

**WATER QUALITY EVALUATION OF KONANDUR POND, THIRTHAHALLI, KARNATAKA,
INDIA**

Nagaraj Parisara

Department of Environmental Science, Sahyadri Science College (Autonomous), Shivamogga-577203,
Karnataka, India

E mail: parisarasmg@gmail.com Mobile - 9901798999

ABSTRACT: Water samples were collected from konandur pond in Theerthalli (T). The physico-chemical parameters like TDS, Total Hardness, Total Alkalinity, Nitrogen, NO_3^- , Cl^- , SO_4^{2-} , Ca^{+2} , Mg^{+2} , and Phosphate were analyzed. The results were considered for correlation analysis and it was observed that many of the parameters bear a good positive correlation and some bears a negative correlation. The study revealed that, pond water was not much polluted. In the light of standard of water quality recommended by WHO, the pond water should be used for drinking and cooking after proper treatment.

Key Words: Physico-chemical parameters, Konandur pond, Karnataka, India

INTRODUCTION

Water is one of the abundantly available substances in nature, which man has exploited more than any other resources for the sustenance of life (Shinde et al., 2011). Ponds and tanks are important multi-usage components, they are sources of irrigation, fishery and other domestic purposes (Hocioglu and Dulger, 2011). The presence of safe and reliable drinking water is an essential prerequisite for a stable community. Limnological investigations on water bodies were aimed to assess the deterioration of water quality due to pollution. The role of water in nature is unique not only from the point of human consideration; even the numerous organisms make aquatic medium their abode. Understanding such aquatic life requires a sound knowledge not just for organisms themselves but also of those of external influences of the medium that affect them. The physical and chemical properties of fresh water bodies are characterized by the climatic, geochemical, geomorphological and pollution conditions. The quality of aquatic life depends on the water quality. In order to utilize fresh water bodies successfully for all purposes, it is very important to study the physico-chemical factors which influence the biological productivity of the water body.

Physico-chemical parameters play a vital role in determining the distributional pattern and quantitative abundance of organisms inhabiting a particular aquatic ecosystem (Santhoshkumar Singh et al., 2009). Several investigators have studied the physico-chemical dynamics of varied lentic water bodies with the intent to assess the water quality (Begum et al., 2010; Sayeswara et al., 2010; Begum et al., 2011; Purushothama et al., 2011; Purushothama et al., 2011a; Sayeswara et al., 2011; Sayeswara et al., 2011a; Sayeswara et al., 2011b; Mahesh Anand Goudar & Sayeswara, 2011; Sayeswara et al., 2012; Vasantha Naik et al., 2013; Sayeswara, 2014). Due to increased human population, industrialization, use of fertilizers in agriculture and man-made activity, the natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to water quality and depletion of aquatic biota. It is therefore necessary that the quality of drinking water should be checked at regular time interval because due to use of contaminated drinking water, human population suffers from a variety of water borne diseases. It is difficult to understand the biological phenomena fully because the chemistry of water reveals much about the metabolism of the ecosystem and explain the general hydro Biological relationship. The physico-chemical parameters of water and the dependence of all life process of these due to increased human population, industrialization, Use of fertilizers in agriculture and man-made activity.

MATERIALS AND METHODS

Water was sampled on monthly basis, between 7 to 9 am from January to December 2007. This water samples were collected in good quality polythene bottles. Water temperature was recorded at the sampling site itself. Dissolved oxygen was fixed on the spot itself in BOD bottles. Various parameters like turbidity, total hardness, sulphate, free CO_2 , alkalinity, BOD, TDS, phosphate, nitrate and chloride were estimated as per the standard methods (APHA, 1998).

Study area

The Present Study involves the Analysis of Water Quality in terms of Physico-chemical parameters of Konandur pond of Theerthalli taluk at Shimoga district, Karnataka (Between 13° 27' and 14° 39' North latitude and between 74° 38' and 76° 4' East longitude. Konandur pond is located at a distance of 80 km from Shimoga surrounded by agricultural fields which is utilized by the local people for drinking, irrigation, fishing, laundry etc. Water samples were collected from the pond at random in the morning time between 7 to 8 am in PPE bottles from June 2011 to May 2012 (post monsoon and winter). The water has undergone moderate changes in its physico-chemical properties due to ecological degradation, overflowing of water from adjacent paddy fields and other excessive human activities. In the present investigation, an attempt has been made to assess the suitability of water for human consumption and domestic purposes.



KONANDUR POND,
THEERTHALLI (TQ)
SHIMOGA (D)

Figure-1: Location of water sample

RESULTS AND DISCUSSIONS

Season-wise chemical compositions of 12 water samples of Konandur pond from Shimoga district by monsoon, pre-monsoon and post-monsoon seasons are presented in Table 1 and Table 2. Statistical summary of water samples in monsoon, pre-monsoon and post-monsoon of konandur pond is shown in Table 3. Monthly and seasonal variations of different Physico-chemical parameters are depicted in Figures 2 & 3.

Hardness: The value of hardness fluctuates from 16.2 mg/l to 28.6 mg/l. The maximum value (28.6 mg/l) was recorded in the month of June (summer) and minimum value (16 mg/l) in the month of April was reported total hardness was high during Rainy season than summer and winter. High value of hardness during Rainy can be attributed to increase in water volume and increase of rate of inclusion if minerals to the water body. Similar results were obtained in the present study.

Total dissolved solids: The total dissolved solids fluctuate from 48 mg/l to 64.2 mg/l. the maximum value (64.2 mg/l) was recorded in the month of February and minimum value (48 mg/l) in the month of July.

Alkalinity: Total alkalinity ranges from 40.44 mg/l to 49.6 mg/l. the maximum value (49.6 mg/l) was recorded in the month of May (summer) and minimum value (40.44 mg/l) in the month of August (Rainy). The alkalinity was maximum value in May (summer) due to increase in bicarbonates in the water.

Table 1: monthly mean of selected physicochemical parameters of konandur pond

Months	Total hardness	Total alkalinity	Calcium	Magnesium	Sulphate	Chloride	Ammonical nitrogen	Nitrate - nitrogen	Phosphate	TDS
June 2001	28.6	42	8.24	2.84	7.8	11.4	2.1	0.81	0.6	52
July 2001	26.8	40.5	8.12	2.14	7.6	12	1.98	0.23	0.62	48
August 2001	26.36	40.44	9.02	2.64	6.78	12.2	1.78	0.12	0.8	54.22
Sept 2001	25.02	41.2	9.2	2.02	7.42	11.4	1.88	0.16	0.12	52.12
Oct 2001	22.6	41.5	6.8	1.22	5.8	14	1.1	1.22	0.92	51.42
Nov 2001	23	42.2	7.1	1.92	6.28	14.2	1.2	0.92	0.8	50.2
Dec 2001	24	42.5	7.8	1.94	5.28	14.6	1.11	1.1	0.96	54.2
Jan 2002	22.6	42	6.4	1.2	4.9	13.2	0.82	1.22	0.8	58.8
Feb 2002	22.6	43.12	7.4	1.82	4.8	10.4	1.8	1.5	0.9	64.2
March 2002	18	42.62	7.2	2	6.8	12	1.56	1.06	0.98	52.8
April 2002	16	48.4	8.2	2.8	8.2	16.2	0.8	1	0.98	54
May 2002	16.2	49.6	7.6	2.34	8.6	17.6	1	0.36	0.88	60.4

All values are expressed in mg/l

Table 2: seasonal average of selected physicochemical parameters of konandur pond

Months	Total hardness	Total alkalinity	Calcium	Magnesium	Sulphate	Chloride	Ammonical nitrogen	Nitrate - nitrogen	Phosphate	TDS
pre monsoon	26.695	41.035	8.645	2.41	7.4	11.75	1.935	0.33	0.535	51.585
monsoon	23.05	42.05	7.025	1.57	5.565	14	1.0575	1.115	0.87	53.655
post monsoon	18.2	45.935	7.6	2.24	7.1	14.05	1.29	0.98	0.935	57.85

Table 3: Correlation between the physicochemical parameters of konandur pond

Correlations										
	Total Hardness	Total Alkalinity	Calcium	Magnesium	Sulphate	Chloride	Ammonical nitrogen	Nitrate nitrogen	Phosphate	TDS
Total Hardness	1	-.824**	.346	.020	-.213	-.672*	.688*	-.270	-.542	-.379
Total Alkalinity		1	-.088	.335	.476	.776**	-.563	.077	.391	.444
Calcium			1	.714**	.542	-.212	.564	-.742**	-.582*	-.259
Magnesium				1	.739**	.096	.341	-.483	-.098	-.146
Sulphate					1	.347	.161	-.668*	-.278	-.326
Chloride						1	-.807**	-.022	.443	.085
Ammonical nitrogen							1	-.407	-.568	-.243
Nitrate nitrogen								1	.597*	.376
Phosphate									1	.316
TDS										1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Calcium and magnesium: These are the minerals that are both important for bone density and have opposite effects on nerve, muscle and clotting activity. Calcium stimulates and magnesium relaxes or decreases activity. Calcium ranges from 6.4 mg/L to 9.2 mg/L. similarly magnesium ranges from 1.2 mg/L to 2.84 mg/L.

Sulphate: It is a naturally occurring substance that contains sulphur and oxygen. It is present in various mineral salts that are found in soil. Sulphate forms salts with a variety of elements including barium, calcium, magnesium, potassium and sodium. Here it ranges from 4.8 mg/L to 8.6 mg/L.

Chlorides: The values of chlorides range from 10.4 mg/l to 17.6 mg/l The maximum value (17.6 mg/l) was recorded in the month of May (summer) and minimum value (10.4 mg/l) in the month of February. In the present study maximum value of chloride reaches in summer.

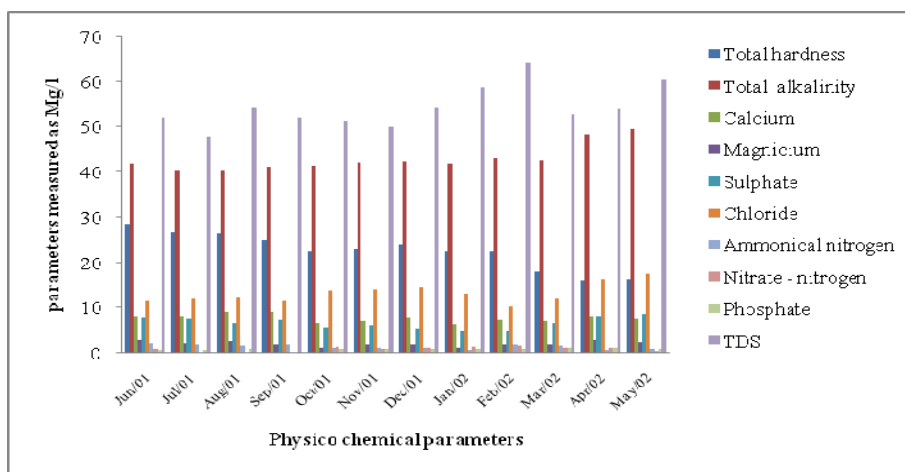


Figure 2: Monthly variation of the physicochemical parameters

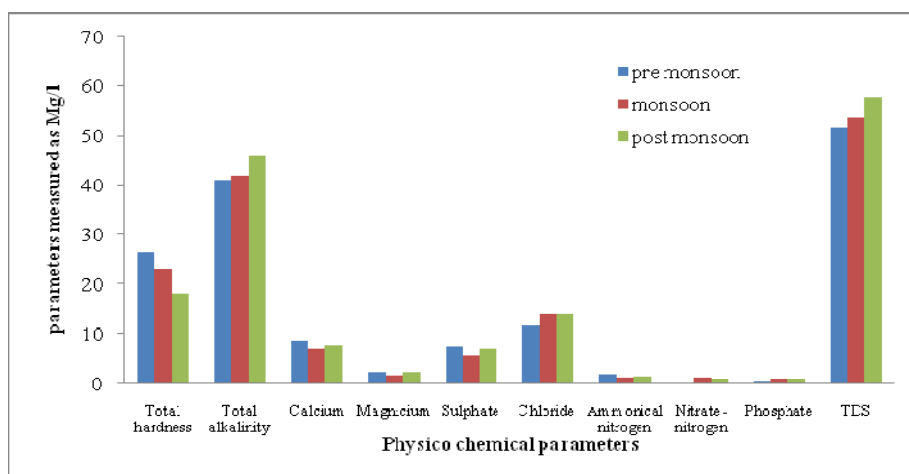


Figure 3: Seasonal variation of the physicochemical parameters

Nitrogen: The values of nitrogen ranges from 0.8 mg/l to 2.1 mg/l. the maximum value (2.1 mg/l) was observed in the month of June (monsoon) and minimum (0.8 mg/l) in the month of April.

Nitrates: The values of nitrate ranges from 0.12 mg/l to 1.5 mg/l. the maximum value (1.5 mg/l) was observed in the month of February and minimum (0.12 mg/l) in the month of August.

Phosphate: The value of phosphate fluctuates from 0.12 mg/l to 0.98 mg/l. the maximum value (0.98 mg/l) was recorded in the month of March and April (summer) and minimum value in the month of September (winter). The high values of phosphate in March and April months are mainly due to rain, surface water runoff, agriculture run off; washer man activity could have also contributed to the inorganic phosphate content.

CONCLUSION

The study assessed the evolution of water quality in pond water of konandur pond, of Theerthahalli. In this present investigation it was found that the maximum and minimum parameters were not at the level of pollution. In the light of standard of water quality recommended by WHO, the pond water should be used for drinking and cooking after proper treatment. In order to maintain the health of the tank with respect to water quality it is essential that authorities should take immediate step on the following points.

- * Washing of clothes and vehicles should be prevented.
- * Awareness should be created regarding the impact of water pollution on the human health.
- * People should be advised at least to boil the water to disinfect the pathogens before using the water for drinking purpose.

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