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STUDY OF SOME PHYSICO-CHEMICAL PARAMETERS OF WATER FROM DIFFERENT RESERVOIR IN NASHIK DISTRICT (MS)

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ABSTRACT : - The present study deals with the physico-chemical parameters of water from water reservoir in Nashik District such as Gangapur dam, Darna dam, Kedrai dam Karanjvan dam and Ozarkhed dam. Many of them are surrounded by small scale Industries and slums. The waste from Industries and surrounding localities is directly or indirectly goes in to the dams. To evaluate the water quality of these dams, study was carried out. The water sample were collected to analyzed for different physical and chemical parameters and obtain result were compared with standard values [1-2]. The pollution status was investigated on the basis of obtain result of physical and chemical parameter of water [3-5]. High level of variation was recorded during analysis which was a result of human activity and discharge of waste water to the dam.

KEYWORDS : Nashik District, Water pollution, Physico-chemical, Electrical conductivity.

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INTRODUCTION:

Nashik is one of the most growing and becoming smart city in India. In Nashik district there are so many dams such as Gangapur, Karanjvan, Ozarkhed and Kedrai Dams. The water used for drinking and agriculture purpose in and around Nashik coming from these water resources. Most of the peripheral areas of Nashik are surrounded by large numbers of small industries and slums. The waste water coming from them is responsible for the pollution of water sources. Aquatic environment of water bodies also disturbed due to somewhat mismanagement and unawareness of people. The development of new environment problems as a result of this has given rise to new ideas in the field of monitoring and assessment of aquatic ecosystem. Monitoring and assessment provide the basic information on the condition of a water bodies.

Temperature, Electrical conductivity, Turbidity, TDS, Hardness, pH etc are important factor, which regulates the biogeochemical activities in the aquatic environment. Electrical conductivity of water depends upon the concentration of ions and is a measure of capability to transmit electric current. Also it is a tool to assess the purity of water [6]. A high level of conductivity reflects the pollution status as well as tropic levels of the aquatic body [7]. Clay, slit, organic matter, phytoplankton and other microscopic organisms cause turbidity in dam water [8]. High turbidity shows presence of large amount of suspended solids [9]. Higher turbidity affects the life indirectly, as its cut of light to be utilized by the plants for photosynthesis there by lowering the rate of primary productivity. TDS indicates the presence of various mineral in the water. pH is a measure of acidity or alkalinity of the water. Total Alkalinity in water is due to salts of weak acids and bicarbonates of highly alkaline water [10]. The degradation of plants, living organism and organic waste is one of the reasons for increasing carbonate and bicarbonate those results in increase in alkalinity of water [11-13]. Calcium is most abundant ions in fresh water and is important in shell construction, bone building and plant precipitation of lime [14]. Magnesium is essential for chlorophyll growth and it also acts as a limiting factor for the growth of phytoplankton [15]. Magnesium is often associated with calcium in all kinds of waters, but its concentration remains generally lower than the calcium [16]. Ca and Mg salts are responsible for hardness of water. High value of dissolved oxygen is good for aquatic life [17]. Oxygen is dissolved more during active photosynthesis period [18-19]. Biochemical Oxygen Demand indicates dynamism in aquatic life and it refers to the oxygen used by the microorganism in the aerobic oxidation of organic matter.

MATERIAL AND METHODS:

The present study was carried out for analysis of physico-chemical parameters of water from

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different water resources (Table-1) in Nashik District.

Table – 1: Location of the water resources

Sample No.	Water resource	Place/ Location
A	Gangapur Dam	Gangapur, Tal, Dist.Nashik
B	Darna Dam	Darna, Tal. Igatpuri, Dist- Nashik
C	Karanjvan Dam	Karanjvan, Tal. Dindori, Dist – Nashik.
D	Kedrai Dam	Kedrai, Tal. Chandwad, Dist – Nashik.
E	Ozarkhed Dam	Ozarkhed, Tal. Dindori, Dist – Nashik.

In present study, the sampling was done during morning hour in winter season. The water samples were collected in polyethylene bottles. The samples were collected from five different points and were mixed together to prepare an integrated sample. To minimize the physico-chemical changes that can affect the water quality, the temperature, pH, DO, EC, and turbidity of water sample were analyzed immediately on the spot by pH meter, DO meter, conductometer and Nepthalo turbidity meter respectively after the collection, whereas the remaining parameters such as alkalinity, chloride, TDS, calcium, magnesium, BOD, total hardness, nitrate and phosphate were determined in the laboratory by the suggested method [3-5]. Estimation of sodium was done by Flame Photometric method. The mean value of the data was calculated as season wise and standard error was also calculated.

Table -2: Physico-chemical parameters of water samples

Sr. No.	Physico-chemical Parameters	Water samples				
		A	B	C	D	E
1	Temperature (^{0}C)	17 ± 0.71	16 ± 1.2	17 ± 1.29	17 ± 1	15 ± 1.72
2	EC (mho/cm)	4.1± 0.3	2.6± 0.5	5.2 ± 0.1	9.3±0.3	6.5± 0.8
3	Turbidity (NTU)	10 ± 1.03	14 ± 1.5	11 ± 2.6	15 ± 4	13 ± 5.06
4	TDS (ppm)	210± 3.	350 ± 2	560 ± 5.21	43 ± 4.5	634 ± 5.23
5	pH	8.3 ± 0.4	8.2 ± 0.3	8.0 ± 0.3	8.0 ± 1	8.1 ± 0.2
6	Alkalinity (ppm)	230 ± 5	157 ± 5	272 ± 5	357 ± 5	312 ± 5
7	Total Hardness (ppm)	102 ± 4.5	59 ± 1.8	97 ± 5.0	150 ± 1	125.00
8	Calcium (ppm)	20 ± 1.2	18.48	52.50	31.54	23.02
9	Magnesium (ppm)	2.1 ± 0.3	3.7 ± 0.2	1.9 ± 0.6	3.0 ± 0.8	2.5 ± 0.6
10	Dissolve Oxygen (ppm)	11 ± 0.3	13 ± 0.4	12 ± 0.2	10 ± 5.0	14..10

11	BOD (ppm)	5 ± 1.5	6 ± 3.5	4 ± 0.12	3 ± 0.21	6 ± 0.5
12	Chloride (ppm)	102 ± 1.2	110 ± 4	105 ± 0.6	112±0.2	101 ± 0.7
13	Nitrate (ppm)	5.1 ± 0.12	6.0 ± 0.2	5.4 ± 0.14	6.2 ± 0.3	5.3 ± 0.14
14	Phosphate (ppm)	1.2 ± 0.2	1.0 ± 0.14	1.1 ± 0.12	1.18 ± 0.1	1.15 ± 0.5

RESULT AND DISCUSSION:

Temperature: Generally water temperature corresponds with air temperature indicating that the samples collected from shallow zone have a direct relevance with air temperature.

Electrical Conductivity: The relative high conductivity recorded during study may be due to the non leached substances and the large size of the catchments area.

Turbidity: The increase in turbidity might also be due to the growing of aquatic vegetation and also by lowering the volume of water.

Total Dissolved Solid: High concentration of TDS enriches the nutrient status of water body which was resulted into eutrophication of aquatic ecosystem.

pH: Alkaline state of pH might be due to the chemical buffering and release of bicarbonate and carbonate ions or salts.

Total Alkalinity: The degradation of plants, living organism and organic waste may be one of the reasons for increasing carbonate and bicarbonate those results in increase in alkalinity of water.

Total Hardness: High values of hardness are probably due to regular addition of large quantities of sewage and detergent into dams from the nearby residential localities.

Calcium and Magnesium: Relatively higher proportion of calcium in the surrounding rocks and soils might have also contributed to the rich calcium level in dam water. Calcium is present in water naturally, but the addition of sewage waste might also be responsible for the increase in amount of calcium. Magnesium is often associated with calcium in all kinds of waters, but its concentration remains generally lower than the calcium.

Dissolved oxygen and BOD: The high temperature, increased microbial activity and sewage or other waste might be responsible for low value of dissolved oxygen.

Chloride, Nitrate and Phosphate: The high concentration of chloride, nitrate and phosphate in water may be due to high rate of evaporation or due to organic waste of animal origin, discharge of sewage, industrial waste and run off from agriculture fields, washing of clothes and addition of domestic sewage in water resources.

CONCLUSION:

The results obtained during study were compared with standards [1-2] and it is found that, most of the physico-chemical parameters in water from various dam are in desirable limit in winter season. This shows that the dam water receives very less amount of pollutants from the surrounding. These water reservoirs are slightly contaminated and if the similar condition continue for the longer period, dam may soon become ecological inactive.

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