



Water quality analysis of Kaveri water of Mukkombu in Thiruchirapalli, Tamilnadu during monsoon period

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Abstract:

The present study was carried out to analyze the quality of water of Kaveri river during monsoon. River Kaveri is considered as the main source of Southern India and carry the same cultural values as the holy river Ganga. It originates from the hills of Talakaveri in Coorga in Karnataka and flows through Karnataka and Tamilnadu. Both states share the water for farming and irrigation of their lands. Krishnarajasagara is a massive dam built across Kaveri near Mysore. Many historic, religious and tourist places have developed on the banks of the river. Thousands of tourist and pilgrims visit these places every year. To analyze the water quality of Cauvery River, the samples were collected and physical chemical parameters were assessed. The various Physico-Chemical parameters studied were water Temperature, Turbidity, Electrical Conductivity, pH, Carbonates, Bicarbonates, Nitrate, Phosphate Silicate, Chloride, Sulphate, Magnesium, Sodium, Potassium, Calcium, Ammonia, Dissolved Oxygen, Biological Oxygen demand and Chemical Oxygen demand.

Introduction

Earth is a living planet which uses water as a main ingredient for survival of life. Water has long been regarded as the most crucial and necessary resource for the biological as well as human civilisation's development. Air, Heat, Soil, and Sky are the other agents accountable for the biosphere on the planet. All of these agents are considerably more closely related to one another, and any anomalies in one of them impacts the others as well. Due to many factors such as the emergence of industry, home wastes, runoff from metropolitan areas, and urban and rural rubbish, this resource began to be contaminated and its quality began to deplete as our civilisation progressed. The most significant factor in sculpting the terrain and controlling the climate is water. Rivers are an important part of the biosphere. Despite containing less than 1% of the world's freshwater, they have immense ecological and socioeconomic value. They serve a variety of

purposes, including economic (fishing, energy production, transportation, and irrigation), aesthetic (recreation), ecological (biodiversity), water for consumption (water supply for home and industrial applications), and waste water discharge transportation (treated or untreated). The physical, chemical, and biological aspects of water are commonly used to characterise its quality. Rapid industrialization and indiscriminate use of chemical fertilisers and pesticides in agriculture are polluting the aquatic environment in a variety of ways, causing water quality to deteriorate and aquatic biota to dwindle. Humans are infected with water-borne illnesses as a result of their usage of polluted water. As a result, it is vital to monitor the water quality on a frequent basis. Temperature, pH, turbidity, salinity, nitrates, and phosphates are some of the parameters that may be measured. Water quality may be thought of as a web of interconnected factors (pH, oxygen concentration, temperature, etc.); any changes in these physical and chemical variables can have a range of effects on aquatic biota. Different pollutants or water quality criteria play a deterministic role in water quality evaluation for each application of river water. Contamination by hazardous substances can endanger human health, especially through the food chain. Also various waterborne diseases are affecting the human health. According to the Environmental Protection Agency (EPA), only about 22.5 outbreaks occur per year, with an average of about 4,640 to 9,331 people infected annually. To control this the water quality standards must be examined properly. However, it becomes more and more difficult to meet such water quality standards because of continuous economic expansion, urban development and growing population pressure. One such resource is the Kaveri River, the major river system of south India in which the water quality analysis is done and the area selected was Mukkombu in Thiruchirapalli, Tamilnadu during monsoon period. Because the water shows less transparency during the monsoon as compare to winter or summer.

Materials and methods

Study area

Mukkombu (Latitude 10o53'32.90"N, Longi-tude 78o34'57.97"E) reservoir lies 15 Kms away from Kulithalai station and considered as an area of importance. From this small reservoir the River Kaveri trifurcates into Kaveri proper, Coolroon and the Ayyan Vaikaal (stream), hence the name Mukkombu (three parts). This is otherwise called the Upper Anicut.

Water sample collection

The water sample was collected from Mukkombu reservoir. For the analysis of physico-chemical parameters, the surface water sample was collected in sterilized 250ml reagent bottles. Sample was protected from direct sun light and immediately transported to the laboratory for analyses.

Physico-chemical analysis of water

The physical factors like water temperature, turbidity and electrical conductivity and chemical factors like pH, carbonate, bicarbonate, nitrate, phosphate, silicate, salinity, chloride, sulphate, calcium, magnesium, sodium, potassium, ammonia, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand and total dissolved salts were analysed by following standard methods. The collected sample was analysed within

three days during which sample was kept in cold storage (Kulshrestha et al., 1991) according to methods suggested by Golterman (1975), American Public Health Association (APHA, 1976) and National Environmental Engineering Research Institute (NEERI, 1986).

RESULT AND DISCUSSION

Water samples collected in the river Kaveri showed lower temperature in the monsoon season (Table 1). Whereas in the summer season it was found to be highest, reported by Annalakshmi and Amsath, 2012. The variation is mainly correlated with the temperature of atmosphere and weather conditions. Higher temperature during summer was due to greater heating (Adebowale and Sawyer 2008). BOD or biochemical oxygen demand represents microorganism use the atmospheric oxygen dissolved in the water for biochemical oxidation of organic matter, which is their source of carbon. The BOD is used as an approximate measure of the amount of biochemically degradable organic matter present in a sample. The BOD ranges from (mg/l) to 14.5 (mg/l) in the river Kaveri. The mean value obtained was about 0.56mg/l. In the present investigation, the turbidity level increased in the monsoon season and also during pre and post monsoon as evidenced by Parvati Kushram, (2016). In this study the analysis of physical and chemical parameters gives us the overall quality of Kaveri water in Mukkombu. This suggests that during the monsoon period, some of the water quality parameters such as phosphate, EC, total hardness and TDS were relatively low compared to the other stations that had been previously studied by the researchers in different places in the river basin. The water is not alkaline in nature and suitable for domestic use when there are aspects of human skin. Concentrations of nitrates, phosphates, sulphates and coliforms were well below the standard limits. Transparent water is seen due to lower turbidity. The above water quality parameter data for the Kaveri River has clearly shown that the water in the river is safe for drinking water supply, fishing, irrigation and industrial purposes, as most of the parameters are within allowable limits.



Physico chemical analysis of water collected from Mukkombu during Monsoon season

PARAMETER	MEAN	±S.E.
Water temperature	22.38°C	1.4°C
Turbidity	8.98ds/m	0.58ds/m
Electrical conductivity	0.52	0.04
pH	7.31	0.04
Carbonates	14.85mg/lit	2.77mg/lit
Bicarbonates	192.2mg/l	1.76mg/l
Nitrate	4.32mg/l	2.59mg/l
Phosphate	47.64mg/l	34.18mg/l
Silicate	2.28	0.38
Chloride	140.04	24.28
Sulphate	38.43mg/l	17.09mg/l
Magnesium	38.43mg/l	17.09mg/l
Sodium	55.15	8.44
Potassium	9.19mg/l	2.44mg/l
Calcium	39.33mg/l	4.43mg/l
Ammonia	0.48	0.17
Dissolved oxygen	7.7mg/l	0.37mg/l
Biological oxygen demand	0.56mg/l	0.01mg/l
Chemical oxygen demand	25.07mg/l	2.45mg/l
Total dissolved solids	393.75mg/l	6.25mg/l

Conclusion

During the present study entitled “Water quality analysis of Cavery water of Mukkombu in Thiruchirapalli, Tamilnadu during monsoon period”. The obtained data provides simple representation of different characteristics such as physical and chemical that reveals the overall water quality of Cauvery River in mukkombu region.

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