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Studies on the physico-chemical parameters of reservoir at Dhanegoan district Osmanabad (M.S.), India.

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Abstract
The present study deals with assessment of some physico-chemical parameters of reservoir at Dhanegoan, District Osmanabad (M.S.), India. The physico-chemical characteristics were studies and analyzed during August 2009 to July 2010. Seasonal variation at four different Sampling Sites of the Reservoir at Dhanegoan, were observed. The results revealed that the condition of this reservoir in different months showed seasonal wise fluctuation in the Physico-chemical parameters.

Keywords: Physico-chemical Parameters, Monthly Variation, Reservoir at Dhanegoan.

INTRODUCTION

Water means "life" and it is one of the abundantly available Substances in nature, which man has exploited more than any other resources for the substance of life. Water covers about 70% of the earth's surface out of which only 2.7% of the total water if freshwater of which 1% is ice free water in the rivers, lakes and atmosphere as biological water. It has been estimated that only 0.00192% of the total water on earth is available for human consumption.

Water quality analysis is important to preserve and protect the natural ecosystem. The Various physico-chemical and biological methods have been carried out water quality management. The study of different water parameters are very important for understanding of the metabolic events in aquatic ecosystem. The parameters influence each other and also the Sediment parameters, as well as they govern the abundance and distribution of the Flora and the Fauna. Such studies when done from time to time can indicate the ecosystem. The quality of surface occurring in the including rivers and reservoir, lakes, depends on their physical, chemical and biological prosperities [8].

MATERIAL AND METHODS

Water Samples for physico-chemical analysis were collected from Reservoir at Dhanegoan, Osmanabad (M.S.) at four different sites in early morning between 9 am to 11 am in every month. From August 2009 to July 2010. The samples were collected in the five liter plastic container from depth of 5-10 cm below the surface of water. The physico-chemical characteristics of the reservoir water like, Temperature, pH, Water Transparency, Dissolved Oxygen, Total Hardness, Total Alkalinity, Sulphate, Chloride, Nitrate, Phosphate were determined monthly variation By using Standard Methods Prescribed By [2,5].

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RESULT AND DISCUSSION

The season wise physico-chemical parameters data of Reservoir at Dhanegoan, Osmanabad (M.S.) India, have been presented seasonal mean values, seasonal standard deviation of different parameters in table 1 and graph A to J.

Physico-chemical Charactristics

Water Temperature

Water Temperature is playing an important role in aquatic ecosystem as critical Factor. It affects biological reactions, population fluctuations in water body as well as the physical and chemical characteristics of water. It is necessary to study temperature variations in water body, in animals ecophysiological and toxicological aspects because, water density and oxygen content are temperature related and hence temperature indirectly affects osmoregulation, respiration, behavior and metabolism of the animals.

The maximum temperature was recorded (26.60±1.65 ˚c) during summer and minimum Value was recorded (21.06±1.89 ˚c) during winter in monsoon the temperature was (25.67±1.12˚c) recorded. The water Temperature was constantly lower atmospheric temperature. In the present investigation, the temperature values were maximum during summer and minimum during winter. Lower temperature recorded in winter may be due to high water level, less solar radiation, low atmospheric temperature and in the present investigation, the temperature values were maximum during summer and minimum during winter. Lower temperature recorded in winter may be due to high water level, less solar radiation, low atmospheric temperature and high temperature in summer because of low water level, high solar radiation and clear atmosphere. Similarly, results have been reported by [1, 4 and 6] recorded minimum temperature, in winter season and maximum in summer

pH

pH is a measure of the acidity or alkalinity of an aqueous solution, the difference between pH Values at different stations in

various months of the year was significant. The variation in pH is due to the presence or absence of free carbon dioxide and carbonate, planktonic density during various months. The maximum pH was recorded (8.50±0.18) in winter season and it was minimum (6.65±0.24) in summer season.

Water Transparency

The transparency of natural water is an indicator of productivity. The extent to which light can penetrate depends on the transparency of standing water column. Further, transparency of standing water is inversely proportional to turbidity, created by suspended inorganic and organic matter [9]. The transparency of water body is affected by the factor like planktonic growth, rainfall, suns position in the sky, angle of incidence of rays, cloudiness, visibility and turbidity due to suspended inert particulate matter.

The maximum value was recorded (35.67±1.13cm) in summer and minimum value was recorded (19.56±4.90cm) in monsoon. In the present investigation, the transparency values were maximum during summer and minimum during monsoon. Low value of transparency in monsoon may be due to influx of rain water from catchments area, clouding, less penetration of light and high turbidity due to suspended inert particulates matter. However, high valued of transparency in summer may be due to clear atmosphere and high light penetration.

Table 1. Seasonal Variation in the water quality of Reservoir at Dhanegoan, Osmanabad (M.S.) August 2009 to July 2010

Parameters	Seasons		
	Summer	Monsoon	Winter
Water Temperature (.C)	26.60±1.65	25.67±1.12	21.06±1.89
PH	6.65±0.24	7.40±0.48	8.50±0.18
Water Transparency(cm)	35.67±1.13	19.56±4.90	29.62±3.20
Dissolved oxygen (mg/l)	2.04±0.35	3.79±0.46	4.44±0.56
Total hardness (mg/l)	221.20±6.42	178.63±14.83	177.28±7.52
Total alkalinity (mg/l)	130.35±1.83	79.97±7.61	119.86±5.04
Chloride (mg/lit)	46.89±10.45	26.07±6.31	29.66±2.45
Sulphate (mg/lit)	26.86±2.59	38.26±3.35	19.53±2.20
Phosphate (mg/l)	0.17±0.02	0.79±0.11	0.32±0.06
Nitrate (mg/l)	0.81±0.07	1.40±0.19	1.03±0.08

Abbreviation: WT = Water Temperature, pH=Hydrogen Concentration of ion, WTr = water transparency, DO= Dissolved Oxygen, TH= Total Hardness, TA= Total alkalinity, CL= chloride, SO_4= sulphate, PO_4= phosphate, NO_3= nitrate

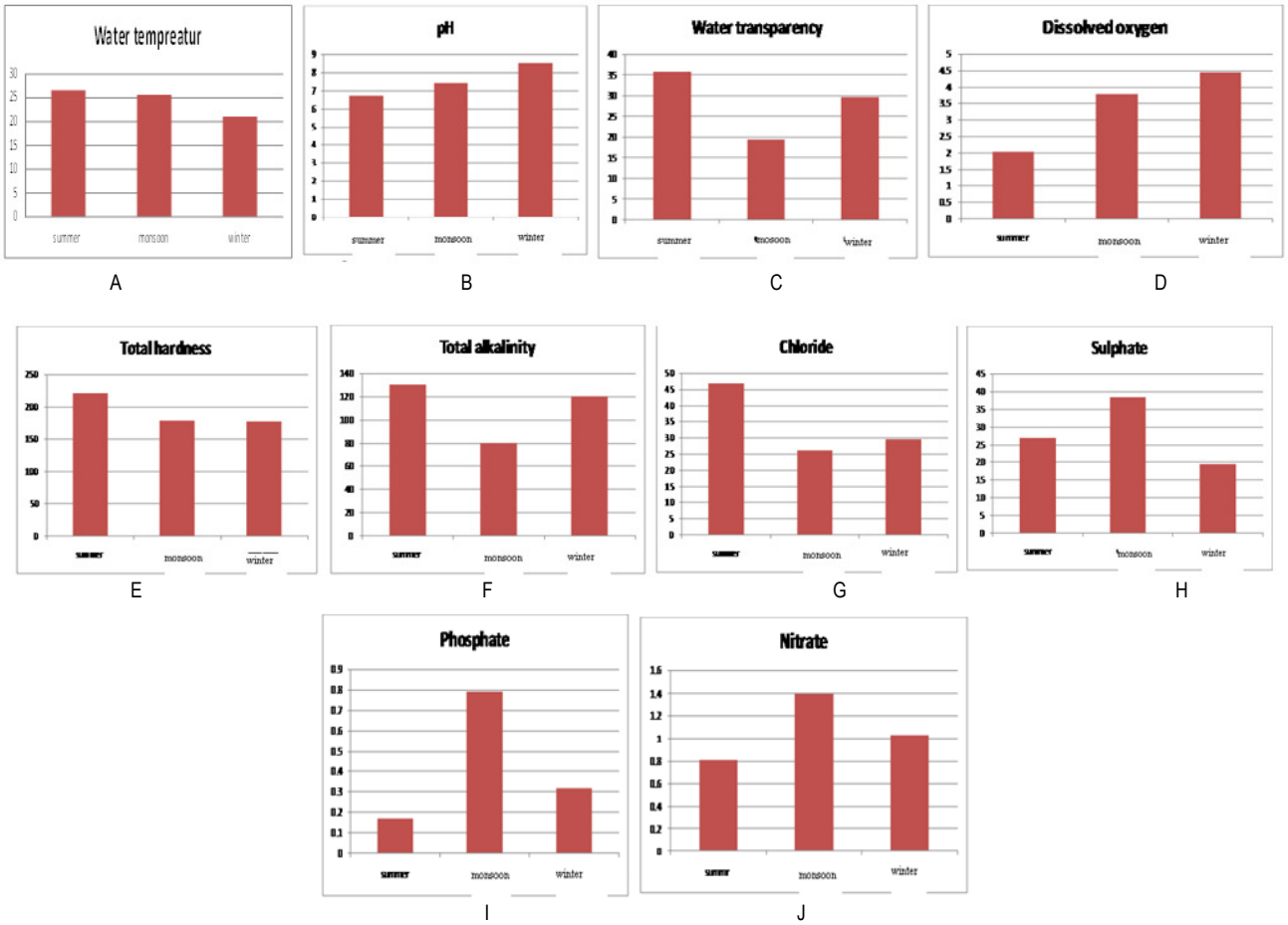

Fig 1(A - J). Graphs showing seasonal variation of four sites in Water temperature, pH, Water transparency, Dissolved oxygen, Total hardness, Total alkalinity, Chloride, Sulphate, Phosphate, Nitrate.

Dissolved Oxygen (DO)

The oxygen supply in water comes from two sources (a) atmospheric diffusion and (b) photosynthetic activity of plants. It is one of the most important and limiting parameter of water quality assessment, which maintain aquatic life. It regulates the metabolic process of aquatic organisms. The maximum dissolved oxygen was recorded (4.44±0.56mg/lit) in winter and minimum dissolved oxygen was recorded (2.04±0.35 mg/lit) in the summer season.

Total hardness (TH)

The hardness of natural water is mainly caused by the presences of carbonates, bicarbonates, sulphates, chlorides of calcium and magnesium. During the study year the total hardness of water was recorded (221.20±6.42mg/lit) maximum in summer season and minimum (177.28±7.52mg/lit) in winter season.

Total alkalinity (TA)

The capacity of water to neutralize a strong acid is known as alkalinity and is characterized by the presence of hydrogen ion; most of the alkalinity of water is due to dissolution of carbonate. The maximum alkalinity value (130.35±1.83mg/lit) in summer season and it was recorded minimum (19.97±7.61mg/l) in monsoon season.

Chloride (CL)

(cl-) anion is generally present in natural water and is major in wastewater. The ecological significance of chloride lies in its potential to regulate salinity of water and exert consequent osmotic stress on biotic communities. The maximum value was recorded (46.89±10.45mg/lit) in summer and minimum value was recorded (26.07±6.31mg/lit) during monsoon. Maximum value during summer could due to higher concentration of chloride resulted from evaporation.

Sulphate (SO_4)

Sulphate is present in fertilizer they contribute to water pollution and increase sulphate concentration in water body. They also come from runoff water, which contain relatively large quantities of organic and mineral sulphur compounds. They supply ions in surface water under natural conditions are due to the reaction of water with sulphate containing rock and with the biochemical and partly chemical oxidation of sulphides and other compounds of sulphur. The most stable from of sulphur in water at 25 degree and atmospheric pressure are SO_4, H_2SO_4, free sulphur and HS-H_2S In the present investigation, the sulphate value were maximum recorded (38.26±3.53mg/lit) in monsoon and minimum value recorded (19.53±2.20mg/lit) in winter season.

Phosphate (PO_4)

It is nutrient for plant growth and fundamental element in the metabolic reaction of plants and animals. It controls algal growth and productivity. The maximum value was recorded in monsoon (0.79±0.11 mg/lit) season. Minimum (0.17±0.02 mg/lit) in summer season. In the present investigation the phosphate values were maximum during monsoon and minimum during summer

Nitrate (NO_3)

It is commonly present in natural water, because it is a product of aerobic decomposition of organic nitrogenous matter. Unpolluted natural water contain usually only minute amount of nitrate. The maximum value was recorded (1.40±0.19 mg/lit) in monsoon and minimum value was recorded (0.81±0.07mg/lit) in summer. In the present investigation, values of nitrate were maximum during monsoon and minimum during summer season. Nitrate levels in surface water often show marked seasonal fluctuation with higher concentration being found during monsoon months compared to summer and winter months. During summer months the reduction in nitrate could be due to algal assimilation and other biochemical mechanism and nitrate value higher during monsoon may due to surface runoff and domestic sewage and specially washing activities similarly, result have been reported [3,7].

CONCLUSIONS

The present study shows detailed Physico-chemical characteristic and quality of water in reservoir at Dhanegoan, Osmanabad (M.S), India. The summer, monsoon and winter season shows different seasonal fluctuation in varies Physico- chemical parameter. The water of present reservoir is useful for irrigation as well as fish culture. The water parameters indicate that the reservoir is rich in nutrients. To improve water quality and maintain the favorable condition essential for fish survival, growth and reproduction in Reservoir at Dhanegoan, Osmanabad District.

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