ANALYSIS OF PHYSICO-CHEMICAL WATER QUALITY TO ASSESS ENVIRONMENTAL DEGRADATION OF NAGZARI DAM FROM LATUR DISTRICT (M.S.) INDIA

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ABSTRACT

The quality of surface water has progressively worse in many countries in the past few decades. As a result of the growing population, urbanization, agriculture, and increasing industrialization, the inland water bodies are confronted with the increasing water demand, as facing with extensive anthropogenic emissions of nutrients and sediments, predominantly the lakes and reservoirs. To resolve this problem, it is necessary to carry out water quality assessment, planning, and management, in which water quality monitoring plays an important role. This study aimed at assessing the water quality of Nagzari Dam from Latur district (MS) India.

Nagzari Dam used for irrigation, livestock watering and fish production: This study carries using some selected physico-chemical parameters. The result of water samples shows high pH indicates the basic nature of water samples, sulphate in the dam water was high, the phosphate content of reservoir water were found high which lead to unpleasant taste and odor. The obtained values of each parameter were compared with the standard values set by the World Health Organization (WHO). The values of each parameter were found to be within the beyond safe limits set by the WHO. Overall, the water from all the locations was found to be not safe as drinking water. However, it is also important to investigate other potential water contaminations such as chemicals and microbial and radiological materials for a longer period of time, including human body fluids, in order to assess the overall water quality of Nagzari Dam.

KEYWORDS: Water Samples, Environmental Degradation, Nagzari Dam.

INTRODUCTION

Water is the most important essential component for the living being. Water plays a significant role in maintaining the human health and welfare. Clean drinking water is now considered as a

fundamental right of human beings. Life on the earth is never imaginable without water. Water is one of the most vital irreplaceable elements of a basic human need. It is being used for many purposes such as irrigation, water supply, industrial, drinking, propagation of fish and other aquatic systems and generation of hydro-power plants. Water is the main source of power, energy and executes the evolution on the earth. 71% of earth surface is occupied by water (CIA, 2008), 96.5% of the world's water is marine water which is salty that is not to be directly useful for drinking, irrigation, domestic and industrial purposes.1.7% in groundwater, 1.7% in glaciers. Less than 1% water is present in lakes, ponds, rivers, dams, etc., which is used by man for domestic, Industrial and agricultural purposes. According to an estimate about 70% of all the available water in our country is contaminated water bodies due to the discharge of effluents from industries and the domestic sewage waste.

Water pollution confronting serious problem in India as almost 70 per cent of its surface water resources and a growing percentage of its reservoirs are contaminated by biological, toxic, organic, and inorganic effluents. These resources have been rendered unhygienic for human consumption as well as for other activities, such as irrigation and industrial needs. This shows that degraded nature of water quality can contribute to water scarcity as it limits its availability for both human use and for the ecosystem. Due to growth of increasing population, agricultural usage, and industrialization, demand for domestic water has increased many times during the last few years. Improper waste disposal industrial effluents and over exploitation of resources has affected the quality, not only of tap water but also of ground water. Water pollution has many sources. The most polluting elements are the city sewage and industrial waste discharged into the rivers. The facilities to waste water treatment are not adequate in any city in India. Presently, only about 10% of the waste water is treated; the rest is discharged as it is into our water bodies. Therefore pollutants enter groundwater, rivers, and other water bodies. The Central Pollution Control Board monitoring results obtained during 2005 indicate that organic pollution continues to be predominant in aquatic resources.

Physico-chemical Parameters:-

The availability of good quality water is an contributing characteristic for preventing diseases and improving quality of life. It is necessary to know details about different physico-chemical parameters such as temperature, acidity, hardness, pH, sulphate, chloride, DO, alkalinity used for testing of water quality. Some physical test should be performed for testing of its physical appearance such as temperature, pH, turbidity, while chemical tests should be perform for its dissolved oxygen, alkalinity, hardness and other characters.

MATERIAL AND METHOD

Water samples were collected in previously cleaned polythene bottles. Water samples were collected during January 2017 to June 2017 from 4 stations decided in the reservoir in the morning (9.00 to 10.00 a.m.). Temperature, EC and pH of water samples were measured in the field immediately after collection with help of thermometer, conductometer and pH meter. Other physic-chemical parameters were analyzed in the laboratory and all other parameters were analyzed by titration methods outlined in standard methods (2002).

RESULT AND DISCUSSION

The average six month values from January 2017 to June 2017 values of every physico-chemical characteristics are given in the table1.

Parameters	Spot 1	Spot 2	Spot 3	Spot 4
Water temperature	27^0c	32^0c	29^0c	30^0c
pH	7.3	7.4	7.5	8.5
Conductivity	125	167	168	141
Dissolved O_2	3.4	2.1	3.7	4.8
Alkalinity	105	124	178	218
Sulphate	29	47	61	51
Phosphate	0.10	0.11	0.19	0.24
Chlorides	72	79	89	116.4
Total hardness	91	90	110	180

Table 1: showing the average six month values from January 2017 to June 2017 values of physico-chemical parameters from Nagzari Dam

Temperature:- It is mainly related with atmosphere and weather conditions. Temperature is basically important for its effects on certain chemical and biological activities in organisms attributing to aquatic media. Temperature is in the range from 27^0c to 32^0c. Lowest temperature is at Spot 1 is 27^0c and highest value is recorded at Spot 2 is 32^0c. Temperature effects the seasonal and diurnal variation. It controls the rate of all biochemical and biological reactions

including growth, multiplication, mineralization, decay, production etc. Temperature is recorded with the help of maximum minimum thermometer.

pH :- It is determined with the help of pH meter. The pH values ranged from 7.3 to 8:5. This indicates the basic nature of water samples. pH is used to express the intensity of acidic or alkaline conditions. It is the appearance of hydrogen ion concentration, more precisely, the hydrogen ion activity. pH is an parameter important in assessing the water quality. Acidic conditions will increases as pH value decreases and alkaline conditions will increases as the pH value increases.

Electrical conductivity:- Ground water quality is measured by the method of electrical conductivity. As the salt is more conducive of electricity and if there is more amount of salt in a fixed volume of water the electrical conductivity of the water will be more in comparison to less saline water. The ability of a solution to conduct an electrical current is calculated by the migration of solutions and is dependent on the nature and numbers of the ionic species in that solution. This property is called electrical conductivity. It is a useful parameter to assess the purity of water. Electrical conductivity measures between 125 to 168.

Dissolved Oxygen (DO):- It is one of the important parameters in water quality assessment. It shows the physical and biological processes prevailing in the water. Non polluted water is generally saturated with DO. The DO ranges from 2.1 to 4.8 mg/L. Dissolved oxygen is an important parameter that determines the quality of water in rivers and reservoirs. The higher concentration of dissolved oxygen, provide better water quality.

Total Alkalinity:- Bicarbonate alkalinity together with carbonate alkalinity are called total alkalinity. Alkalinity, pH and hardness affect the toxicity of many substances in the water. It is determined by simple dil HCl titration in presence of phenolphthalein and methyl orange indicators.Alkalinity of water is its acid neutralizing capacity. The alkalinity of groundwater is mainly due to carbonates and bicarbonates. The acceptable limit of alkalinity is 200 mg/l and in the absence of alternate water source, alkalinity up to 600 mg/l is acceptable for drinking which measures between 105 to 218.

Sulphate and Phosphates:- The result of sulphate in the dam water was high (20- 71 mg/L). The source of sulphate may be from mineral rocks and fertilizers. The phosphate content of resevoir water were found in range of 0.10 to 0.24 mg/L. Phosphate lead to eutrophication which

could also lead to unpleasant taste and odor. The presence of heavy metals in drinking water higher than a certain concentration can cause detrimental impacts on human health.

Chloride:- Chlorides are practically found in all natural water. This is the most common inorganic anion present in water. Man and animal excrete have high quantities of chloride. Also salts present in soil are the sources of chloride. Chloride content of water samples was 72 to 116.4 mg/L.

Total Hardness (TH):- In groundwater hardness is mainly contributed by bicarbonates, carbonates, sulphates and chlorides of calcium and magnesium. So, the principal hardness causing ions are calcium and magnesium. It is measured by titration method by standardized EDTA sol. using Erichrome black T as indicator. In most of the fresh water TH is important mainly by calcium and magnesium ions found in combination carbonate and bicarbonates. In the present study TH were found to be 91 to 180 mg/L.

CONCLUSION

The six month survey (January 2017 to June 2017) has shown that physicochemical parameters of Nagzari Dam from Latur district (MS) India shows wide range of results. After the analysis of data the present study can be concluded that the effects of water pollution are not only devastating to people but also to animals, fish, and birds also destroys aquatic life and reduces its reproductive ability. Contaminated water is unsuitable for drinking, recreation, agriculture, and industry. It reduces the aesthetic quality of reservoirs and lakes. Eventually, it is a hazard to human health. To minimize the pollution in drinking water we can use modern technologies such as reverse osmosis and ozonation in large scale, which are effective in the Comparison of present study parameter values with the permissible limits prescribed by bureau of Indian Standards and WHO provides the conclusion that the water of Nagzari Dam is useful for water supply. But some parameters giving alarm for protection of water from pollution it may be used for drinking purpose for long time.

The present study was undertaken to account to bring an acute awareness among the people about the quality of water. The individual and the community can help minimize water pollution by simple housekeeping and management practices the amount of waste generated can be minimized.

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