



Physico chemical parameters of Anekere Water body Hassan district (Karnataka)

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Abstract

Present paper deals with the physico-chemical parameters of Anekere water body, Channarayana Taluka, Hassan District, Karnataka State. The work was carried out during the period of Sep-2012 to Aug 2013. This water body was established for Irrigation, Drinking water and Fish culture purpose last two decades back. It was in the out of 7 km distance from Channarayana town. In rainy season it's receiving city sewage, industrial wastes, agriculture runoff to the water body. This type of water injures to the health of human and other aquatic fauna. So there is an urgent requirement for its extent of pollution which will help us in further management of conservation. During the study period examine the physico-chemical parameters such as: atmosphere temperature, water temperature, pH, electrical conductivity, alkalinity, total hardness, TDS, Ca, Mg, chlorides, sulphates and phosphate, following standard methods (APHA 1998). Now this water body is becoming eutrophic nature. Preventive measures like, diversion of sewage, total prohibition on washing of cattle and cloths. The physico-chemical properties of Anekere water body reveals that the level of water pollution is continuously increasing. The intensity of water pollution has very deteriorated in Anekere. Therefore, it has concluded that there is close relation between locations of water body and a level of water pollution. It is studied that there is inverse proportion between quantity of water in the water body or tanks and level of pollution.

Key-Words: Anekere water body, physico-chemical parameter, Hassan

Introduction

Water is one of the most important available substances on the earth. The survival and quality of human life depends on the availability of fresh water. The aquatic animal's life directly or indirectly depends on water quality status (Bajpai, 1993; Mishra et al. 1993; Sayeshwara, 2010). Water quality study provides the current information about the suitability of water for designated uses and to improve existing condition. Now a day's most of the aquatic ecosystem receives million liters of municipal sewage, industrial and agricultural runoff. Its cause to nutrient enrichment leads to the eutrophication in aquatic ecosystem (Ansari, 2006).

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Pollution of the aquatic environment by inorganic and organic chemicals is a major factor that hinders the survival of aquatic organisms and including fish population (Saeed and Shaker 2008). Parameters of Anekere water body and to suggest conservation methods. The main object of this paper is to examine the physico-chemical. The water bodies serve as a rich source of water supply for irrigation, drinking to nearest villages & fish culture. The quality of water is getting polluted due to the industrialization, Urbanization and indiscriminate use of pesticides in agriculture which runoff with water and contaminate the water bodies. Hence the quality of water for potability is assessed on the basis of physico-chemical parameters in order to provide the information.

Material and Methods

The investigation was carried out to study the physico-chemical and biological aspect of the water body during September 2012 to August 2013, The Anekere

water body situated 7 km distance from channarayapatna town, Hassan district Figure-1. Surrounding villagers are depended irrigation under this water body .Water sample were collected in morning hours at 6-00 am to 8-00am. APHA (1998) Trivedy & Goel (1985) and Kodarkar (2006).Preservatives were used while carrying the sample at laboratory.

Physical chemical parameters such as: temperature, pH, TDS, electrical conductivity, alkalinity, total hardness, TDS, Ca.Mg, chlorides, sulphates and phosphate, following were analyzed in the laboratory by using stranded methods (APHA, 1998).

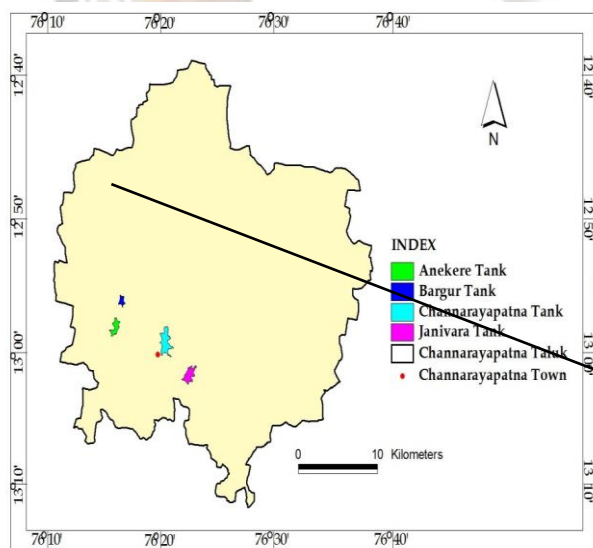


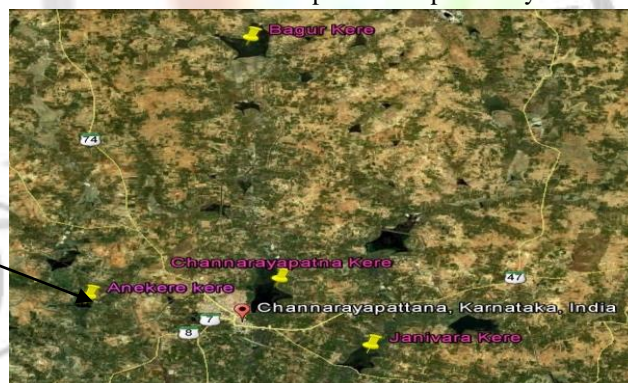
Fig. 1: Anekere Water Body

Results and Discussion

Atmosphere, Water Temperature, an important role plays in determine the growth of organisms ultimately the water quality. Excess amount of nutrients, high temperature cause to the eutrophication. The maximum temperature was 35°C in the month of June, and minimum 19°C was recorded in the month of January. Although the water temperature recorded was consistently lower than the atmosphere temperature. Atmosphere temperature positive correlated with water temperature, electric conductivity, total hardness, calcium, chloride phosphate, sulphate, nitrate, Dissolved Oxygen and negative correlated with, pH, TDS, Mg, alkalinity, Water Temperature positive correlated with electric conductivity, total hardness, calcium chloride phosphate, sulphate, nitrate, DO and negative correlated with pH, TDS, Mg, alkalinity. Water temperature is one of the most important

physical parameter. It is also determining factor for seasonal distribution of organisms, solubility of gases & salts in water. No other factor has so much influence as temperature. In the present study the water temperature ranges from 18.0 to 33.0°C recorded at the spot. The season wise analysis showed that the highest values recorded in summer, moderate in rainy season & lowest in winter season. Narayana *et. al* (2005) reported the water temperature varies from 24.75 to 30.25°C in Aujanapra reservoir. Similar finding were observed in the present study. pH plays an important role in the aquatic situations for the growth of flora & fauna.

The most of the aquatic organisms are adapted to a average pH & do not withstand abrupt changes. Anekere water body ranges from 7.8 to 8.7 at the spot in the present study the alkaline trend of the pH was observed. Similar alkaline pH was reported by Khan



et.al (2005). The high pH was observed in summer season it is due to aquatic plants use carbon dioxide in their photosynthetic activity and its removal is responsible for such a high pH. Dissolved oxygen is very important parameter of water quality and is an index of physical & biochemical processes occurs in water.

Electric conductivity is a numerical expression ability of an aqueous solution to carry electric current. It's the best indicator of water pollution as conductivity is the indirect measure of TDS, nutrient. The maximum value of conductivity 1820µm was recorded in month of July and minimum 1240 µm was recorded in the month of April. In study period i.e. September, 2012 to August 2013. Electric conductivity showed high significant positive relationship with Dissolved Oxygen and Sulphate. Its shows negative relationship with pH, Total Dissolved Solids and Water temperature.

The D.O. content of the Anekere water body at all the sampling station is much above the value of 3 mg/lit the prescribed ISI standard. Dissolved oxygen reflects the status, physical and biological process in water,

shows the metabolic balance and D.O. level acts as an indicator of water body. In the present study dissolved oxygen values are ranges from 7.4 to 11.2 mg/l. The highest value of DO was observed in the early summer months and it may be due to high photosynthetic activity by plants and low values in summer which is due to high atmospheric temperature. Similar results were reported by Devidas (2006) and Lokhande (2009). The Total Dissolved Solids (TDS) are the amounts of particles that are dissolved formed in the water. It may also include all suspended impurities (solids) that may or may not pass through the filter. In the present study the TDS values ranges from 980 to 1385 mg/l. The lowest values were observed in the months of December and January in winter season while highest values in August and September in rainy season similar observation were made by Lokhande (2004) while working on Dhanegaon reservoir. Naturally the Total Dissolved Solid content in this reservoir were well below the permissible limit.

In the present investigation the total hardness ranges from 88 to 162 mg/L. the minimum values of hardness were observed in the summer season & maximum in the rainy season. Highest values may be due to rainwater carries the surface runoff the similar results were observed by Hosmani (1999). Pendse (2000) also reported low value of hardness in summer season.

The maximum value of calcium 110 mg/lit was recorded in month of May and minimum 60mg/lit was recorded in the month of September. In study period, September 2012 to August 2013. Ca showed high significant positive relationship with water temperature, Atmospheric temperature. Its shows negative relationship with Electrical conductivity and total dissolved solids. The maximum value of magnesium 58 mg/lit was recorded in month of March and minimum 16 mg/lit was recorded in the month of September. In study period i.e. September 2012 to August 2013 Mg showed high significant positive relationship with Total hardness, Calcium, pH. Its shows negative relationship with Water and Air temperature, EC and total dissolved solids.

Nitrate is normally the most common form of combined inorganic & organic nitrogen in lakes & streams. In the present study the value of nitrate ranges from 0.04 to 0.08 mg/L. The seasonal trends the minimum values were found in the rainy season and maximum value in summer season. The drinking water standards for human being set to 45mg/L (Raghvendra, 1992). The Anekere water body is less than 45 mg/L. Low concentration of nitrate can be attributed to their utilization by aquatic plants or phytoplankton population. It may be due to this water is used as

drinking purpose same results were observed by Pawar and Khobragade (2009).

Separation of alkalinity soft & hard water scale is 40mg/lit. J. B. Moyle (1949). The maximum value of 342mg/lit was recorded in month of December and minimum 92mg/lit was recorded in the month of June. In the present study, Alkalinity showed high significant positive relationship with EC, magnesium and Total Dissolved Solids. Its shows negative relationship with pH, total hardness, water and Air temperature. The maximum value of Chlorides 74.2mg/lit was recorded in month of May and minimum 54 mg/lit was recorded in the month of December. Chlorides increase in summer and decrease in winter (Singh 1960, Zafar A.R.1964). The maximum value of Phosphates 3.0mg/lit was recorded in month of May and minimum 0.9mg/lit was recorded in the month of November high value of phosphate during summer may be attributed to the decrease water level and release of phosphate due to decomposition of organic matter. it's a present in fertilizer they contribute to the water body from agricultural runoff. In the present study the maximum value of Sulphates 3.2 mg/lit was recorded in month of June and minimum 1.1mg/lit was recorded in the month of December. Reddy *et.al* (2009) high value recorded in monsoon season.

Conclusion

The physico-chemical properties of Anekere water body reveals that the level of water pollution is continuously increasing. The intensity of water pollution has very deteriorated in Anekere. The pollution of the water body is mainly due to draining of several terminals of sewage, cattle washing, mass bathing, cloth washing, and adding human waste. Therefore, it is necessary to take some preventive measures to reduce the water pollution of the water body and its surroundings. Preventive measures like, diversion of sewages, total prohibition on washing of cattle and cloths. Therefore, it has concluded that there is close relation between locations of water body and a level of water pollution. It is studied that there is inverse proportion between quantity of water in the water body or tanks and level of pollution.

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Table 1: Physico-chemical parameters of Anekere water body, Hassan district

	Units	12-Sept	12-Oct	12-Nov	12-Dec	13-Jan	13-Feb	13-Mar	13-Apr	13-May	13-Jun	13-Jul	13-Aug	Max	Min
Atm. Temp	^o C	29.8 0	29.0 0	26.0 0	24.0 0	19.0 0	25.0 0	31.0 0	34.0 0	38.0 0	35.0 0	31.0 0	28.00	19.00	35.00
Water. Temp	^o C	28.5 0	26.6 0	25.2 0	22.0 0	18.0 0	23.9 0	29.5 0	32.8 0	36.2 0	33.0 0	29.0 0	26.20	18.00	33.00
pH		7.80	8.20	8.10	8.30	8.70	8.40	8.50	8.30	8.20	8.10	8.00	7.90	7.80	8.70
EC	μmoh s/cm	1530 .00	1810 .00	1720 .00	1400 .00	1410 .00	1302 .00	1250 .00	1240 .00	1620 .00	1770 .00	1820 .00	1725.0 0	1240. 00	1820. 00
TDS	mg/L	1325 .00	1170 .00	1178 .00	980. 00	995. 00	1250 .00	1102 .00	1145 .00	1209 .00	1050 .00	1188 .00	1215.0 0	980.0 0	1325. 00
Total Hardness	mg/L	88.0 0	119. 00	122. 00	128. 00	135. 00	130. 00	150. 00	162. 00	141. 00	121. 00	110. 00	98.00	88.00	162.0 0
Calcium	mg/L	60.0 0	65.0 0	70.0 0	74.0 0	80.0 0	89.0 0	92.0 0	101. 00	110. 00	92.0 0	83.0 0	79.00	60.00	110.0 0
Magnesium	mg/L	16.0 0	55.0 0	52.0 0	53.0 0	55.0 0	41.0 0	58.0 0	51.0 0	31.0 0	29.0 0	28.0 0	19.00	16.00	58.00
Alkalinity	mg/L	250. 00	302. 00	310. 00	342. 00	268. 00	181. 00	160. 00	192. 00	110. 00	92.0 0	190. 00	232.00	92.00	342.0 0
Chloride	mg/L	65.0 0	71.0 0	56.0 0	54.0 0	62.0 0	69.0 0	72.0 0	73.0 0	74.2 0	69.2 0	71.0 0	68.00	54.00	74.20
Phosphate	mg/L	1.20	1.12	0.90	0.97	1.22	0.99	1.20	2.00	3.00	1.90	1.20	1.05	0.90	3.00
Sulphate	mg/L	1.80	1.60	1.04	1.10	1.30	1.44	1.70	2.20	2.80	3.20	1.90	1.50	1.10	3.20
Dissolved Oxygen	mg/L	10.8 0	11.2 0	8.90	9.20	9.80	7.90	8.80	8.60	7.40	8.60	7.90	7.80	7.40	11.20
Nitrate	mg/L	0.04	0.08	0.03	0.06	0.05	0.04	0.06	0.08	0.07	0.06	0.06	0.04	0.04	0.08

Table 2: Correlation coefficient of Anekere water body, Hassan district

	Atm. Temp	Water. Temp	pH	EC	TDS	Total Hardness	Calcium	Magnesium	Alkalinity	Chloride	Phosphate	Sulphate	DO
Atm. Temp	1												
Water. Temp	0.995	1											
pH	-0.406	-0.391	1										
EC	0.132	-0.213	-0.605	1									
TDS	-0.611	-0.619	0.341	0.187	1								
Total Hardness	0.163	0.190	0.757	-0.663	-0.750	1							
Calcium	0.580	0.602	0.329	-0.379	-0.830	0.693	1						
Magnesium	-0.350	-0.374	0.788	0.421	0.240	0.702	0.129	1					
Alkalinity	-0.721	-0.035	-0.004	0.123	0.597	-0.289	-0.816	0.369	1				
Chloride	0.676	0.671	-0.013	-0.108	0.500	0.255	0.598	-0.233	-0.742	1			
Phosphate	0.764	0.277	0.016	-0.103	-0.830	0.455	0.790	-0.180	-0.680	0.564	1		
Sulphate	0.846	0.840	-0.205	0.138	0.138	0.159	0.637	-0.416	-0.842	0.646	0.831	1	
Dissolved Oxygen	0.862	0.789	0.321	0.142	0.426	0.123	0.426	-0.132	-0.231	0.423	0.762	0.123	
Nitrate	0.102	0.032	0.142	0.123	0.214	0.213	0.124	-0.142	0.321	0.421	0.621	0.134	1