Analysis of Water Quality Parameters of Surface Water in Tiruchirapalli District, Tamil Nadu, India

M. Shahul Hameed, Asst. Prof.
Department of Civil Engineering
K.Ramakrishnan College of Technology
Trichirapalli, India

B. Sathish Kumar, UG.Student
Department of Civil Engineering
K.Ramakrishnan College of Technology
Trichirapalli, India

Abstract **- Water plays a vital role in each in every organism life. Now-a-days world facing different complicated diseases because of varying water qualities. Many types of surface water sources are available in our world and the sources are from river, ponds and lakes, etc., in which the pond water is the major source for many villages and their people around in it. This paper is about the testing of physical and chemical parameters from the three ponds named as S–Sembattu pond, E-Edamallaipattipudhur pond and A-Ayyampatti pond in Trichirapalli, India which are tremendously polluted by industrial waste, septic and non-septic wastes around the area. The physical and chemical characteristics such as colour, turbidity, pH, total hardness etc., are analyzed. The result of water sample parameters are compared with BIS standards shows that the surface water is highly contaminated and lethal for human health when it is used, so that the treatment process is planned to be conducted on that pond we can avoid some problems in presence and many in future.**

Keywords: BIS standards, physical and chemical parameters, S–Sembattu pond, E-Edamallaipattipudhur pond and A-Ayyampatti pond.

INTRODUCTION

Water is one of the vital components of the physical environment. The quality of drinking water is closely associated with human health, and providing safe drinking water is one of the important public health priorities. Present estimation says that 80 per cent of all diseases and over one third of deaths in developing countries are caused by the consumption of contaminated water, and on an average as much as one tenth of each person's productive time is sacrificed to water-related diseases. About 97.2% of water on earth is salty on that 20% is occurring as groundwater and 2.8% present as non-salty water. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. Natural water contains different types of impurities are introduced in to aquatic system by different ways such as weathering of rocks and leaching of soils, dissolution of aerosol particles from the atmosphere and from several human activities, including mining, processing and the use of metal based materials. People on globe are under tremendous threat due to undesired changes in the physical, chemical and biological characteristics of water. The site that was selected in Trichirapalli is highly affected and contaminated by human and factory waste. The factory effluents and the septic waste from the nearby areas deform the pond to an unusable medium for domestic process and construction.

STUDY AREA

Trichirapalli is the fourth largest city in TAMIL NADU, INDIA. Trichirapalli is located in the central region of Tamil Nadu state between 10º48’36” N and 78º41’08.16”E longitude at an altitude of 78m. Trichirapalli is fed by Cauvery and Kollidam River and the inner areas are fed by pond water around it. Trichirapalli is an important educational center in Tamil Nadu and it earned the title of ENERGY EQUIPMENT AND FABRICATION OF INDIA. The southern west part of the district is ranged by Western Ghats mountain range and the water quality is so good and the soil is very fertile.

ABOUT THE SITE

The site that we selected was not so wealthy in water conditions and they are not so aware of the water qualities. Because of the poor sanitary and sewage conditions the water quality of these sites are highly affected

A-Ayyampatti

Because of the septic waste from the village and its surrounding area the pond is highly contaminated

E-Edamallaipattipudhur

As like the Ayyampatti pond the people around this area is the main reason for the contamination in this pond

S- Sembattu pond

The people around this area is having good sanitary and sewage arrangement, the is contaminated by the tannery factory effluent. The tannery factory have more poisonous chemical substances in it

COLLECTION OF WATER SAMPLES

Water samples from the three different sampling points are collected. The samples are collected from the three different depths from the every pond. The water is collected from S- Sembattu pond, A- Ayyampatti pondand E- Edamallaipattipudhur pond. The samples are kept safely during transportation and after two hours the water samples are given for testing in the laboratory. Various water qualities such as appearance, odour, turbidity, total

dissolved solids, electrical conductivity, pH, total hardness and other chemical compounds are tested.

ACCEPTABLE AND REJECTION CRITERIAN

TABLE 1, As per IS 10500: 1991 and CPHEEO standards

PROPERTY	***ACCEPTABLE***	***REJECTABLE***
Turbidity	2.5	10
Total dissolved solids	500	2000
pH	6.5-8.5	6.5-9.0
Alkalinity as CaCo3	200	600
Total hardness as CaCo3	200	600
Calcium	75	200
Magnesium	30	150
Iron	0.1	1
Manganese	0.05	0.5
Chlorides	200	1000
Sulphate	200	400

The above criterion are suggested and followed by B.I.S.

TABLE 2, INSTRUMENTS TO ANALYSE THE CHARACTERSTISC

PROPERTY	***METHODSTO ANALYSE***
Appearance	Tinto meter
Turbidity	Turbidity meter
T.D.S.	Conductivity meter
E.C.	Conductometry
pH	pH meter
Total Alkalinity	Conductometry
Total Hardness	EDTA titration
Ca, Mg and Fe	EDTA titration
Chlorides	Silver nitrate method
Sulphate	Turbido metric method

The above table shows the methods and instruments used for the analysis of the samples that are collected from the three sites.

RESULT AND DISCUSSION

The samples which are taken from the three ponds are completely analyzed and the water is not potable for drinking and construction. The table 3 shows the various parameters and its value which analyzed on the three layers of the three pond.

TABLE 3, RESULT OF WATER QUALITY IN THREE PONDS

AYYAMPATTI POND

PARAMETERS	***TOP LAYER***	***MIDDLE LAYER***	***BOTTOM LAYER***
COLOUR	PALE YELLOW	PALE YELLOW	PALE YELLOW
ODOUR	UNPLEASENT	UNPLEASENT	UNPLEASENT
TUBIDITY	8.1	18.1	13.7
T.D.S.	328	337	332
E.C.	386	396	391
pH	8.16	8.12	8
TOTAL ALKALINITY	800	675	635
T.H.	240	225	225
Ca	146	137	137
Mg	94	88	88
Fe	NIL	NIL	NIL
Cl	375	375	375
So_4	83	91	85

EDAMALLAIPATTIPUDHUR POND

PARAMETERS	***TOP LAYER***	***MIDDLE LAYER***	***BOTTOM LAYER***
COLOUR	PALE YELLOW	PALE YELLOW	PALE YELLOW
ODOUR	UNPLEASENT	UNPLEASENT	UNPLEASENT
TUBIDITY	24.1	28.4	15.0
T.D.S.	356	367	383
E.C.	419	432	450
pH	7.29	7.21	7.08
TOTAL ALKALINITY	890	920	1000
T.H.	325	290	300
Ca	198	176	183
Mg	127	113	117
Fe	NIL	NIL	NIL
Cl	262	248	244
So_4	84	63	69

SEMBATTU POND

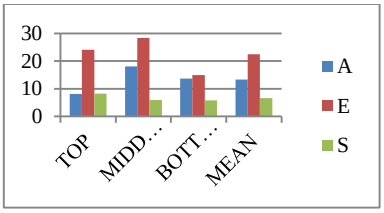
PARAMETERS	***TOP LAYER***	***MIDDLE LAYER***	***BOTTOM LAYER***
COLOUR	PALE YELLOW	PALE YELLOW	PALE YELLOW
ODOUR	UNPLEASENT	UNPLEASENT	UNPLEASENT
TUBIDITY	8.3	5.9	5.8
T.D.S.	202	203	211
E.C.	238	239	248
pH	9.18	8.52	8.78
TOTAL ALKALINITY	1695	475	435
T.H.	205	205	185
Ca	125	125	113
Mg	80	80	72
Fe	NIL	NIL	NIL
Cl	236	236	218
So_4	76	71	76

TABLE 4, THE MEAN QUALITY OF THE WATER IN PONDS

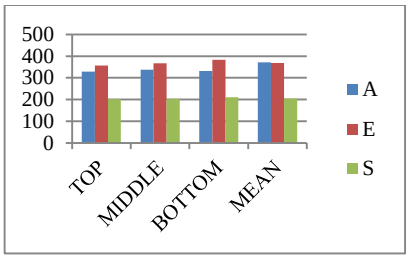
PARAMETERS	*A*	*E*	*S*
COLOUR	PALE YELLOW	PALE YELLOW	PALE YELLOW
ODOUR	UNPLEASENT	UNPLEASENT	UNPLEASENT
TUBIDITY	13.3	22.5	6.67
T.D.S.	371.67	368.67	205.3
E.C.	391	433.67	241.67
pH	8.1	7.19	8.82
TOTAL ALKALINITY	703.3	936.67	868.3
T.H.	230	305	198.3
Ca	141.5	185.07	119
Mg	91	119	76
Fe	NIL	NIL	NIL
Cl	375	251.13	227
So4	86.3	63	73.5

The above Table 3 and table 4 shows the present quality of water in that pond. The present quality of water is not potable for drinking and construction because of these ponds are having more alkalinity which cause many non-communicable diseases and may cause efflorescence during the setting of concrete.

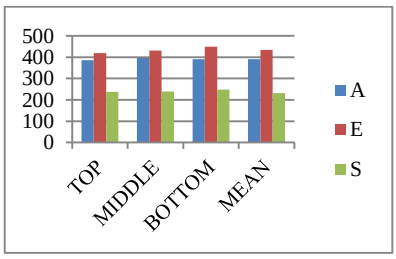
TURBIDITY



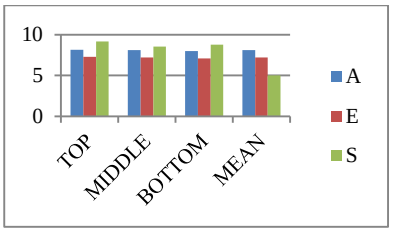
T.D.S.



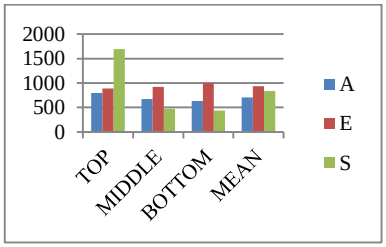
E.C.



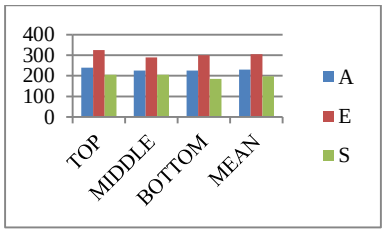
pH



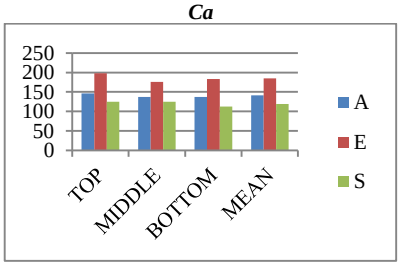
TOTALALKALINITY



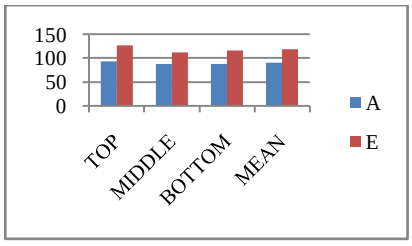
T.H.



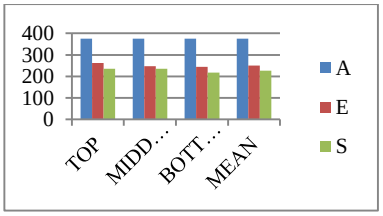
Ca



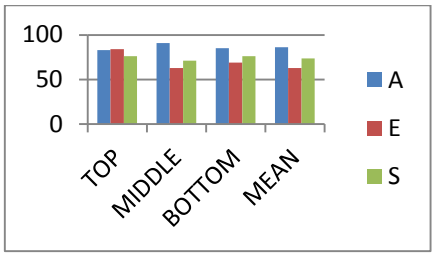
Mg



Cl



So4



pH:

By considering the three ponds the pH of these ponds the Sembattu pond has more pH

TOTAL ALKALINITY:

The total alkalinity on these three ponds are very high because high salt content

TURBIDITY:

On considering the three ponds the Sembattu pond has low turbidity because of tannery effluents

CONCLUSION

The above table and the result shows that the water in Ayyampatti, Edamallaipattipudhur and Sembattu pond are highly polluted. By considering the physical properties like colour, odour, turbidity and total hardness are analyzed from which the turbidity is maximum in Ayyampatti and Edamallaipattipudhur pond than Sembattu pond. On analyzing the chemical properties of the water samples all the properties are in the given level but the alkalinity of the sample is high in all the ponds. This increased alkalinity cause the water to not potable for any work. The increased range of these parameters are so lethal to living organism so the treatment is tobe done on the water bodies or the aste water is to be treated well

REFRENCE

[1] Efficacy of microbes in bioremediation of tannery effluent, 1.Aneez Mohamed, Sekar and George John
[2] Analysis of water quality Parameters in Vembakottai water reservoir, Virudhunagar district, Tamil Nadu – A report,Pulugandi C.
[3] Surface water quality monitoring for Thamirabarani river basin, Tamil Nadu using GIS, S. Krishna Kumar, N.Karthikeyan, M.C.Sashikkumar
[4] Physico-chemical parameters for testing of water – A review Patil. P.N, Sawant.D.V, Deshmukh. R.N
[5] Assessment of supply water quality in the Chittagong city of Bangladesh ,Zuthi M. F. R, Biswas M. and Bahar M. N.
[6] Seasonal variations in physcio-chemical characterstics of pond and groundwater of Tiruchirapalli, India, B.Balaji Prasath, R.Nandha kumar, S.Dinesh kumar, S.Ananth,