Water Quality Analysis

Umme Saban[1], Hoorul Ain[2], Sadiya Meraj[3], Satishkumar M R[4]

[1,2,3,4]*UG Student, Department of Civil Engineering*

B.G.S.I.T, BG Nagar ,Nagamangala (T)-571432 Mandya (D) ,Karnataka, India

Abstract-Water quality is an index of health and well being of a society. The water quality is determined by the amount and kinds of suspended and dissolved substances in water. Industrialization, urbanization and modern agricultural practices have direct impact on water resources quantitatively and qualitative. All the water samples tested were had parameters like temperature, pH, electrical conductivities, sodium, potassium, Manganese , calcium & magnesium, chloride, and sulphate within the permissible limits ofIndian Standard for drinking water -specification, Bureau of Indian Standard (BIS except hardness),but total hardness is not in permissible limits. This paper represent the physical and chemical parameters of the pond of Bettadamallenahalli village. And also it contains information about the variation in Hardness at selected area.

Keywords- Surface water , physical and chemical methods, Bettadamallenahalli village.

I. INTRODUCTION

The quality of ground water depends on various chemical constituents and their concentration, which are mostly derived from the geological data of the particular region.Assessment of surface water quality can be a complex process undertaking multiple parameters capable of causing various stresses on overall water quality. To evaluate water quality from a large number of samples, each containing concentrations for many parameters is difficult. To analyse water quality, different approaches like statistical analyses of individual parameter, multi-stressors water quality indicesRivers are life line of living being and constitute an integral part of both rural and urban community as a source of drinking and cooking purposes. Water used by the public must be free from disease causing bacteria; toxic chemicals, excessive amount of minerals and organic matter. Fresh water becomes polluted due to three major reasons, excess nutrients from sewage, industries, mining and agriculture .People residing in these areas utilize pond water for their daily needs. Sampling locations were selected on the basis of the detailed survey of the study area and discussion with local public, the details regarding the locations.

II. METHODOLOGY

a. Study area:

Bettadamallenahalli is a small Village/hamlet in Nagamangala Taluk in Mandya District of Karnataka State, India. It comes under Bettadamallenahalli Panchayath. It belongs to Mysore Division . It is located 43 KM towards North from District head quartersMandya, 4 KM from Nagamangala, 112 KM from State capital Bangalore .

Nagamangala Rural (5 KM) , BadriKoppalu (5 KM) , Balpada Manti Koppalu (5 KM) , Kasuvanahalli (7 KM) , Palagrahara (7 KM) are the nearby Villages to Bettadamallenahalli.

Bettadamallenahalli is surrounded by MandyaTaluk towards South ,KrishnarajpetTaluk towards west , PandavapuraTaluk towards South , Kunigal Taluk towards East . Mandya ,Maddur , Shrirangapattana , Tiptur are the near by Cities to Bettadamallenahalli. Nagamangala Rural (5 KM) , BadriKoppalu (5 KM) , Balpada Manti Koppalu (5 KM) , Kasuvanahalli (7 KM) , Palagrahara (7 KM) are the nearby Villages to Bettadamallenahalli. Bettadamallenahalli is surrounded by Mandya Taluk towards South ,Krishnarajpet Taluk towards west , Pandavapura Taluk towards South , Kunigal Taluk towards East . Mandya , Maddur , Shrirangapattana , Tiptur are the near by Cities to Bettadamallenahalli.

III. MATERIALS AND METHODS

The water Samples were collected from four different places in the morning hours between 9 to 11am, in polythene bottles. The water samples were immediately brought in to laboratory for the estimation of various physico-chemical parameters like water temperature, pH were recorded by using thermometer and digital pH meter,electrical conductivities were measured by using digital conductivity meter. While other parameters such as hardness, sodium, and potassium by flame photometry .calcium & magnesium,chloride,andsulphate were estimated in the laboratory by using standard laboratory methods. Present study involves the analysis of water quality in terms of physicochemical methods.

IV. RESULT AND DISCUSSION

a. Temperature

Temperature is one of the most important factors for determining water quality. It primarily aids in the regulation of all metabolic and physiological activities in the water system. The temperature of the water samples

varied from 27.2°C to 28.7°C. The highest (28.7°C) was recorded in S3 and S6 and the lowest (27.2°C) in S1.

b. pH

The pH of a solution is the concentration of hydrogen ions,

expressed as a negative logarithm. It reflects the acidity or alkalinity of a solution. pH of the water samples ranged from 8.08 to 8.84, S_6 being the minimum (8.08) and S_3 being the most alkaline (8.84) among all the samples taken. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH.(Kamble et al., 2009).

c. Electrical Conductivity

EC was maximum in S_5 with a value of 906µS/cm and minimum in S_2 with a value of 2.67µS/cm. These values of electrical conductivity are related to the dissolved ionic matter in the waters and so help in understanding that particular aquatic system. Hence, increasing levels of conductivity and cations are the products of decomposition and mineralization of organic materials (Abida, 2008).

d. Total hardness (TH)

Total hardness of water is the sum of concentration of alkaline earth metal cations present in it. Calcium and magnesium are the principle cations imparting hardness. It is defined as the concentration of multivalent metallic cations in solution. At saturated conditions, the cations react with anions in water to from solid precipitate.

Hardness in natural water comes mainly from the leaching of igneous rock and carbonate rocks (dolomite, calcite and limestone). Water containing the soluble salts of calcium and magnesium such as chlorides, sulphates and bicarbonates is called hard water (Ramaswamy and Rajaguru, 1991). Generally hard water originates in the areas where thick topsoil and lime stone formations are present. Soft water originates in the areas where the topsoil is thin and limestone formats are absent. The hardness in water is derived largely from contact with the soil and rock formation. The ability to dissolve the ions is gained in the soil where CO2 exists in equilibrium with carbonic acid. Under low pH condition, the basic materials particularly limestone formations are converted to soluble bicarbonates.

The hardness values shown ranges from 310mg/l to 460mg/l .The values for samples from all sampling stations were above the permissible limits.

e. Sodium

In the study area, sodium concentration ranges from 25 to 124mg/L .All values are within permissible limit as per BIS standards.

f. Potassium

The concentration of potassium in the study area ranges from traces 1.5 to 2.8mg/L. The highest value noticed is 2.8 mg/L.

g. Calcium

The minimum and maximum values of Calcium in the area are 32 and 445 mg/L. 4 samples recorded higher values of calcium >200mg/L, which is the permissible limits of BIS range.The highest value of calcium noticed is around 445mg/L.

h. Magnesium

Magnesium occurs generally lower than calcium in accordance with the relative abundance in rocks. In the surveyed area, it is observed that in Magnesium is determinant over calcium by 44%, which may be due to weathering process of magnesium. The general range varies from 24 to 561mg/L, which is the permissible limit of BIS. Highest value of 561mg/L noticed at S6.

i. Chloride

Chloride values range from 259 to 895mg/L and the general range is 250 to 1000mg/L. Samples are within the permissible limit.

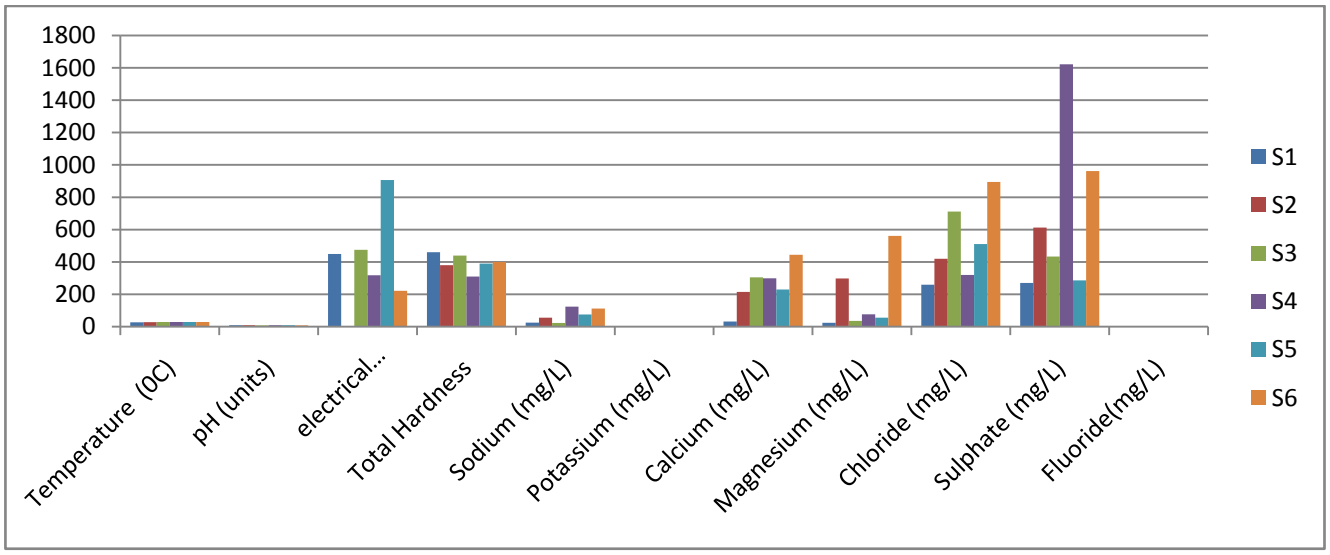
j. Sulphates

In the study area, sulphate ranges from 270 to 1622mg/L.4 samples have recorded higher values>400mg/L which is permissible limit of IS. Highest values ofSulphates are noticed aroundS4

Samples / **Parameters**	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
Temperature (^{0}C)	27.2	27.5	28.7	28.4	28.4	28.7
pH (units)	8.61	8.45	8.84	8.71	8.83	8.08
electrical conductivities(µS/cm)	449	2.67	475	318	906	222
Total Hardness	460	380	440	310	390	400
Sodium (mg/L)	25	55	23	124	75	112
Potassium (mg/L)	1.5	2.1	1.3	1	2.8	2.4
Calcium (mg/L)	32	215	305	299	230	445
Magnesium (mg/L)	24	298	36.1	76	55.6	561
Chloride (mg/L)	259	420	712.2	320	511	895
Sulphate(mg/L)	270	612.2	433.5	1622	286	962
Fluoride(mg/L)	0	1	0.5	0	2.5	0.5

k. Fluoride

Fluoride (F-) concentration is an important aspect of hydrogeochemistry, because of its impact on human health. The recommended concentration of F- in drinking water is 1.50 mg/l. Low F- content (<0.60mg/l) causes dental caries, where as high (>1.20mg/l) fluoride levels result in fluorosis (Venkateshraju et al., 2010). Bureau of Indian Standard for drinking water (BIS, 1991) has specified a fluoride limit between 1.0 and 1.5 mg/l for drinking water. In the present study, most of the water samples had fluoride levels less than 0.5mg/l.



Graph 1: Representation of physico-chemical charecteristics of water.

V. CONCLUSION

The study provides information about the water quality status ofBettadamalenahalli village. The parameters namely temperature, pH, electrical conductivities, sodium, potassium, calcium magnesium, chloride,andsulphate were within the permissible standard limits and satisfy the requirement for the use of various purposes like domestic, agricultural etc except hardness. The microbiological quality of all the water sources was good . Only one water sample had high fluoride content and therefore treatment is required before use and care should be taken for handling of such water.

VI. ACKNOWLEDGMENTS

We are thankful toVision group of service and technology, we thankful to our guide Mrs.Shruthi R. for her continuous support and also to our management who provides healthy environment to carry out high quality research.

REFERENCES

[1]. Alonso, J.L., Amoroj, I., Chang S. and Garelick, H. 1996.Quantitative determination of Esch.coli in water using CH-ROM agar E.coli. J Microbial Meth., 25:30915.

[2]. Agarwal, A. K. and Rajwar, G. R. (2010): Physicochemical and microbiological study of Tehri Dam Reservoir,Garhwal Himalaya, India. J. Amer. Sci., 6(6): 65-71

[3]. Abdulla, H., A.B. Choudary, S.M. Rahaman and M.A. Zaman. 2000. Impact of sugar mills effluent on water quality and aquatic biota in Rajashahi, Bangladesh. Ecology, Environment and Conservation, 6(1): 121-126.

[4]. IS (1994),"Indian Standards Specifications for Drinking Water", Bureau of Indian Standards, IS:10500 -2012).

[5]. Environmental Planning Frame Work for Water Resources Management in Tamil Nadu. 2001. Final Draft, Public Works Department, Government of Tamil Nadu.

[6]. Nitin Gupta S.M. Nafees, M.K. Jain and Kalpanar "Study on heavy metal contamination in GW at outer Skirts of kota cents, Rajastan, media" intJ.C.Lem. S.S.i, 9(1), 2011, 285-306.