Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 01, pp.63782-63785, January, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

PHYSICO- CHEMICAL PARAMETERS OF GROUND WATER POLLUTION IN AND AROUND UDAYARPALAYAM TALUK AT ARIYALUR DISTRICT, TAMILNADU

Mohamed Sihabudeen, M. and *Arulnangai, R.

Department of Chemistry, Jamal Mohamed College (Autonomous), Tiruchirappalli District, Tamil Nadu, India

ARTICLE INFO

Article History:
Received 14th October, 2017
Received in revised form
19th November, 2017
Accepted 03rd December, 2017
Published online 19th January, 2018

Key words:

Udayarpalayam Taluk,
Physico-Chemical parameters
Ground water.

ABSTRACT

Ariyalur is an administrative in the state of Tamil Nadu. Many industries like cement and mining industries are located in and around this area. A total ground water samples were collected in and around Udayarpalayam Taluk in Ariyalur district. The samples were analysed in order to find out pollution impact. The Physico-Chemical parameters analyses pH, EC, TDS, TH, Ca, Mg, Cl, CO3, HCO3, DO, COD and BOD were determined and the results were compared with the World Health Organisation (WHO 2011) standard values. It was found that the some of the ground water quality parameters were above the limit.

Citation: Mohamed Sihabudeen, M. and Arulnangai, R. 2018. "Physico- chemical parameters of ground water pollution in and around Udayarpalayam Taluk at Ariyalur district, Tamilnadu", *International Journal of Current Research*, 10, (01), 63782-63785.

INTRODUCTION

Water is required by all living organisms for cell metabolism. Water is also a resource for agriculture, manufacturing, transportation and many other human activities. Water is the most managed resource in the world. Groundwater is the water that percolates downward from the surface through the soil pores. Groundwater is generally an excellent source for drinking, cleaning, bathing, irrigation and industrial purposes.
Water is essential to human life. In all its use, quality and quantity are the most important terms to consider. Quantity of water differs from place to place due to geographical and climate differences land user. In other hand the quality of water may differ due to pollution from nutrient pollutant flows through disposal of sewage and other urban waste. Water is odourless, tasteless, transparent liquid that is colourless in small amounts but exhibits a bluish tinge in large quantities. It is the most familiar and abundant liquid on earth. In solid form and liquid form it covers about 70 % of the earth's surface. It is present in varying amounts in the atmosphere. Most of the living tissues of human beingsis made up of water. It constitutes about 92% of blood plasma, about 80 % of muscle tissue, about 60 % of red blood cells and over half of most other tissues. It is also an important component of the tissue for most living thing (Gleick, 1993).

***Corresponding author*. Arulnangai, R.**
Department of Chemistry, Jamal Mohamed College (Autonomous), Tiruchirappalli District, Tamil Nadu, India.

MATERIALS AND METHOD

Study Area

Ariyalur is a town and district headquarters of Ariyalur district in the South Indian state of Tamil Nadu and rich lime stone and surrounded with five cement factories and two sugar factories. It is the smallest district headquarters in Tamil Nadu. The town is located at a distance of 310 km (190 mi) from the state capital Chennai.

Soil

Land of Limestone Ferruginous red loam occurs in Ariyalur district. The texture is usually loamy, the colour varying from red at the surface to yellow at the lower horizon. The soils are of medium depth with good drainage, free from accumulation of salt and calcium carbonate, pH ranging from 6.5 to 8.0 and contain low amounts of organic matter, nitrogen and phosphorus but with generally adequate amounts of potash and lime.

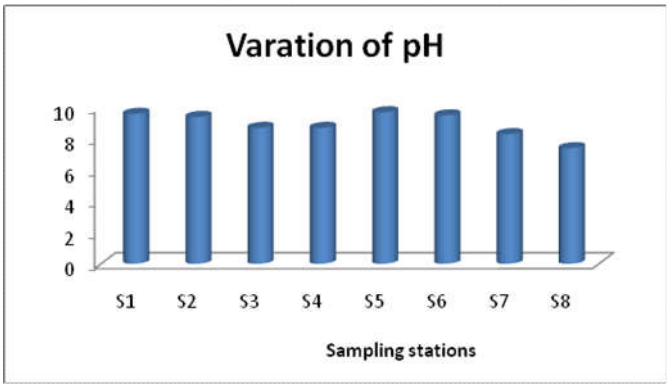
Collection of sample

The physico-chemical parameters were analysed for the ground water samples are performed during January-2017. The water samples were collected in (2 litre bottle) which had been thoroughly washed and rinsed several times with the water to

be collected. The water samples were collected at various stations such as Udayarpalayam (S1,S2), Jeyankondam (S3,S4), Kachiperumal (S5,S6), Thathanur (S7,S8). The physico-chemical parameters were determined and the results were compared with WHO standard values (2011).

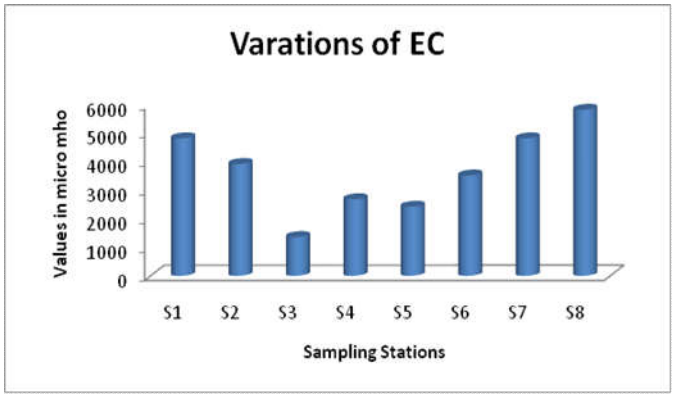
pH

pH value of drinking water is an important index of acidity or alkalin (Moscow *et al.,* 2011). The pH values of water samples varies between 7.4 to 9.7 and were found above the limit prescribed by WHO (6.5-8.5). Most of the water samples are slightly alkaline due to the presence of carbonates and bicarbonates.



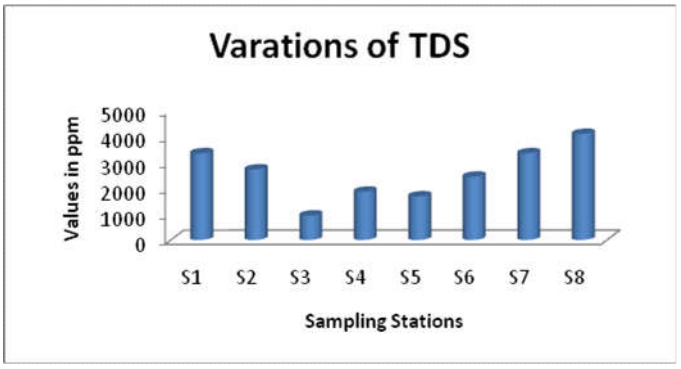
Electrical conductivity

Electrical conductivity (EC) is a measure of water capacity to convey electric current. It signifies the amount of total dissolved salts (Ramesh.K and Bhuvana Jagadeeswari.P-2012). EC values were in the range of 1357 to 5812 micro ohms/cm. In the present study the EC values in all the water samples are found above the permissible limit set by WHO (600 micro ohms/cm). This may be due to the presence of high amount of dissolved inorganic substance in ionized form in water.



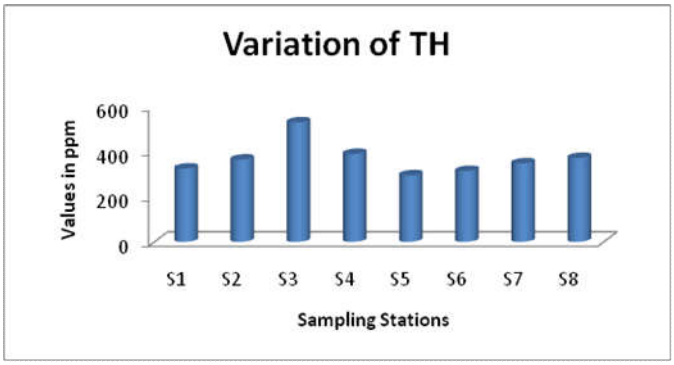
Total dissolved solids

Total dissolved solids indicate the salinity behaviour of groundwater. TDS values vary from 944 to 4095 ppm. In the present investigation TDS values are showing higher than the prescribed by WHO (500ppm), High level of TDS values are mainly due to carbonates, chlorides, etc. Usually TDS in water does not harm human beings, but high concentration can cause heart and kidney disease (Jacob Vincent 2015) suggested that high level of TDS may aesthetically be unsatisfactory for bathing and washing.



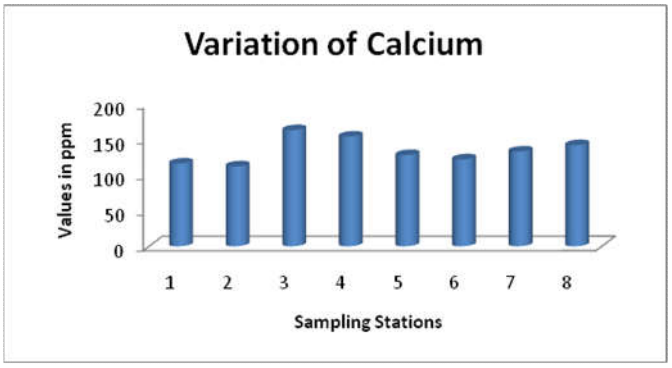
Total hardness

Total hardness indicates the concentration of calcium and magnesium ions. The greatest value of total hardness was found due to dissolution of limestone (D.freedagnana Rani - 2006). The mean TH values are within the range of 295-530ppm. The TH values for all ground water samples were found above the prescribed by WHO (500ppm).



Calcium

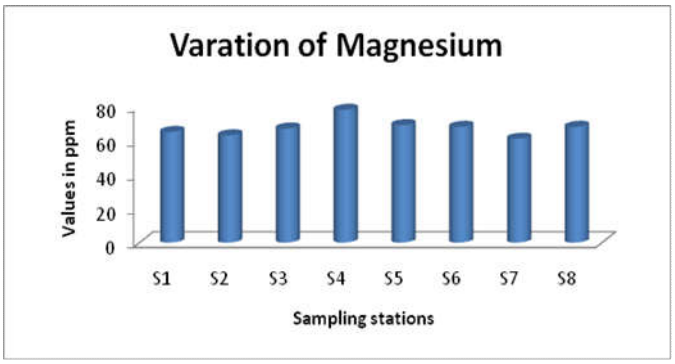
The calcium content in water is one of the important parameter. The presence of calcium in water is mainly due to its passage through or over deposits of limestone, dolomite, gypsum and other gypsiferous materials (Garg *et al.,* 1998). The calcium content in the investigated water sample was ranging from 112 to 163ppm which were found above the limit (100ppm).



Magnesium

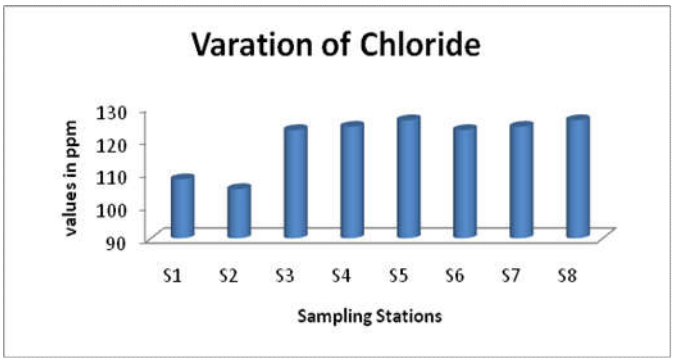
Magnesium occurs in all kinds of natural waters along with calcium. The principal sources in the natural water are various kinds of rocks. Magnesium is directly related to hardness (Achuthan Nair *et al.,* 2005) Magnesium content in the investigated water samples was ranging from 61 to 78 ppm. Which were found below the WHO limit (150ppm). The high

content of magnesium is undesirable for household uses, such as washing, bathing and laundering because of consumption of more soap and other cleaning agent. High Mg causes stone formation and diuretic action.

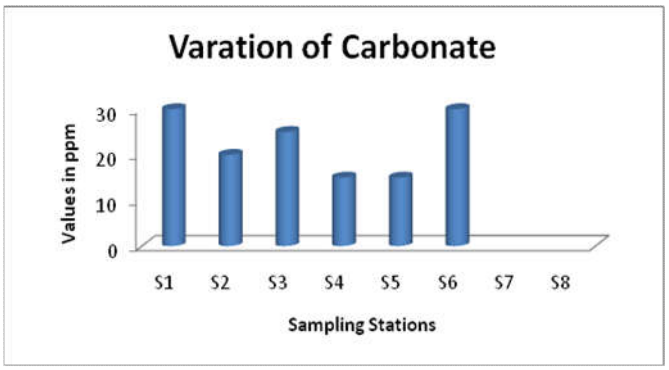


Chloride

The chloride concentration serves as an indicator of pollution by sewage. In present analysis chloride concentration was varies from 105 to 126 ppm. The values are observed lower than the limit WHO (250ppm). High chloride content indicates heavy pollution. It can be due to the uses of inorganic fertilizer, landfills leachetes, and septic tank effluent drainage (Freeze and Cherry1979).

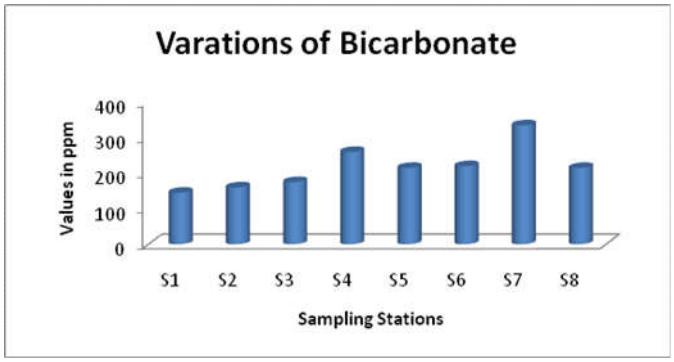


Carbonate



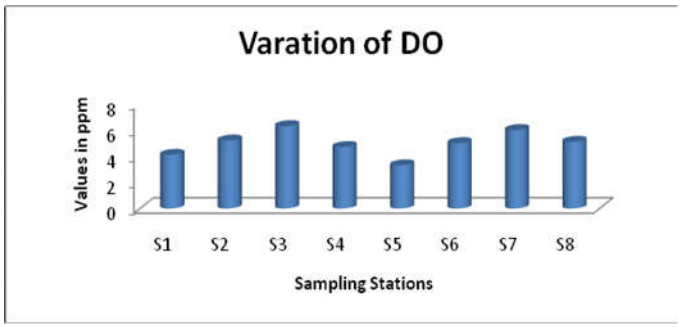
Bi-carbonate

(Chapelle *et al.,* 1987) attributed HCO_3 concentration in natural water to the dissociation of H_2CO_3 Carbonate values were in the range of 15 to 30 ppm in the present study the Carbonate values are found below the permissible limit by WHO (600) ppm. Bicarbonate values were in the range of 145 to 260 ppm in the present study the bicarbonate values are found below the permissible limit by WHO (500ppm).

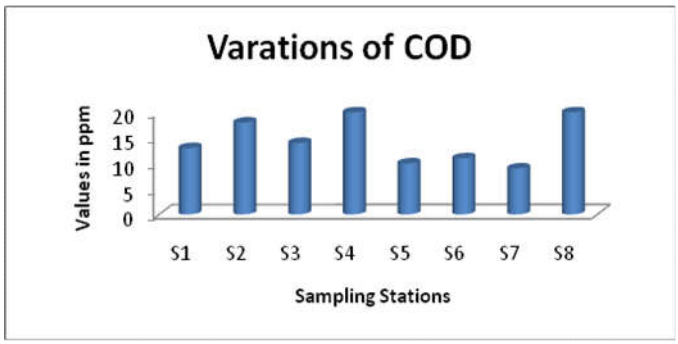


Dissolved oxygen (DO)

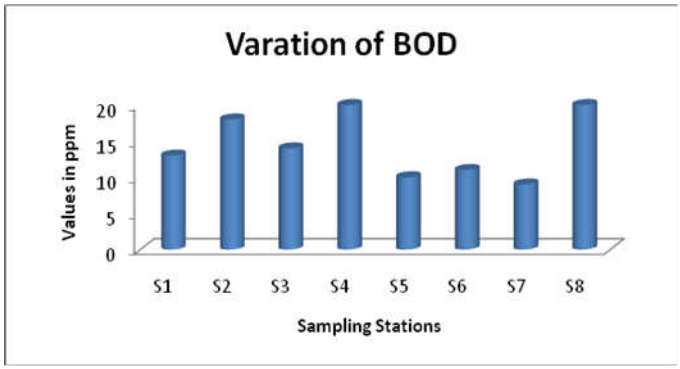
Dissolved oxygen is one of the important parameter in water quality assessment. It plays an important role in precipitation and dissolution of organic substance in water (Sunita Verma-2015). It is essential to maintain a variety of forms of life in the water and the effect of waste discharge in a water body are largely determined by the oxygen balance of the system. The DO value shown ranges from 3.3 to 6.3 ppm. The DO values are obtained in the study were recorded most of the samples within the permissible limit of WHO (6ppm) except S8 sample.



Chemical oxygen demand



Biological oxygen demand



COD and BOD is an important parameters for oxygen required to degredation of organic matter (Dhanajid Kanase *et al.,* 2016). In the present study the COD values have ranged from 21 to 24 ppm and above permissible limit set by WHO (10ppm). BOD is the amount of oxygen required by the organisms engaged in the utilization and ultimate destruction of organic water. It is a very important indicator of the pollution status of the water body. The BOD values shown ranged from 9.6 to 20.5 ppm. The BOD values of all water samples were found above the prescribed limit WHO (6ppm). Both COD and BOD may be due to discharge of domestic sewage and industrial waste water to soil and water bodies and may be due to logging of the industry wastes. High COD and BOD may cause to affect the aquatic life.

Conclusion

The ground water samples are collected from eight different stations in Udayarpalayamtaluk at Ariyalur district in and around areas. The samples were subjected to physico chemical analysis. In the physico chemical concentration such as pH, EC, TDS, TH, Ca, DO, BOD and COD in the ground water samples are found to be higher than the permissible limit of the WHO values. Mg, Cl, CO_3 and HCO_3 in the ground water samples are found to be lower than the permissible limit of the WHO values. Even though, the condition is very bad at present, and if the same continues in future ground water source will be completely polluted and become unfit for drinking and other purposes. This observation indicates contamination of the environment. Thus dumping of waste polluted materials should be avoided and they should not be let into the area. Hence lot of precaution should be done to avoid consequences.

REFERENCES

Achuthan Nair, Premkumar, K, Muftah, A., Al- Mariami and jalal Ahamed Bohjuari, 2005. Assesment of the Well Water Qualityof Benghazi, Libya, *IJEP*., 25(6):481-489.

Chapelle, F.H., Zelibor, J.L., Grimes, D.J., Knobel, L.L. 1987. Bacteria in deep coastal plain sediment of Maryland.

Devaraj, N., Chidambaram, S., Thivya, C. 2016. IOSR Journal of Applied Geology and Geophysics (IOSR-JAGG) e-ISSN:2321-0990, p-ISSN:2321-0982. Volume 4, Issue 5 Ver. II, pp 15-20.

Dhanajid Kanase, G., Shagufta Shaikh, A., Pramod Jagadale, N. *Advance in Applied Science Research,* 2016, 7(6): 41-44.

Freedagnana rani, D. 2006. Hydrochemistry of groundwater of Thirumanur area Tamil Nadu (India) Journal od Environ. science and Engg., vol.48, NO 3,P.199-202.

Garge S.K. 1998. Sewage disposal and air pollution engineering 11thed.khanna publications Delhi.

Gleick, P.H., ed. 1993. Water in Crisis: A Guide to the World's Freshwater Resources. Oxford University Press. p. 13, Table 2.1 "Water reserves on the earth".

Jacob Vincent, 2015. International Journal of Chemtech Research CODEN (USA):IJCR GG ISSN:0974-4290 vol.8, NO 4 PP 1826-1828 2015.

Moscow S., Jothivenkatachalam, K. and Subramani P. 2011. Der chemical sinica, 2(2); 199-206.

Ramesh, K. and Bhuvana Jagadeeswari, 2012. PHydrochemical characteristics of ground water for domestic and irrigation purposes in PeriyakulamTaluk of Theni district Tamil Nadu. *Research Journal of Environment sciences,* Vol 1(1),19-27.

SunitaVerma and J.B. Khan 2015. *IOSR Journal of Pharmacy and Biological Science* (IOSR-JPBS) - e-ISSN :2278-3008, P-ISSN:2319-7676. Volume 10, Issue 5 Ver. IV, PP 41-45.

****