

Seasonal variation of physicochemical parameter of water of Pakadiguddam reservoir Korpana Tahsil Chandrapur District, (M.S.) India.

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ABSTRACT

Pakadiguddam water reservoir was analysed for selected physicochemical parameter which includes Temperature, pH, Conductivity, Transparency, Dissolved oxygen, Free Carbon Dioxide, Biochemical Oxygen Demand, Chemical Oxygen Demand, Alkalinity, Chloride, Total Hardness, Calcium Hardness, Magnesium Hardness, Total Solids, Total Suspended Solids, Total Dissolved Solid, Phosphate, Sulphate and Nitrate as per standard method available in literature during period of research work from Jan 2016 to Dec 2016. Results of the study revealed that, there were variation occurred in various parameter during the period of study. There were no significant changes occur in some parameter like pH temperature. The study concludes that water quality is poor and can be source of water borne diseases.

Keywords: - Pakadiguddam reservoir, physicochemical parameter, water quality, pollution, aquatic animals.

INTRODUCTION

The water quality must be an important for drinking purpose, industrial purpose etc. Due to over interference of mankind and impact of human activities in and around the water body affects physicochemical properties which directly affects aquatic animals as well phytoplankton present in the water. The time to time study of water quality provide a data to assess quality of water and also sustainability of a water body [1].

Due to wide agriculture development, farmer have used metal based fertilizers which directly came in water body and high industrial discharge results in continuous rise in concentration of poisonous metals in water body. Discharge of these waste may affects aquatic life as well chemical composition of water [2]. According to literature, water quality is affected by wide range of natural and human influences. Natural influences includes geological, hydrological and climatic. The biological study of water helpful in pollution control, construction and renovation of dam or lake, fish and aquatic life. Pakadiguddam reservoir in korpana tehsil mainly designed to provide water for agriculture, industry and drinking water. Without chemical study of water, it is not possible to understand whole biological processes taking place ecosystem of water [3]. It is not possible to live without pure water, it must free from pathogens and have balance chemical composition [4]. However, variety of microorganism found in water body like bacteria, fungi, algae and viruses. These microorganism formed complex ecosystem, these microorganism play an important role for contamination of water and cause water borne diseases [5]. Present study assessed the quality of water by studying various physicochemical parameter of water of Pakadiguddam reservoir in korpana tehsil, Chandrapur district, MS, India, using standard methods available in literature.

METHODOLOGY

Site Description:

The Pakadiguddam Lake is located in korpana tahsil of Chandrapur District, with 19° 42' 05" latitude and 79° 02' 00" E longitudes. This lake came in existence in year 1993 mainly for irrigation and water source for industries. It has a storage capacity of 13.31 million cu. mt. The recorded rainfall of this region is approximately 1147 mm. The water of this lake is utilized for irrigation, fishing, industry and domestic purpose by the local residents.

Laboratory analysis of samples:

All the physicochemical parameter of water were measured following standard method as outlined in ALPHA [6].

RESULTS AND DISCUSSION

The result of physicochemical parameter of water sampled during the study period are summarised in the table a.

Water physicochemical properties:

Water pH: Water pH of study sample ranges from 7.07 to 8.12. It clearly indicate that, the pH was within acceptable range for drinking water as per WHO standard. Variation of pH value can affect rate of biological reaction taking place in water body and also survival of microorganism.

Temperature: The water temperature have ranged from 21.54 °C to 33.5 °C. The minimum temperature have been recorded in the month of January and maximum in the month of June during the year 2016.

Total alkalinity: The total alkalinity ranged from 28 to 76.87. The values obtained from experiment are fall within acceptable limit for portable water as per the standard. Total alkalinity is due to presence of CO₃, HCO₃ OH ion. Results clearly revealed at such ions were less in this reservoir.

Dissolved oxygen: Dissolved oxygen of sampled water ranged from 4.07 to 8.09. These values was quite higher than standard values (around 3 mg/l at 25° C).

Free CO₂: The carbon dioxide is soluble in water and incorporated in aquatic plant by during photosynthesis [7]. The content of free CO₂ have been varied from 2.81 mg/l to 6.85 mg/l. The concentration of free CO₂ was found to be maximum in the month of June may be due to heavy rainfall and minimum in the month of January.

Conductivity: Electrical conductivity of sampled water varied from 0.147 to 0.22. The high value of conductance is indication of water pollution. These values of conductance clearly indicate the presence of high amount of inorganic salts in water. The higher levels of EC alter the chelating properties of receiving systems, which favours free metal availability to flora and fauna [8].

Table a: - Physicochemical parameter of of water of Pakadiguddam reservoir in korpana tehsil, Chandrapur district, MS, India.

Parameter	Feb	Mar	Apr	May	Jun	July	August	Sept	October	Nov.	Dec.	January	Min	Max
Temperature	27.2	27.2	28.55	30.2	33.5	31.57	29.55	27.3	26.3	24.3	23.56	21.54	21.54	33.5
pH	7.08	7.1	7.23	7.44	7.59	7.87	8.1	8.12	7.35	7.07	7.1	7.17	7.07	8.12
Conductivity	0.234	0.265	0.27	0.287	0.321	0.233	0.22	0.178	0.163	0.154	0.147	0.148	0.147	0.22
transparency	56.49	54.33	50.21	33.81	25	24.8	31	46	48	54	44	47	24.8	56.49
Total Alkalinity	48	49	54	76.87	69.88	50	33.29	28	33.34	36.23	29	23.89	28	76.87
Total Hardness	53	62	64	79	74.77	48	39.88	42.42	52.98	48	36.55	32	32	79
Cal. Hardness	33	36	40	54.55	51	36.64	24.66	29	35.56	26	23	21.04	21.04	54.55
Mg Hardness	21.9	23.43	24.54	28.21	23	15.34	16.74	13.69	26.03	13	14.34	14.05	13	26.03
T.S.	276	389	451	534	409	615	498	413	321	289	278	234	234	615
T.S.S.	189	245	231	379	275	409	325	276	207	189	197	154	154	409
T.D.S.	85	143	118	196	141	210	169	126	117	101	93	76	76	210
D.O.	5.34	5.02	5.65	4.67	6.57	7.32	7.43	7.72	7.32	7.21	8.07	8.09	4.67	8.09
CO2	3.09	4.89	4.23	5.43	6.85	5.12	5.09	4.24	3.67	4.08	3.12	2.81	2.81	6.85
Phosphate	0.243	0.368	0.543	0.558	0.456	0.415	0.532	0.243	0.241	0.217	0.212	0.204	0.204	0.558
Sulphate	23.4	25	30.65	31.34	24.67	23.23	19.8	24.45	25.78	23.43	21.34	17.99	17.99	31.34
Nitrate	0.213	0.267	0.275	0.32	0.459	0.435	0.417	0.378	0.354	0.254	0.269	0.265	0.213	0.459

All parameter are in Mg/L, except temperature

Transparency: Transparency of sampled water varied from 24.8 to 56.49.

Total hardness: In the given time period, the value of total hardness varied from 32 mg/l to 79 mg/l. The maximum value of hardness was observed in the month of May due to evaporation which increases concentration and minimum in the month of January due to less concentration.

Cal. Hardness: Calcium hardness was ranged from 21.04 mg/l to 54.55 mg/l, similar trend was also reported by various author during their study.

Mg Hardness: Mg hardness was ranged from 13 mg/l to 26.03 mg/l which showing agreement with general trend observed.

Total solid: TS ranged from 234 mg/l in the month of January to 615 mg/l in the month of July. This high value in the month of July was due to low water level (Poor rainfall) and low value of TS in the month of January was due to increased water level and dilution.

Total suspended solid:

Total Dissolved solid: TDS of sampled water varied from 76 to 210. It clearly indicates that, water of reservoir is suitable for drinking and irrigation.

Phosphate: In the present study, phosphate content was ranged from minimum 0.204 mg/l in the month of January to maximum 0.558 mg/l in the month of May.

Sulphate: Sulphate content of sampled water ranged from 17.99 mg/l to 31.34 mg/l. Here, Maximum observed in the month of May and minimum in the month of January.

Nitrate: In the present investigation, the value of nitrate content was varied from 0.213 mg/l to 0.459 mg/l. The values obtained from experiment are fell within acceptable limit for portable water as per the standard.

CONCLUSION

From above reported result and discussion, it is clearly concluded that the various parameter have been varied with season. Most of the physicochemical parameter were appeared to be permissible limit as per standard report. The water body studied here is suitable for irrigation and drinking purpose.

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