ENVIRONMENTAL SCIENCES

PHYSICAL PROPERTIES OF JAKEKUR PROJECT OF OSMANABAD DISTRICT (M.S.), INDIA

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Abstract

Present paper deals with study of physical factors like water temperature (Temp), pH, transparency, turbidity, Total Dissolved Solids (TDS), and conductivity (EC) of Jakekur project (Reservoir).

Keywords: Physical properties, Jakekur, Water, Quality

Introduction

The physical characteristics of water such as temperature, pressure, density, currents, pH, Transparency, Turbidity, Total dissolved solids, Conductivity etc in one way or another, have significant influence on aquatic life. It should be understood that each physical factor is described not as an isolated physical phenomenon but as a contributor to the sum total of all aquatic environment where the organisms exist, grow and reproduce. Water is a universal solvent and it is one of the fifth most important key elements besides the food, cloth, living place and oxygen it required for the very existence of life. Life on earth would be impossible without water. It is a gift to man by nature. But man's activities have made water as a source of potential danger to his health and every existence. The most basic and important benefit of fresh water is related to the health of people, ecosystem and societies.

Considering the lack of knowledge of water quality, the study of the physical environment of Jakekur project which includes the water parameter like, temperature (Temp), pH, transparency, turbidity, Total Dissolved Solids (TDS), and conductivity (EC). The Jakekur project (Reservoir) is one of the most important aquatic water bodies in Tq. Omerga Dist. Osmanabad (M.S). The reservoir is used for irrigation and drinking purpose by the local communities.

The quality of water resources is usually described according to its physical chemical and biological or bacteriological characteristics. Assessment of water resource quality is an important aspect for the developmental activities of this region; because of it is the sum of water supply of Domestic, Industrial, Agriculture & aquaculture practices (Jain and Seethapathi, 1996; Jakher and Rawat, 2003).

Materials and Methods

Samples were collected from the sampling stations for a period of one year .Water sample was collected with the help of sampler in the morning hours. Water samples were brought in one-liter plastic containers to the laboratory for analysis. Parameters like, Temperature, pH, Transparency, Turbidity, Total Dissolved Solids, Conductivity, were analysis. The methods used for the analysis of various physical properties are as given in methodology for water analysis (Kodarker, 2006 and Salodia, 1996).

Results and Discussion

Table1. Physical Properties of Jakekur Project

Sr. No	Parameter	Units	Summer	Monsoon	Winter	Min Max
1	Temperature	^0C	25	25	22	22 - 25
2	pH		8.53	8.59	8.39	8.39 - 8.59
3	Transparency	cm	18.7	432	121	18.7 - 432
4	Turbidity	NTU	116	5.1	17.8	5.1 - 116
5	Conductivity	mS/cm	10.25	9.25	10.25	9.25 - 10.25
6	TDS	mg/L	227	210	247	210 - 247

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Temperature, pH, Transparency and Turbidity, Conductivity and TDS

The Physical parameters measured in the study provide an interesting depiction of the patterns in the reservoir. The appearance of the water samples is clear or turbid during study period. Smell is nil. Thermal structure and circulation of the lakes are not uniform but depend on the surface area, depth, and the volume of the body concerned. The temperatures of water were found to in the range between 22 to 25°c.Temperature ranges in the study is within optimum range of aquatic life support system. The temperature of water was maximum in the summer season and minimum in the winter season .During the present study water temperature followed a common pattern, it was higher in summer and relavitly lower in monsoon and winter. Such types of observation were made by Sakhare (2007). According to Sharma and Jain (2000) the fluctuations in water temperature have relationship with the air temperature. Same results were indicated by Welch (1952), Rao (1955) and Saha and Pandit (1986). The highest temperature recorded in summer months can be attributed to the direct relationship between bright sunshine, its duration and air temperature in the tropical countries (Hussain 1977; and Devi 1985).The significant correlation between ambient temperature and water temperature was observed by Ganpati (1943),Verma (1967) pointed out the seasonal changes were mainly dependent on water temperature. The low oxygen values coincided with high temperature during the summer months. (Pawar and Phulle , 2005).

pH: The pH is range between 8.39 – 8.59 the findings shows that the reservoir are moderately alkaline in nature. The high pH value was recorded in monsoon and low value in winter. The pH of water is important for the biotic component because most of the plant and animal species can survive a narrow range of pH from slightly acidic to slightly alkaline condition. Das (1961), observed that high pH values coincided with plankton peak. The pH is affected not only by the reaction of carbon dioxide but also by the organic and inorganic solutes present in water. Any alteration in water pH is accompanied by the changes in other physico-chemical parameters (Kulshrestha et al, 1992).The water was alkaline throughout the study period with no definite seasonal variation. This observation is similar to the investigation made by Chandrasekhar (1996) on Saroornagar Lake of Hyderabad and Jumbe et al.(2010).

Sharma and Jain (2000) reported pH range of 7.7 to 8.9 with low values during winter and higher values during summer. The pH range of 6 to 9 is most suitable for pond fish culture. While pH more than 9 is unsuitable (Swingle, 1967). Thus, the pH range

indicates that the Jakekur Reservoir which is having a pH range of 8.39 to 8.59 is suitable for survival of fish.

Transparency and Turbidity: Environmental energy in the form of solar radiation entering into an aquatic ecosystem is fixed by primary producers resulting into the production of glucose through photosynthesis. Water transparency is also dependent on turbidity; which is directly proportional to the amount and density of suspended matter. In the present study water transparency ranges from 18.7 to 432 cm and turbidity ranges between 5.1 to 116 NTU. The water transparency values were maximum in the season of summer and minimum in the season of Monsoon. Similar observation recorded by Pawar and Phulle (2005). Water transparency is a physical measurable variable and is quite significant for production. High transparency values were also indicative of low primary productivity (Prakasam and Joseph, 2000). According to Das (1996) high secchi disc transparency indicates insufficient phytoplankton productivity to support enough fish food organism for good fish production.

Conductivity: The Electrical Conductivity values of the reservoir ranges between 9.25 –10.25 mS/cm. In the present study, maximum value of conductance was observed in winter and minimum during monsoon season. Higher conductance during the winter season can be explained by the fact that the dead matter which was exposed over the sediment was decomposed and released substantial amount of nutrients into the water. Salodia (1996) also reported the maximum conductance during winter season. The specific conductivity which is indicative of the total concentration of total dissolved ions is a valuable tool in assessing water quality (Shariatpatanahi and Anderson, 1987). Specific conductance is related to the total concentration of the ionized substances in water at a particular temperature (APHA, 1985).

Total Dissolved Solids (TDS): Total Dissolved Solids refers to solid matter dissolved in water .In reservoir water sample observed ranges in between 210 -274 mg/L. During present study the total dissolved solids were high in winter followed by monsoon and summer. According to Jhingran and Sugunan (1990), the total dissolved solids up to 200 mg/L. were in medium productive reservoirs and more than 200 mg/L were in highly productive reservoirs. High solids may adversely affect water or effluent quality. Water with high solids tends to be less palatable and may cause transient gastrointestinal distress in non-acclimatized consumers. High mineral content in water may also limit its use in many industries. Because of the effects of solids in water, a limit of 500 mg/L dissolved solid is desirable in potable waters (Shariatpatanahi and Anderson, 1987)

During the study period water sample were alkaline with pH varying from 8.39-8.59, Temperature (22-25^0_C), Transparency(18.7-432 cm), Turbidity(5.1-116 NTU), Conductivity (9.25 – 10.25 mS/cm), Total Dissolved Solids(210-247 mg/L), of almost all the sample analysis value were within permissible limits as BIS (1991).

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