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Water Quality Study: Physico-Chemical Characteristics of Neelona Dam, Yavatmal (Maharashtra), India.

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Abstract:

Life cannot be imagined without Water. Hence small or large dams are constructed on rivers. This dam water is supplied for drinking as well as agricultural purposes. Yavatmal is one of the districts of Maharashtra. Neelona Dam is situated near Yavatmal at about 2 kms and it is main source of drinking water supplied by the corporation to Yavatmal city. Water pollution is an acute problem all over India. Hence it is essential to study the quality of this dam water. In the present study quality of water of Neelona is studied with respect to some physico-chemical characteristics as Temprature, pH, EC, DO, BOD, COD, Cl, TH, NO_3, SO_4 and PO_4. It is concluded from the study that the values of studied parameters are in the permissible limits and water of Neelona dam is useful for water supply.

Key Words: Water, dam, Physico-chemical characteristics etc.

Introduction

Life cannot be imagined without Water as it used for drinking, agriculture, domestic purpose etc. Day to day demand of water is increasing with increasing population in India and the percentage of rain fall is decreasing. Hence good quality water is becoming essential for everyone. Various water borne diseases are making the life difficult. Water pollution is an acute problem in all the dams in India. Water is known to contain a large number of chemical elements. The interaction of both the physical and chemical properties of water plays a significant role in composition, distribution and abundance of aquatic organisms.

The Yavatmal district lies between $19^0$26' to $20^0$42' North latitude and $77^0$18' to $79^0$9' East latitude. The Yavatmal district belongs to Balaghat ranges. It is bound by the main rivers, Wardha and Penganga. Yavatmal district is surrounded by Amravati in North, Chandrapur and Wardha in the East, Nanded district and Andhra Pradesh in in the South and Akola and Perbhani in the West.

Materials And Methods

Water samples were collected in previously cleaned polythene bottles. Water samples were collected during November 2014, December 2014 and January 2015 from 7 stations decided in the dam 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. Phosphate was analysed using Calorimeter and all other parameters were analyzed by titration methods outlined in standard methods (2002).

Result And Discussion

The average values of three values of every physico-chemical characteristics are given in the table1.

Table 1

Parameter↓	L-I	L-II	L-III	L-IV	L-V	L-VI	L-VII
Temp.^{o}C	30.1	30.3	28.9	30.1	30.0	29.9	29.8
pH	7.20	7.17	7.25	7.17	7.17	7.23	7.22
EC	576	617	874	634	645	816	767
DO	4.87	4.76	5.07	4.83	4.37	4.92	5.14
BOD	1.19	1.32	1.25	1.87	2.17	1.94	1.54
COD	21.8	21.4	20.7	21.4	21.8	21.5	21.7
Cl	43.9	42.7	46.7	47.3	48.3	43.9	42.6
TH	342	356	387	421	396	405	408
NO_3	3.75	3.26	3.67	4.02	3,38	3.85	3.26
SO_4	76.9	69.4	78.7	73.5	72.6	68.4	64.7
PO_4	0.67	0.74	0.46	0.83	0.81	0.63	0.69

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 28.9^{0}C to 30.3^{0}C.Lowest temperature is at location III and highest value is recorded at location II.

pH :- The pH values ranged from 7.17 to 7.25. This indicates the basic nature of water samples.

Electrical Conductivity (E.C.):- The EC varied from 576 to 874µs/cm. It generally is the measure of dissolved electrolytes. The high values are for samples of lower side locations.

Dissolved Oxygen (DO):- It is one of the important parameters in water quality assessment. It reflects the physical and biological processes prevailing in the water. Non polluted water is generally saturated with DO. The Do ranges from 4.37 to 5.14mg/L.

Biological Oxygen Demand (BOD):- It is the amount of oxygen required by the bacteria in stabilizing the decomposable organic matter. The values are observed from 1.19 to 2.17 mg/L.

Chemical Oxygen Demand (COD):- It is the amount of oxtgen consumed during the chemical oxidation of organic matter using strong oxidizing agent. COD is linked with pollution from paper industries, domestic sewage and industrial effluents. In present study the values vary from 20.7 to 21.8 mg/L

Total Hardness:- 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 342 to 421mg/L.

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 42.6 to 48.3 mg/L.

Nitrate, Sulphate and Phosphates:- The result of nitrate analysis revealed that the

higher values recorded (3.26- 4.02 mg/L) may be attributed to the oxidation of ammonia by nitrifying bacteria and biological nitrification. The nitrate concentration could be due to leaching and surface run-off nitro phosphate fertilizers from nearby farmland into water.

The sulphate in the dam water was high (64.7 – 78.7 mg/L). The source of sulphate may be from mineral rocks and fertilizers.

The phosphate content of dam water were found in range of 0.467 to 0.834 mg/L. Phosphate lead to entroplication, which could also lead to unpleasant taste and odor.

Conclusion

Comparision of present study parameter values with the permissible limits prescribed by bureau of Indian Standards and WHO provides the conclusion that the water of Neeelona 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.

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