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PHYSICO-CHEMICAL PARAMETERS ASSESSTMENT OF DAM WATER IN DIFFERENT SITES OF WARUD REGION

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ABSTRACT
The present investigations reveals the physico-chemical parameters of Satnoor and Naghthana dam water in warud region, Dist. Amravati(MS), Eight samples were collected in the month of January 2013**.** Physical and Chemical Parameters such as pH, TDS, Alkalinity, Total Hardness, Chlorides, Magnesium, Fluoride, Nitrates, Dissolve Oxygen and COD were studied . The results indicate that, there is a marked variation in Physico-Chemical parameters of this dam water
Keywords: Nagthana Dam, Satnur Dam, Physico-Chemical Parameters

INTRUDUCTION

Water is the most vital resource for all kinds of life on this planet, but it is being adversely affected both quantitatively and qualitatively by all kinds of life. Ground water contributes 0.6 % of the total water resources on the earth is the major source of drinking and agriculture water in rural and urban areas. Fresh water is finite resource, essential for agriculture, industry and even human existence, without fresh water of adequate quantity and quality, sustainable development will not be possible. Better Quality of water described by its Physical, Chemical and Biological Characteristics. But some correlation was possible among these Parameters and the significant one would be useful to indicate quality of water. The contamination of soil, ground water and surface water by heavy metals or metalloids has become a major environmental and public health hazard and a major constraint to sustainable development in many countries of Asia. Along with the depletion of water levels the pollution of water bodies is becoming a matter of serious concern and attention is needed. For developing sustainability both quality and quantity of water resources need to be monitored and preventive and mitigative measures need to be taken. Abnormal levels of fluoride are common in the fractured hard rock zone with pegmatite veins. The main purpose of this dam water is to supply water to warud region and nearby villages for dringing and agriculture purposes.

Study area

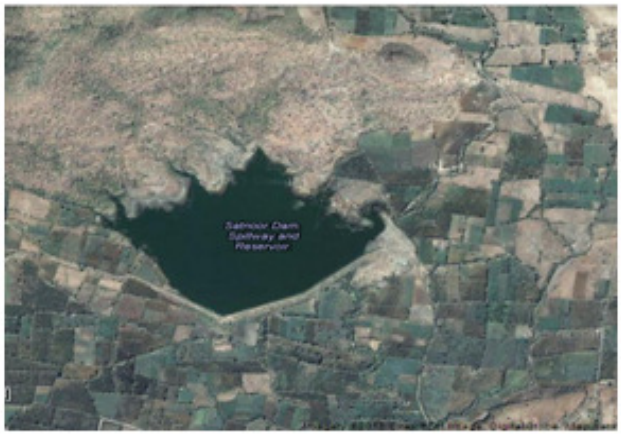
The dam selected in the present investigation and the area around it is known for cultivation of Orange orchards. This dam is located about 8 to 10 Km north of the warud tribal belt of satpuda in Amravati district. Warud is taluka place located on the border of Maharashtra and Madhya Pradesh state. The annual rainfall of this area is 965.3 mm with average 55 rainy days[1].

EXPERIMENTAL

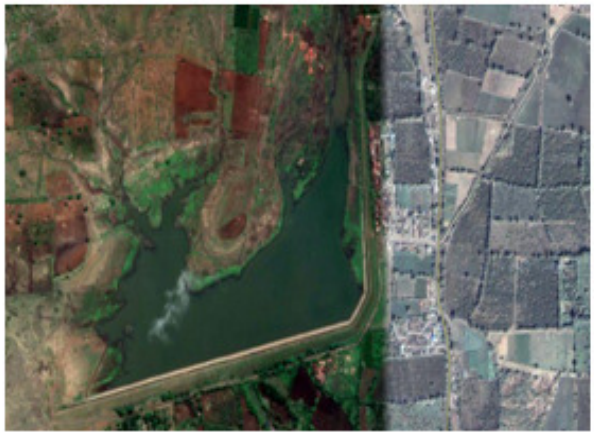
The following methodologies was adopted during the present investigation-

- Data collection regarding the physico-chemical analysis
- During field investigation physical parameter like pH and temperature were measured.
- Proper sampling and preservation techniques for collecting water samples for DO, COD etc.

About 08 sampling stations of two dam chosen for this present study area during Jan. 2013.
Eight water samples were collected from two different points of each dam. The water samples were collected in 2 Litre Polyethylene can previously cleaned and washed with deionised water and rinsed with this samples several times. These samples were collected in the month of Jan. 2013. The physico-chemical parameters such as pH, Conductivity, Alkalinity, Calcium, Magnesium, Chloride, Total Hardness, Fluoride, Nitrite, Do and COD were determined using standard method[2-5]. The method used for estimation of various nutrients and parameters are shown in Table-2. Reagent used for the present investigation was A.R. Grade and double distilled water was used for preparing various solutions.
Methods used for estimation of various nutrients and parameters are shown in Table-2.



Satellite view of Satnoor Dam



Satellite view of Nagthana Dam

Fig.-1 and 2: Satellite view of Sites

Table-1

S.No.	Sampling Point	Place
1	S_1N	East side of Nagthana dam.
2	S_2N	West side of Nagthana dam.
3	S_3N	North side of Nagthana dam.
4	S_4N	South side of Nagthana dam.
5	S_1S	East side of Satnoor dam.
6	S_2S	West side of Satnoor dam.
7	S_3S	North side of Satnoor dam.
8	S_4S	South side of Satnoor dam.

Table-2

S. No.	Parameters	Method
1	P^H	pH Metrically
2	Conductivity (µS)	Conductometrically
3	Alkalinity (mg/l)	Titration Method
4	Calcium	Titration Method
5	Magnesium	EDTA Titration Method
6	Chloride (mg/l)	Precipitation Titration

7	Total Hardness (ppm)	Titration Method
8	Fluoride (mg/l)	Potassium Thiocyanite, Spectrophotometrically
9	Nitrite (ppm)	Spectrophotometrically
10	Dissolved Oxygen	Winkler Method
11	COD	Titration Method

RESULTS AND DISCUSSION

Eleven physico-chemical parameter of water sample were determined in month of Jan. 2013. The temperature of the sample was noted at the sample spot during collection. Other parameters like pH, Conductivity, Alkalinity, Calcium, Magnesium, Chloride, Total Hardness, Fluoride, Nitrite, Do and COD were measured within few hours from sampling. The parameters were analysed by prescribed standard method. The variation in various parameters of different samples is shown in Table-3.

pH

Observation reveals that, (Table-3) the pH of Nagthana dam water reservoir is 7.31 to 8.25 and Satnoor dam reservoir is 8.10 to 8.25. Satnoor dam water is highly alkaline than Nagthana dam water. The higher pH may due to photosynthetic activity in water body and helps in photosynthesis of phytoplanktons.

Conductivity

Conductivity is varies in Nagthana Damp where it is constant in Satnoor dam water.

Alkalinity

The alkalinity of Nagthana dam water varied between 300 to 400 mg/l and Satnoor dam water varied between 250 to 280 mg/l. Total alkalinity of Nagthana dam is higher than Satnoor dam.

Calcium

The water above Calcium values 25 mg/l are classified as 'Calcium rich'. The present investigation shows that the concentration of calcium of the Nagthana water is 16.20 mg/l and Satnoor dam water is 13.4 mg/l. Nagthana dam water contains high concentration of calcium than Satnoor dam. All the water samples are Calcium deficient.

Magnesium

The observed value of Magnesium in Nagthana dam is 5.01 mg/l and Satnoor dam is 2.53 mg/l. The observed value of Magnesium of Satnoor dam is 2.53 mg/l is higher than Nagthana dam. The present investigations shows that the Magnesium content in majority of samples does not exceed the limit as prescribed by ISI as well as WHO.

Chloride

The suitability of water resource for the irrigational use in agricultural is depends on its salt concentrations, especially Chloride contents. In the present investigation Chloride concentration is in the range of 1.98 to 36.72 in Nagthana dam and 2.48 to 4.46 in Satnoor dam water. Chloride value is much higher in Nagthana dam water than Satnoor dam water. According to WHO maximum permissible limit for Chloride is 500 mg/l. the value observed in present study are well below the permissible limit

Total Hardness

Total hardness of water is caused by the presence of Calcium and, Magnesium salts. Hardness has no known adverse effect on health. However, maximum permissible level has been prescribed for drinking water is 500mg/l, by WHO. According some classifications water having Hardness up to 75 mg/l is classified as soft, 76 to 150 mg/l is moderately soft, 151-300 mg/l as hard and more 300 mg/l as very hard. In present investigation Hardness of various samples of Nagthana dam water is in the range of 95.04

to 132.66 mg/l. the result shows that, this water is moderately soft. Hardness of Satnoor dam water is in the range 27.72 to 67.32 mg/l, revels that, this water is soft. So all the water samples have values within the permissible limits.

Table-3

S. No.	Parameters	Nagthana Damp				Satnoor Damp			
		S_1N	S_2N	S_3N	S_4N	S_1S	S_2S	S_3S	S_4S
1	pH	7.31	7.69	7.94	8.25	8.22	8.22	8.25	8.10
2	Conductivity (µS)	0.7×10^{-3}	0.5×10^{-3}	0.6×10^{-3}	0.4×10^{-3}	0.5×10^{-3}	0.5×10^{-3}	0.5×10^{-3}	0.5×10^{-3}
3	Alkalinity (mg/l)	400	350	300	305	225	250	260	280
4	Calcium	15.40	16.20	6.82	9.40	11.2	13.4	10	13
5	Magnesium	4.48	5.01	4.23	3.31	2.14	2.53	2.33	1.65
6	Chloride (mg/l)	36.72	45.65	1.98	3.47	2.48	3.47	4.46	3.97
7	Total Hardness (ppm)	95.04	118.80	114.89	132.66	27.72	67.32	59.40	59.41
8	Fluoride (mg/l)	0.325	0.336	0.341	0.349	1.98	1.95	2.09	2.12
9	Nitrite (ppm)	0.00029	0.00026	0.00028	0.00026	0.0052	0.0052	0.0052	0.005
10	Dissolved Oxygen	2.12	2.09	2.10	2.08	3.00	0.49	0.54	0.55
11	COD	4.2	4.3	3.8	3.9	3.8	3.9	4.00	4.2

Fluoride

Fluoride is essential for human being as trace element and higher concentrations of this element causes toxic effects. The permissible limit of Fluoride for potable water is 0.6 to 1 mg/l. in the present study concentration of fluoride varies in between 0.325 to 0.349 mg/l in Nagthana dam and 1.95 to 2.12 mg/l for Satnoor dam. Satnoor dam water having fluoride concentration higher than that of Nagthana dam water. Consumption of such water having fluoride more than 1.5 mg/l may cause degeneration of bones and dental mottling especially in pregnant women and children. It is suggested that defluoridation of the drinking water should be done at these stations.

Nitrite

The prescribed limit of NO_3^- by WHO is 50 mg/l for domestic water. In the present study, Nitrate ranges between 2.6×10^{-4} to 2.9×10^{-4} for Nagthana dam and 5.2×10^{-3} Satnoor dam water. Satnoor dam water having a higher value of Nitrites than Nagthana dam. The concentration of different forms of Nitrogen gives a useful indications of the level of micronutrients in water and hence their ability to support for plant growth.

Dissolved Oxygen

During the study, the concentrations of DO recorded is 2.08 to 2.12 mg/l for Nagthana dam and 0.49 to 3 mg/l for Satnoor dam water. It is observed that Nagthana dam water has higher value of dissolve oxygen than Satnoor dam water.

COD

C.O.D. is the major of oxygen consumed during the oxidation of oxydisable organic matter present in the water. C.O.D. of Nagthana dam water is in the range 3.8 to 4.3 mg/l and Satnoor dam water is 3.8 to 4.2 mg/l. COD of both dam water is nearly same and below the permissible limit.

CONCLUSION

In the present study most of the parameters are found within the prescribe limit of IS and WHO.

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