



Evaluation of Physical and Chemical characteristics of Water at Sothuparai reservoir, Theni District, Tamilnadu, India

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Abstract

Sothuparai is situated at Periyakulam in Theni District and it is 9 km away from Periyakulam. Sothuparai dam supplies water to Periyakulam throughout the year. The physico chemical parameters of sothuparai reservoir water samples were analyzed for a period of six months from June to November 2013. The Parameters such as water temperature, P^H , turbidity, total dissolved solids, total hardness, electrical conductivity, magnesium, calcium and chloride were within the permissible limits and can be used for irrigation and domestic purpose.

Keywords: Water quality, tropic status, physicochemical, Cl, Ca, Mg content, Hardness.

Introduction

Water the most abundant and wonderful natural resource, has become a precious commodity today and its quality is threatened by numerous sources of pollution. Water is an essential requirement of human and industrial development¹. Water naturally contains minerals and microorganisms from the rocks, soil and air with which it comes in contact. Human activities can add many more substances to water.

The demand for freshwater is due to the rapid growth of population and industrialization². Monitoring of water quality leads to the management and conservation of aquatic ecosystem. Water quality is defined as the chemical, physical and biological characteristics of water. It's also a function of geology of the watershed³. The healthy ecosystem depends on the physico chemical and biological characteristics of water⁴.

The tropic status of the aquatic system depends on the locality and its topography of all⁵. Anthropogenic activities such as urban, industrial, and agricultural as well as natural processes, such as precipitation inputs, erosion, and weathering of crustal materials affect river water quality and determine its use for various purposes. The usage also depends upon the linkages (channels) in the river system, as inland waterways play a major role in the assimilation and transportation of contaminants from a number of sources⁶⁻⁸.

To assess these parameters is essential to identify the magnitude and source of pollution load in the aquatic system. Many researches are being carried out to suggest appropriate conservation and management strategies based on the physical and chemical characteristics of water⁹⁻¹⁶.

To evaluate the water quality an effort was made to investigate the Sothuparai reservoir water at Periyakulam in Theni district,

Tamilnadu, India. The Objective of the study is to suggest measures based on the physico chemical parameters of Sothuparai reservoir water for its better management and conservation.

Material and Methods

Sothuparai is situated at Periyakulam in Theni District and it is 9 km away from Periyakulam. Sothuparai dam supplies water to Periyakulam throughout the year. Irrigation under sothuparai system 2,865 acre. Capacity of maximum water level is 100 million sq. ft. Water spread area of maximum water level is 48.64 sq. m. Maximum flood discharged allowed, 807.48. Full reservoir level is 405.5cm. Length of dam is 345 meter. Height of the dam is 1035.00 feet. Maximum water level is 100.22 feet.



Figure-1
Study Area

Sothuparai dam is built across the varganathi in Periyakulam, Theni District of Tamil nadu, Southern India. The water flows from kodaikanal hills to varaganathi. It flows through vadugapatti, Melmangalam, Jayamangalam, Kullapuram and then it reaches vaigai dam.

Sampling and Preservation: Water samples were collected (June to November 2013) in precleaned polyethylene bottles as per prescribed standard methods .On the early hours (7 am – 10am) the samples were collected on the second week of every month. The field parameters such as colour and Odour, water temperature, depth, turbidity, Electro conductivity, and total dissolved solids were determined after that the samples were kept in cool box before transporting to a laboratory.

Analysis of water sample: Colour and odour of the water, depth, temperature, pH were measured on the sampling spot by water analyzer kit. Total alkalinity, total hardness, magnesium, calcium and chloride contents were analyzed by titrimetric methods in the laboratory.

Results and Discussion

Table - 1 shows the range of variation of physico chemical parameters of water sample from Sothuparai reservoir. In Sothuparai reservoir, the level of water was high in October and it is low in June. The water samples were clear and colorless during the period of study. Temperature of water varied from a minimum of 22°C in October to a maximum of 27°C in June¹⁷.



Figure-2
Sothuparai Dam

Table-1
Physico Chemical parameters of water sample from Sothuparai Reservoir during June to Nov2013

Parameters	Jun	Jul	Aug	Sep	Oct	Nov
Appearance	clear	clear	clear	clear	clear	clear
Colour	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless
Odour	None	None	None	None	None	None
Temperature	27	24	23	22	22	22
Turbidity	2	4	2	3	2	4
TDS	29	33	40	35	46	42
EC	42	45	55	50	65	60
pH	7.1	7	5.5	6.3	7.1	6.3
TA	10	15	18	18	20	20
TH	12	10	20	20	22	22
Calcium	2	2	4	4	4	4
Magnesium	1	0.88	3	3	3	3
Chloride	5	5	4	4	6	1

pH of the reservoir slightly varied from 5.5 to 7.1. The minimum P^H was recorded in August, 5.5 and the maximum was recorded in June, 7.1¹⁸.

The electrical conductivity measures the capacity of a substance or solution to conduct electrical current. It depends on the presence of ions, on their total concentration, mobility and temperature of measurement. Higher value of conductivity shows higher concentration of dissolved ions. Electrical conductivity is considered to be a rapid and good measure of dissolved solids. Conductivity is an important criterion in determining the suitability of water for irrigation. The electrical conductivity of the water samples were below the BIS and WHO standards^{19,20}. The criterion suggests that the Sothuparai reservoir water comes under the category of oligotrophic category of lakes and streams.

In the present investigation the total alkalinity values were within the specified range²¹. This shows that the water is soft and can be used for irrigation and domestic use. The magnesium, calcium and chloride content in the water samples were within the prescribed limit^{19,20}.

Conclusion

All the physical chemical parameters of Sothuparai reservoir water were within the permissible limit. This result shows that the water body is Oligotrophic in nature. In future the management and conservation of the reservoir is very essential to maintain its nature and properties of water.

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