**Water Quality Analysis**

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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.

**Phase 1: Project Definition and Design Thinking**

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

Trichirapalli is the fourth largest city in TAMIL NADU, INDIA. Trichirapalli is located in the central region of Tamil Nadu state between 10Âº4836 N and 78Âº4108.16E 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- Ayyampattipondand 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.

TABLE 3, RESULT OF WATER QUALITY IN THREE PONDS

**AYYAMPATTI POND**

pH

|  |  |  |  |
| --- | --- | --- | --- |
| 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 |
| 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 |
| So4 | 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 |
| So4 | 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 |
| So4 | 76 | 71 | 76 |

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 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.

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 waste water is to be treated well