

Physico-Chemical Characteristics of Water Quality of Bemla Dam Babulgaon, District Yavatmal.

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Abstract: The Physico chemical parameter of surface water from Bemla dam of Babhulgaon Dist Yavatmal is determined during March 2012 for 20 locations . The Physico chemical parameters are pH, electrical conductance, DO, BOD, COD, TDS, total hardness, total alkalinity, turbidity; anions includes chlorides, sulphates , nitrates etc.. All the parameters are found to be within the permissible limit. The laboratory test of the collected water samples were performed for analysis of various parameters .The methods employed for the analysis as per standard methods recommended by APHA, WHO, ICMR. The obtained values are compared with the standard limits. The results of this study reveal that the physico-chemical parameters are with in the maximum permissible limit of WHO with some slight variations in some parameters. Hence, water is safe and suitable for domestic, irrigation and drinking purposes.

INTRODUCTION

Water pollution is an acute problem in all the major dams in India. Water is known to contain a large numbers of chemical elements . The interactions of both the physical and chemical properties of water play a significant role in composition, distribution and abundance of aquatic organisms . . Pure water is a real curse for living beings. Man during course of his civilization has settled in places where plenty of water was available. But with increase of population and in exploitation of natural resources for his own benefit, he has behaved in a wild manner by creating problem of pollution hazardous not only to aquatic life but also to his own life. India is still contributing because of irresponsible behavior of citizens rendering water more polluted day by day and the situation is deteriorating progressively.

The Yavatmal district lies between 19° 26' to 20° 42' North latitude and 77° 18' to 79° 9' East

Latitude. It is surrounded by Amravati in the North, Chandrapur and Wardha in the east, Nanded district and Andhra Pradesh in the south and Akola and Prabhani in the west. The Yavatmal district belongs to Balaghat ranges. On the north it extends into Payanghat, and includes a small part of it which is belt of palin from 8 to 22 km in breadth along the north of Yavatmal and Dharwha tashil.

The main rivers of the district are the Wardha and Penganga both of which flow skirting the district and forming the district boundaries. However the district is well drained by a large number of tributaries of the two rivers such as Bembala, and Pus, Adan Arunawati, Waghadi, Khuni, Vidarbha and the Nirguda. The Pus River flows through Pusad. Bembla dam is situated on river Bembla

MATERIALS AND METHODS

Collection of water samples

Water samples were collected during march

2012 at different 20 stations collected early in the morning (8.00am to 9.00am). Subsurface sampling were done in glass stoppered sterilized container (Volume approx 1000ml)

Temperature and pH of water samples were measured in the field immediately after collection with the help of mercury glass thermometer and portable pH meter respectively. Other physico-chemical parameters were analyzed in the laboratory within 4h of collection. The turbidity was measured by a Nephelometer (Elico India model 152).

Electrical conductivity was measured by Conductivity Bridge (EQ 664 A). All other parameters such as dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), total alkalinity, hardness, sulphate, chloride, nitrate, phosphate, total solids and total dissolved solids were estimated following the standard methods as outlined in Standard methods (2002)

Table 1 Methods employed for determination of physico-chemical parameters

Sr. No.	Parameters Methods employed
01	pH pH metry
02	Temperature Thermometry
03	Total dissolved solids (TDS) Conductometry
04	Dissolved Oxygen (DO) Wrinklers method
05	Alkalinity Titration
06	Acidity Titration
07	Hardness as Calcium EDTA titration
08	Chloride Titration
09	Phosphorus Calorimeter

RESULT AND DISCUSSIONS

The physico-chemical characteristics are given in the Table 1.

Temperature

Temperature is basically important for its affects on certain chemical and biological activities in the organisms attributing in aquatic media. The temperature ranged between 20°C to 32°C. The

LOCATIO N	TEMP	PH	EC	DO	BOD	COD	CL	TH	NO ₃	SO ₄	PO ₄
1	30.7°C	7.20	700	2.68	2.31	6.54	51.4	320.3	4.923	103.2	0.634
2	29°C	7.79	630	4.67	1.88	18.42	60.8	428.9	2.661	80.4	0.017
3	28.5°C	8.30	812	3.21	0.92	39.3	66.7	432.7	1.954	68.4	0.992
4	32°C	7.38	1800	2.21	0.89	46.4	70.3	454.2	3.281	96.2	0.871
5	31.4°C	7.19	1230	3.90	1.62	22.8	62.4	485.2	1.631	77.1	0.341
6	28.9°C	8.64	480	4.91	0.92	36.09	47.9	216.7	2.987	68.4	0.264
7	29.5°C	8.13	510	5.55	3.27	28.06	60.1	259.9	1.879	57.3	0.081
8	30.2°C	7.47	610	4.31	2.18	13.8	38.9	287.9	0.9321	44.9	0.738
9	30.5°C	7.17	570	3.30	1.67	24.3	43.6	459.2	3.486	108.6	0.918
10	29.1°C	7.90	540	3.72	1.12	26.10	43.3	192.8	0.9231	52.3	0.082
11	29.4°C	7.71	810	2.91	1.13	38.04	30.4	215	1.979	68.7	0.631
12	30.2°C	7.32	440	4.03	0.72	19.22	35.8	266.2	2.631	74.9	0.115
13	27.5°C	8.30	550	7.09	3.12	9.18	48.7	276.1	2.387	40.68	0.413
14	27.6°C	8.08	560	5.38	2.21	13.26	56.8	260.6	4.682	70.66	0.097
15	27.5°C	7.35	400	2.28	0.4	18.31	28.36	210.1	0.4231	78.76	0.092
16	28.5°C	7.49	420	2.58	1.10	16.15	29.3	190	0.7683	36.01	0.318
17	27°C	7.24	430	5.24	1.88	19.13	28.6	250	0.3819	63.68	0.109
18	28.3°C	7.39	480	3.63	0.81	30.25	32.4	180.8	1.031	60.98	0.863
19	27.4°C	8.10	501	4.04	0.42	39.11	40.8	260.7	1.128	46.18	0.736
20	32°C	7.99	445	5.34	3.11	15.77	47.0	256.2	1.01	71.01	.423

highest temperature of 32°C was obtained at station -20. The lowest and highest values of The variation is mainly related with the temperature of atmosphere and weather conditions.

pH

The PH values of water bodies (lakes) was found in alkaline side (PH>7) The PH ranges from 7.17 to 8.30

Electrical conductivity

In present observation the EC varies from 400 to 1800 µs/cm in pre-monsoon. High EC indicates a large quantity of dissolved minerals, salt thereby making it sour

DO

DO is one of the important parameter in water quality assessment. It reflects the physical and biological processes prevailing in the water. Non polluted surface water is normally saturated with DO. The DO varies from 2.21 to 7.0 mg/L. These values indicate relatively large organic pollution.

BOD

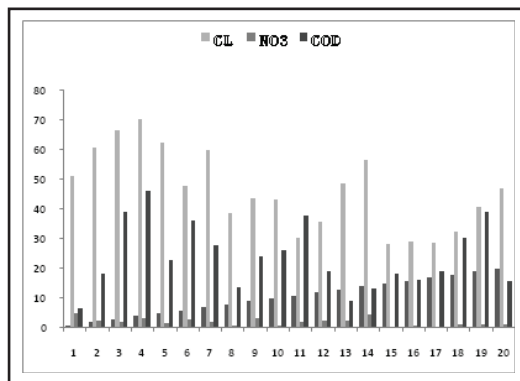
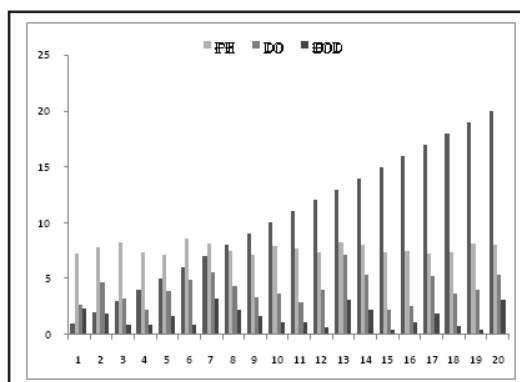
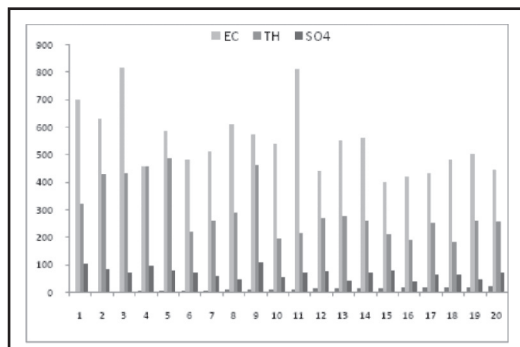
BOD is the amount of oxygen required by the bacteria in stabilizing the decomposable organic matter. The aim of BOD test is to determine the amount of bio chemically oxidisable carbonaceous matter vary from 0.4 to 3.27mg/l and 0.65 to 3.89 mg/l.

COD

COD is the amount of oxygen consumed during the chemical oxidation of organic matter using strong oxidizing agent like acidified potassium dichromate. The COD is linked with heavy pollution from paper industries, domestic sewage and industrial effluents .In present study the value vary from 9.18 to 46.4 mg/L.

Total hardness

In most of the fresh water TH is imparted mainly by the calcium and magnesium ions, which apart from Sulphate, Chloride and Nitrates are found in combination with carbonates and bicarbonates. In the present



study of Total hardness were found to be 190 to 485.2 mg/L

Chloride

Chlorides are found in practically all natural waters. This is the most common inorganic anion present in water. Man and animals excrete high quantities of chlorides therefore it indicates sewage contamination. Variation observed is usually associated with the

hydrology of the basin. In the present study the value ranges from 28.36 to 70.3 mg/L

Nitrates, sulphates and phosphates

The results of the Nitrate present in Tables 1 revealed that the higher values recorded (0.38-4.92 mg/L). It 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 of nitro phosphate fertilizer from nearby farmlands into the water.

The Sulphate concentration in the dam water were very high 36.01 to 108 mg/L. The source of sulphate could probably be from the mineral rocks anthropogenically added and also enters with rain.

The Phosphate content of dam water bodies were found in the range of 0.017 to 0.99 mg/L. Phosphates lead to eutrophication which could also lead to unpleasant taste and odour of the water when algae die and decompose, thus deteriorating the quality of the water. The high concentration of Phosphate after rain is due to leaching of Phosphate fertilizer.

CONCLUSIONS :

Comparing present values of selected parameters with the permissible limits prescribed by Bureau of Indian Standards (IS 101500) & WHO, it can be concluded that the water of Bembla dam is useful for water supply. But before supplying to urban population this must be treated by water department to maintain water quality as required for drinking purposes. Results are presented in the form of graphs.

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