
Assessment of water quality parameters of Koilsagar project in Mahabubnagar district, Telangana, India

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ABSTRACT

Water is an essential and precious natural resource for sustaining life and environment which is available in abundance as a free gift of nature and water is an important component in the ecosystem. Due to increased human population, industrialization, use of fertilizers and manmade activities water is highly polluted with different harm full contaminants. Natural water contaminates due to weathering of rocks and leaching of soils, mining process etc. It is necessary that the quality of drinking water should be checked at regular time intervals, due to use of contaminated drinking water, human population suffers from varied of water borned diseases. In the present study water samples were collected from Koilsagar project, which is located at Mahabubnagar district. This project has two main canals. The left flank canal is about 14.48 km length and it irrigates 3000 acres and the right flank canal length is 25.74 km and it irrigates 9000 acres. The physico-chemical parameters were studied included temperature, P^H, TDS, turbidity, hardness, alkalinity, phosphates, chlorides, nitrates, calcium, magnesium etc. and studied for a period of one year i.e., from March, 2014 to February, 2015. These physico-chemical parameters were compared with WHO standards and also with normal tap water. The results indicate that the Koilsagar project water can be used for domestic, irrigation and pisciculture purpose.

Keywords: Physico-chemical parameters, water samples, hardness, Koilsagar Mahabubnagar.

1. Introduction

A physiological background makes it quite evident that water is an important ecological factor in the life of organisms. It also performs unique and indispensable activities in each ecosystem, biosphere and biogeochemical cycles (Trivedi et al., 2010). As of now only earth is the planet having about 70% of water. Natural water contains different types of impurities are introduced in to aquatic system by different ways such as atmosphere and from several human activities. It is difficult to understand the biological phenomenon fully because the chemistry of water reveals much about the metabolism of the ecosystem and explain the general hydro biological relationship (Basavaraja Simpi et al., 2011).

The availability of good quality of water is an indispensable feature for preventing diseases and improving quality of life. It is necessary that the quality of drinking water should be checked at regular intervals. Accurate and reliable information on the water resource system can, therefore, be a vital aid to strategic management of the resources. Ponds have been used

since time immemorial as a traditional source of water supplying India. However the water of the ponds, lakes and rivers are polluted mainly due to discharged waste water from residential areas, sewage outlets, solid wastes, detergents, automobiles oil wastes, fishing facilities and agricultural pesticides from farm lands (Bhuiyan and Gupta, 2007). Pollution of drinking water is always major problem to human population to rapid industrialization and urbanization. It is known fact that when pure water is polluted its normal functioning and properties are affected. The urban aquatic ecosystems are strongly influenced by long term discharge of untreated domestic and industrial waste water, storm water runoff, accidental spills and direct solid waste dumping (Kumar et al., 2011). So the physico-chemical parameters study is very important to get exact idea about the quality of water and we can compare results of different physico-chemical parameter values with standard value like tap water and WHO values. Aim of the study is to analyzed and to determine the water sample of the project. The climatic characteristic influences the water quality and quantity is affects the biodiversity (Ali and Salam, 2005).

Koilsagar project is an existing medium irrigation project located near Bollaram (Vill), Devarakadra (Mandal) of Mahabubnagar district of Telangana. The project is a construction across Peddavagu stream which is a tributary of Krishna river. The project is completely enriched by hills on all sides except for a small portion on the South Eastern region where a raised bound extending for about 1.5Km marks its boundary (Figure 1). These water is using for irrigation, drinking and pisciculture purpose. The project remains totally isolated from all other aquatic systems in the area.



Figure 1: View of koilsagar project, mahabubnagar dist.

2. Materials and methods

The water samples were collected from different sites in plastic bottles in the morning hours and transported immediately to the laboratory for the estimation of different physico-chemical parameters. Water temperature and p^H were recorded at the time of sample collection by using Thermometer and Pocket Digital p^H meter while other parameters such as TDS, Turbidity, Hardness, Alkalinity, Phosphate, Chloride, Nitrate, Calcium and Magnesium by using Indian Standard procedures by (Ali et al., 2005: APHA, 1998: Trivedy and Goel, 1986). The observed values of various physico chemical parameters of the water samples were compared with standard values recommended by World Health Organization (WHO) and tap water for drinking purpose.

3. Results and discussion

The water samples were taken from the koilsagar project for analyzed the physico-chemical parameters like temperature, P^H, TDS, turbidity, hardness, alkalinity, phosphates, chlorides, nitrates, calcium, magnesium has been mentioned in table 1&2. The results were compared with tap water and WHO standards (Table, 3). P^H is most determining the corrosive nature of the water. The minimum P^H value is 7.3 was found during the month of September and maximum 8.2 in May. The P^H of the project water was found to be slightly alkaline in nature. Various factors bring about changes the PH of water. The higher values observed suggests that carbon dioxide, carbon bicarbonate equilibrium is affected more due to change in physico chemical condition (Karanth, 1987).

TDS was ranged from 165.5 mg/l in April and 370.8 mg/l in the month of July. The concentration is high during rainy season which may be due to addition of solids from run off water, sewage and industrial water. Gupta and Singh (2000) also reported high concentration of TDS in the Damodhar river due to mixing of sewage and industrial water. The minimum total hardness was observed in the month of November (110 mg/l) and maximum in the month of May (196 mg/l). Higher values of hardness during summer can be attributed to low water level and high rate of evaporation of water and addition of calcium and magnesium salts. Mohanta and Patru (2000) stated that addition of sewage, detergents and large scale human use might be the cause of elevation of hardness.

The total alkalinity was ranged from 96 mg/l (January) to 184 mg/l (May). Total alkalinity values in our observation indicated that the water was hard. Higher values of alkalinity registered during summer might be the presence of excess of free CO₂ product as a result of decomposition process coupled with the mixing of sewage and domestic waste (Manjare et al., 2010). Chlorides were observed minimum in the month of January (38 mg/l) and maximum in May (72 mg/l). The high concentration of chloride is considered to be an indication of pollution due to high organic waste of organic origin (Singh, 1995).

The nitrate values ranges from 9.8 mg/l to 30.5 mg/l. The maximum value (30.5 mg/l) was recorded in the month of June and minimum (9.8 mg/l) in the month of December. The high value of nitrate in June is mainly due to rain, surface water runoff, agriculture runoff, could have also contributed to the nitrate content (Saravana Kumar and Ranjith Kumar, 2011).

The value of phosphate ranges from 1.5mg/l to 7.8 mg/l. The maximum value (7.8 mg/l) was recorded in the month of August and minimum value (1.5 mg/l) in the month of October. The high value of phosphate in August is mainly due to rain, surface water runoff, agriculture runoff, washer man activity could have also contributed to the inorganic phosphate content (Arvind kumar, 1995). The calcium was observed in 76 mg/l in the month of May and 165 mg/l in September. The quantities of calcium in natural water depends upon the type of rocks. While the observed minimum value of magnesium in the month of January (64mg/l) and maximum in the month of October (125 mg/l). Magnesium hardness particularly associated with the sulphate ion has laxative effect on persons un accustomed to it (Thakor et al., 2011).

On comparing the results against WHO standards and tap water, it is found that some water samples are non-portable for human being due to high concentration of one or the other parameters. Thus an attempt has been made to find the quality of koilsagar project suitable or not. Basawaraj Simpi et al., (2011) studied monthly changes in various physico chemical parameters of Hosahalli water tank in Shimago district Karnataka. The Present study shows

that all parameters are within the limit and water is non polluted and it can be used for domestic, irrigate and fishery purpose.

Table 1: Physical parameters of koilsagar project in 2014-2015.

Month	Temperature (°C)	pH	TDS (mg/l)	Turbidity (NTU)
March	25.5	7.7	280.8	10.2
April	25	7.8	165.5	8.6
May	26.5	8.2	180.4	6.8
June	25	7.7	276.4	4.5
July	25.5	7.9	370.8	2.4
August	24.5	7.5	358.4	0.9
September	24.5	7.3	315.2	2.2
October	24	7.8	295.6	0.5
November	22.5	8.1	300.5	0.6
December	22	7.8	365.4	1.6
January	23	7.6	262.6	3.5
February	24.5	8.1	279.2	7.6

Table 2: Chemical parameters of Koilsagar Project in 2014-2015 (Values in mg/l)

Month	Hardness	Alkalinity	Phosphate	Chloride	Nitrate	Calcium	Magnesium
March	148	128	3.6	52	21.6	89	96
April	165	152	4.8	60	23.4	85	97
May	196	184	4.9	72	25.6	76	65
June	132	104	6.2	68	30.5	96	76
July	129	169	7.2	65	29.8	112	80
August	132	176	7.8	48	24.2	148	84
September	127	170	6.5	45	15.4	165	114
October	115	154	1.5	42	13.2	121	125
November	110	165	2.6	40	10.5	153	120
December	135	148	2.4	68	9.8	128	68
January	185	96	2.8	38	12.6	98	64
February	174	110	3.4	65	16.5	101	82

Table 3: Physico Chemical parameters of drinking water standards as per WHO and tap water

S.No	Parameter	Drinking water standards as per WHO (Maximum permissible limits)	Tap water
1	Taste	Normal	Normal
2	Colour	Transparent	Transparent
3	pH	6.5-8.5	7.2
4	Temperature		28 ^o C
5	Hardness	500 mg/l	
6	Dissolved Oxygen		5.6 mg/l
7	TDS	1000 mg/l	
8	Nitrate	45 mg/l	0.06 mg/l
9	Calcium	200 mg/l	
10	Magnesium	50 mg/l	

4. Conclusion

Understanding, the quality of water is an important as that of its quantity. Since it is the main factor determining the suitability of water for drinking, domestic, agricultural industrial purposes. The present study ensures that all physico chemical parameters like temperature, P^H, TDS, turbidity, hardness, alkalinity, phosphates, chlorides, nitrates, calcium, magnesium etc. were within the permissible limits. The results indicate that the Koilsagar project water is non polluted and it can be used for domestic, irrigation and pisciculture purpose.

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