Analysis of Surface and Ground Water in Ranipet Industrial Area

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Abstract-

The piece of investigation is carried out to study the ground water quality as well as surface water quality, nutrient status and physio- chemical characteristics in RANIPET INDUSTRIAL AREA. The present work has been conducted by monitoring two types of ground water and surface water i.e., open well water and bore well water as well as ponds. Attempts were made to study and analyze the physio- chemical characteristics of the water. The work has been done by collecting samples from various places of Ranipet industrial area and the chemical analysis is carried out in Environmental Engineering Lab in our college. A water quality standard is a rule or law comprised of the uses to be made of a water body or segment and the water quality criteria necessary to protect that uses, so a study has become necessary in the present to determine suitability of these water for health.

Keywords- *Groundwater, Physio – chemical parameter, Ranipet.*

I. INTRODUCTION

Ranipet is one of the most polluted areas in Tamil Nadu, India. Ranipet is located in latitude 12.9321° N and in Longitude 79.335° E. Ranipet lone occupies around 240 tanneries, 17 Red category industries and small scale chemical industries. Partially treated industrial effluents combined with sewage and other wastes discharged on the surface cause severe groundwater pollution in the industrial belt. This poses a problem of supply of safe drinking water in the rural parts of the country.

The factory in Ranipet manufactures Leather units which exhaust the sodium chromate, chromium salts and basic chromium sulphate tanning powder used in the leather industry. When inhaled, chromium compounds cause the risk of lung, nasal and sinus cancer. Paint wastages which contains the lead which causes intellectual disability which reliable the constipation, abdominal pain, headache, memory problems and tingling in the hands.

The water alone not contaminated. Due to this polluted water the surrounding Environment soil and Plant- also polluted. The waterborne diseases are also produced such as protozoan – amoebiasis, giardiasis

II. MATERIAL AND METHODS

A. *Material*

pH meter, Digital Nepholo meter,Electrical conductivity meter, spectrophoto meter, Burette and pipette titration, ovan,Burner, Filter paper, crucible.

B. *Procedure*

1) *pH*

All the samples are taken in the beaker one by one. The pH value is recorded for the entire sample using the pH meter.

2) *Turbidity*

First, the beaker is taken & is washed properly. Then, distilled water is poured into the beaker. Turbidity of distilled water is measured by the turbidity meter. If the turbidity is not zero, then the settings are adjusted as to make it zero. Then, the sample is poured into the beaker. The turbidity of the beaker is measured using the turbidity meter. The same procedure is repeated for all the samples.

3) *Electrical Conductivity*

The sample is taken in the beaker. The conductivity of the sample is measured. The same procedure is repeated for all the samples. Hence, the conductivity of all the samples is recorded.

4) *Dissolved Oxygen*

Take standard BOD bottle of 125ml and fill it with sample and place the stopper. Remove stopper and add 2ml of $MNSO4$, 2ml of alkaline iodide azide solution. Allow precipitate and settle to give a clear supernatant above mangeneous hydroxide floc. Now add 2ml of H_2SO_4, restopper and mix by inverting several times until dissolving is completed. Measure 20 ml of sample into conical flask and titrate the sample

using standard $Na_2 S_2 O_{3\ solution}$ until the solution attains pale straw yellow color. Add few drops of starch indicator and continue titration until disappearance of blue colour.

5) ***Chemical Oxygen Demand***

10 ml waste water sample or sample diluted to 10 ml distilled water was taken in 250 ml refluxing flask. 0.2 gm of $HgSO_4$ and 15 ml of H_2SO_4 reagent were added. Solution was cooled and 5 ml of 0.25N, $K_2Cr_2O_7$ solution was added. This solution was refluxed for two hours. After 2 hours of reflux, solution was cooled and Diluted to final volume of 70 ml by distilled water. Excess dichromate of 25 ml refluxed solution was titrated against Ferrous Ammonium Sulphate in presence of 3 drops of ferroinindicator. End point of titration was indicated by a colour change from blue green to reddish brown. Simultaneously a blank was also run and COD value was calculated by using the formula.

6) ***Hardness***

Take 20ml sample into a conical flask Add 5ml buffer solution Add 1 and 2 drops of EBT and titrate with standard EDTA solution until wine red changes to blue colour. Note down the volume of EDTA solution required. Repeat the same procedure for the concordant value.

7) ***Total Suspended Solids***

10 ml of water sample is measured using the measuring cylinder. Water sample is transferred into a beaker. Weight of the filter paper is recorded. Filter paper is adjusted in the funnel. Water is transferred to the conical flask through the filter paper. Filter paper is kept in the oven in order to get it dried. Once the filter paper gets dried, it is taken out. The weight of filter paper is then recorded. The initial weight of the filter paper is then subtracted from the final weight. The result which we get is the amount of suspended solids in 10 ml of water. It is divided by 10 in order to get the amount of TSS per ml of water.

8) ***Nitrate value***

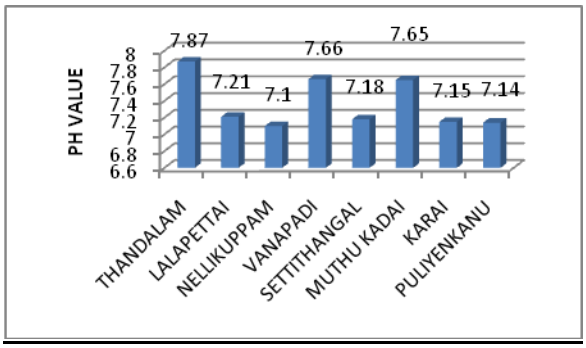
0.5 to 1.5 ml standard nitrate solution is taken in different beakers. Taken 5ml distilled water as a blank. Make up the solution to 5 ml by distilled water. Add 1ml each of brucine sulphanilic acid solution to standards and blank with stirring. Add 10ml sulphuric acid solution to each beaker and mix well. Keep the beaker in dark for 10 minutes; add 10ml distilled water in the beakers while the colour is developing. Cool them for 30 minutes. Measure absorbance of the standards and sample with the help of spectrometer after settling the blank at the zero absorbance at a wavelength of 510nm.repare calibration curve to find out the mg nitrate in the sample.

9) ***Chloride***

Take 20ml of given sample in conical flask. Add 2 to 3 drops of potassium chromate indicator to get light yellow colour Titrate the sample against silver nitrate solution until the colour changes from yellow to brick red. The same procedure is repeated until consistent values are zero.

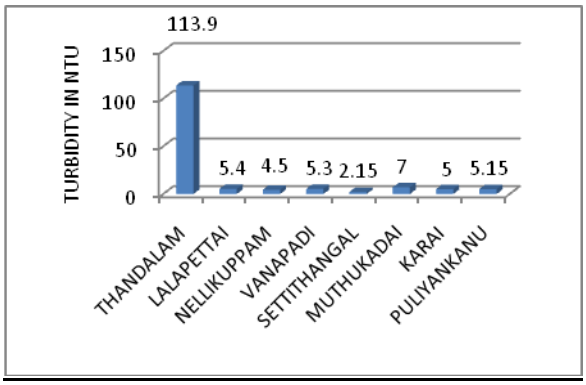
III. RESULT AND DISCUSSION

A. pH



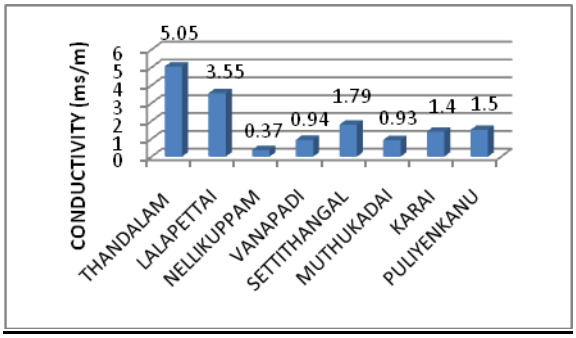
From this graph easily to identify the acid or base of water. All samples range between 7.1-7.9.So all the samples are alkalinity.

B. Turbidity



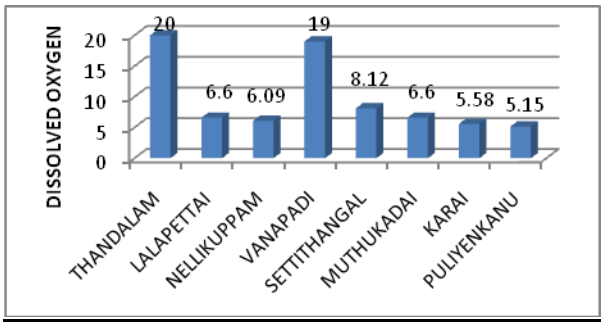
More over all the samples are have permissible turbidity value. But sample one have high turbidity value ranges 113.9 NTU. Because of are present in the water.

C. Electrical Conductivity



Conductivity is based on ions particle present in the water. Sample one and two are higher conductivity, because of maximum industrial water disposal in this site.

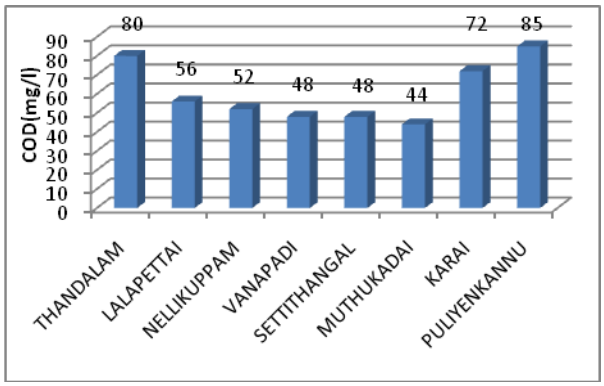
D. Dissolved Oxygen



From this graph sample one and four have over of the limit. Dissolved oxygen is higher in sample 1. Comparing the other.

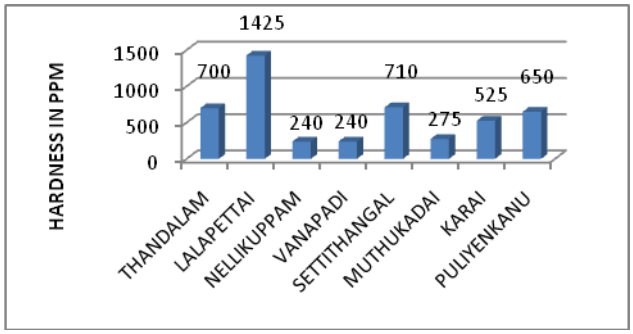
E. Chemical Oxygen Demand

particles which is suspended as high content in sample 1



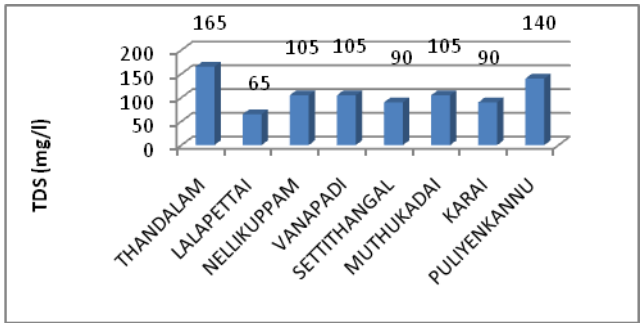
Due to chemical deposition in sample 1 and sample 7 the COD is higher than appropriate

F. Hardness



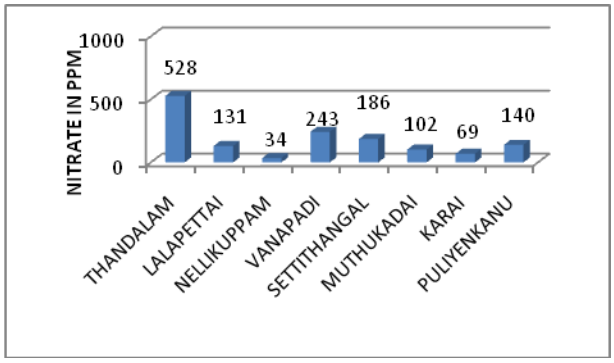
Due to the deposition of salt content present in water the hardness will increase than the appropriate level.

G. Total Dissolved Solids



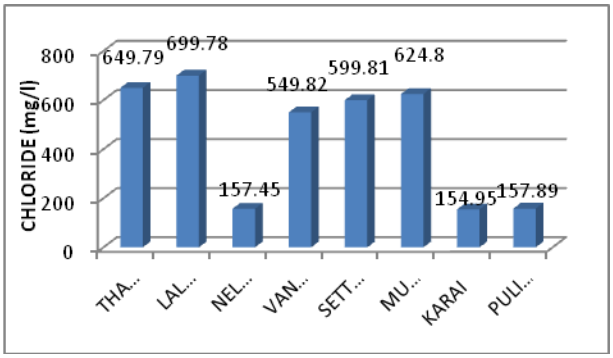
Due to the degradation of organic matter and inorganic maters the solids are converted into particles which is suspended as high content in sample 1

H. Nitrate



The sample collection area is in agricultural area since 30 yrs hence the water pollution as high content of nitrate.

I. Chloride



The presence of sodium chloride in enormous level in the land the contamination also high in sample collected areas.

IV. CONCLUSION

The surface and ground water quality analysis of the Ranipet industrial area is presented in this project. The water qualities of 8 sampling stations were randomly selected in Ranipet industrial area. The spatial variation graphs of major water quality parameters such of pH, Turbidity, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Dissolved Oxygen(DO), Hardness, Chemical Oxygen Demand(COD), Nitrate, Chloride. The water quality has been classified as good, moderate, poor, bad depending upon the quality standards. The surface and ground water in Ranipet industrial area is deteriorating and the maximum sampling stations needs special attention, as all the parameters such as pH, electrical conductivity, chloride, hardness and salinity is found high. It may cause laxative effects on health of the people consuming that water and it is not much suitable for irrigation purpose also. The minimum sampling stations have their respective physico-chemical parameters slightly above WHO limits. The reason for higher values of physio-chemical parameters at certain sampling locations may be due the unsciencitific disposal of solid wastes, the depth of the wells and nature of the geological materials with which the groundwater comes in contact may influence the quality of the water. Hence proper water treatment is required in terms of community health.

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