physico-chemical characteristics and phytoplankton productivity of river Ganga at Varanasi.

Shukla, Suresh C., Kant, Rajani and Tripathi, B.D. (1989): Ecological investigation on physico-chemical characteristics and phytoplankton productivity of river Ganga at Varanasi

Verma, J.P. and Mohanty, R.C. (1995): Phytoplankton and its correlation with certain physico-chemical parameters of Danmukundpur pond