SCIENCE PARK

ISSN: 2321-8045
IMPACT FACTOR : 3.4218(UIF)
VOLUME - 5 | ISSUE - 12 | 19 OCTOBER - 2017

ASSESSMENT OF GROUND WATER QUALITY IN AND AROUND OF OSMANIA UNIVERSITY HYDERABAD

Ashok Gellu[1], R. Uday Kumar[2], S. Kistamma[3], K.Raju[4] and Dr. D. Seshi Kala[5]
Department of Environmental Science, Osmania University, Hyderabad, India.

ABSTRACT

Twelve different ground water samples were taken and analysed for physic chemical parameters to find out the portability of the water. pH, conductivity, TDS,TSS,TS were found to be within the permissible limits set by BIS and ICMR, Where as total hardness ,Ca hardness and Mg hardness found to be much higher than the permissible limits. This study concludes that water is not fit for the consumption purpose without the proper treatment.

KEYWORDS- *Ground water, water quality, Physico chemical parameters, water quality standards, contamination.*

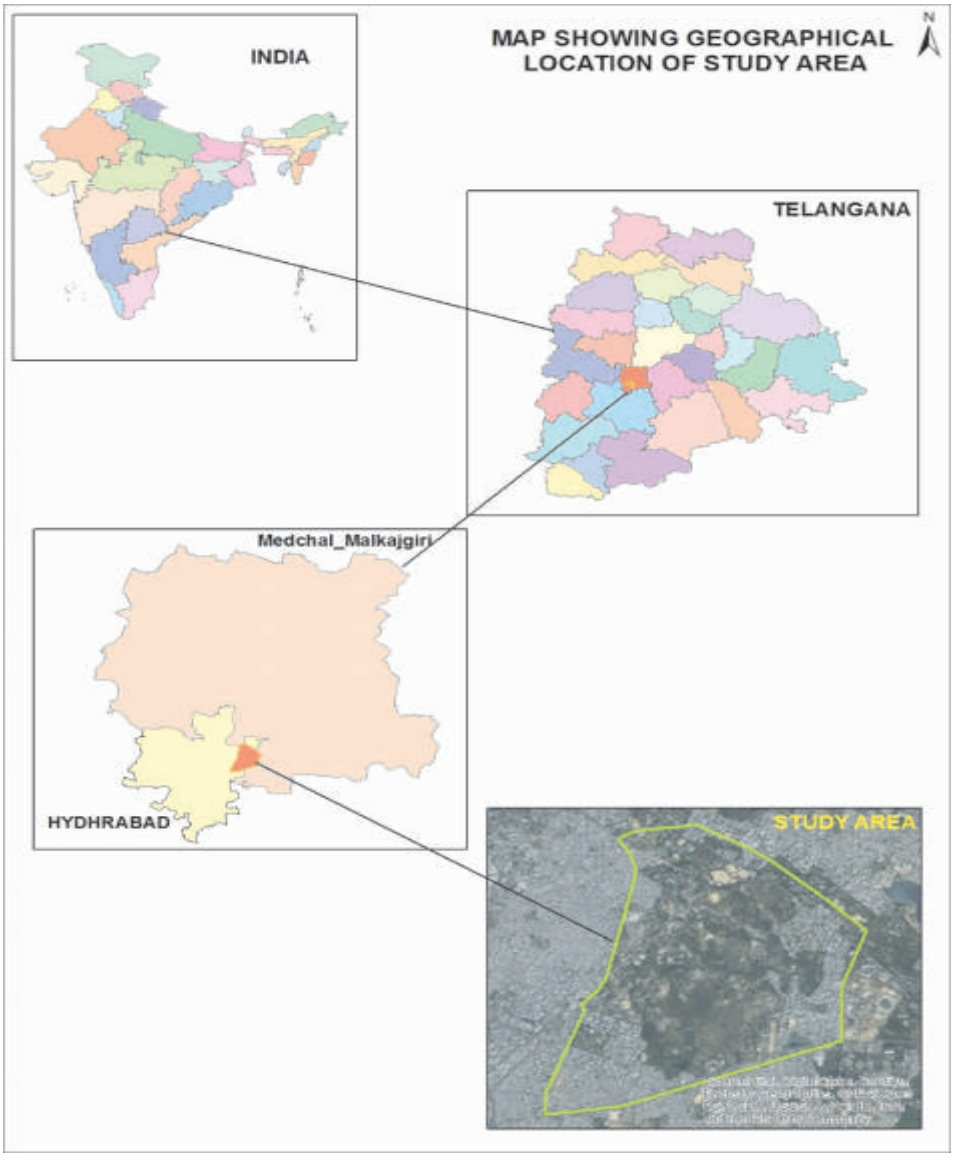
INTRODUCTION

Water is the most important in shaping the land and regulating the climate. It played critical and vital role through history in the growth and continued to be a factor of importance in the economic growth of all contemporary societies. It is one of the most important compounds that profoundly influence life1. Under groundwater, surface water is available to the society to fulfil all the needs, as majority of available surface water is completely polluted, human being is badly depending on ground water for domestic, industrial and irrigation purpose from last few decades, there has been tremendous demand for fresh water due to population explosion, industrialization, modernization and urbanization. As most of the surface water consumed population, recorded water borne diseases according to World Health Organization (WHO) 80% of all the diseases 2 in the human being her caused by water.

This situation gets worsened during summer season due to water scarcity. This surface water pollution is even reaching the underground water, reasons behind this are population pressure, unplanned urbanization, and unrestricted explorations of different mines, dumping of solid wastes, dumping of polluted water without any treatment from industries etc are enhancing the infiltration of harmful compounds to the groundwater 3. Among all the above said, dumping of industrial waste, municipal solid waste emerged as the main cause of pollution of surface and groundwater 4.

Contamination of water available for domestic and drinking purpose with different toxicants released from different industries, agriculture sectors (contain heavy metals, non biodegradable chemicals) and also disease causing agents is one of the serious major health problems 5. Considering the seriousness of the above discussed problems present study was undertaking to investigate underground water quality in and around Osmania University, Hyderabad, Telangana, India. Analysis of water quality plays a very important role to sensitize the people, and for the policy making to build strong and a healthy nation. This research work is an attempt to assess few physico chemical parameters with which quality of underground water is well understood, to sensitise the people who live in that place.

Study Area:



The study area which was considered is Osmania university and surrounding areas like Department of civil engineering (S1) , Ladies hostel (S2), Gouthami hostel (S3), University college of commerce (S4), University college of science (S5), Tarnaka (S6), Hubsiguda (S7), DD colony (S8), Shivam (S9), Adikmet (S10), Jamia Osmania (S11) and Manikeshwar nagar. From these areas 12 samples were collected in a pre cleaned white 2 litre plastic container with necessary precautions. During the month of September 2017 Geographical location of the study area was shown in below picture where the samples were collected.

MATERIALS AND METHODS

The samples were collected from the bore well water which was in regular use for different purposes. All the samples were collected in pre washed polyethene 2 litre bottles. All the necessary care was taken for the preservation of samples. The parameters which are to be done immediately were analyzed or rest other samples were analyzed within 24 hours by following standard methods APHA 2012. The physico chemical parameters were pH, EC, Total hardness, Ca hardness, Mg hardness, Chlorides, Sulphates, TDS, TSS, TS analyzed in 12 different samples. Every parameter was analyzed thrice and average values were taken so as to minimize the

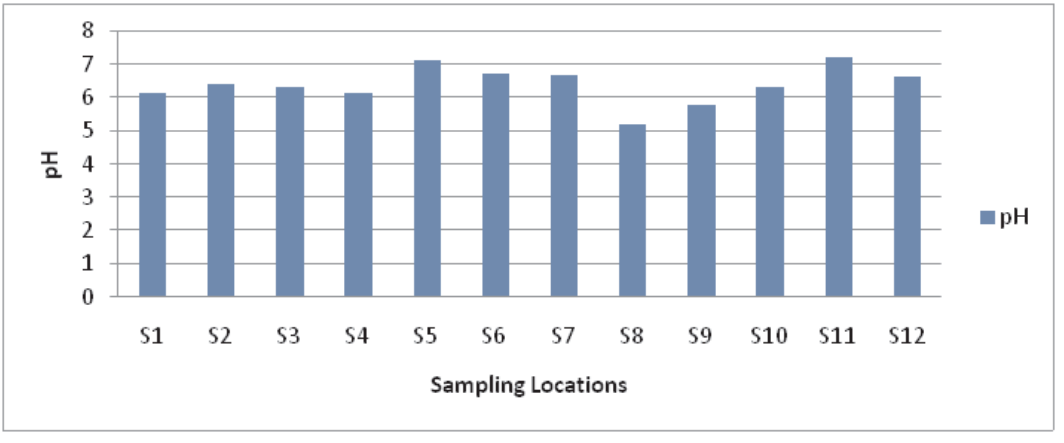
human and instrument error. pH using by pH meter and EC analysed by EC meter, TDS, TSS, TS were measured by using hot air oven rest of the parameters were analyzed by standard procedures, by using Titration method and UV visible spectro photometric method.

RESULTS

Physico-chemical parameters of 12 samples were studied and were represented in different Graphs. Values were compared with BIS and ICMR standards. The results indicate that the quality of water more or less similar but there is some considerable difference from sample to sample. Among parameters studied variations were observed in total suspended solids, Ca and Mg hardness.

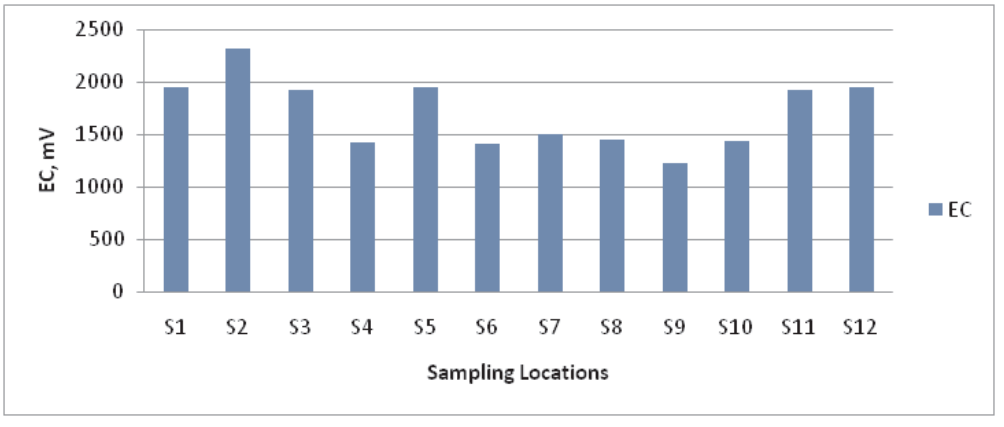
pH:

Though pH has no direct effect on Human health all the biochemical reactions are sensitive to variations of pH. For most chemical reactions as well as for human beings pH 7 is considered as best and ideal. In the present study pH value of water sample vary in a range from 5.23 to 7.25. It is within the range of BIS where as 10 samples were below the lower limit of ICMR. Among the studied 12 samples lowest value is recorded in S8 sample (D.D colony) that is 5.23 and highest reading were recorded values 7.25 in S11 (jamia osmania).



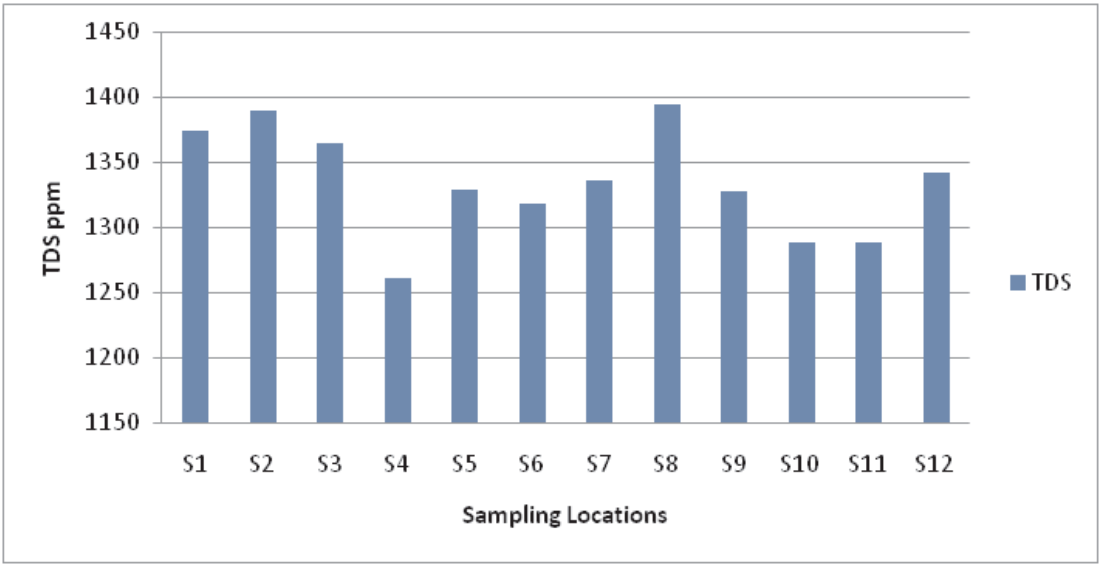
ELECTRICAL CONDUCTIVITY:

There is direct relationship with electrical conductivity and total solids (salinity) with the recorded results it was clear that the sample with more salts shown greater electrical conductivity. The electrical conductivity values can be used to estimate the dissolved solids concentration which affects the taste of the water and sustainability for various uses. Higher the conductivity values indicate higher the dissolved solids in water. Higher the concentration of acids, base and salts in water more will be the conductivity. Among the 12 different samples S2 (Ladies hostel) samples recorded maximum conductivity and S9 sample recorded the least conductivity. All the 12 samples are showing above the permissible limits set by BIS and ICMR.



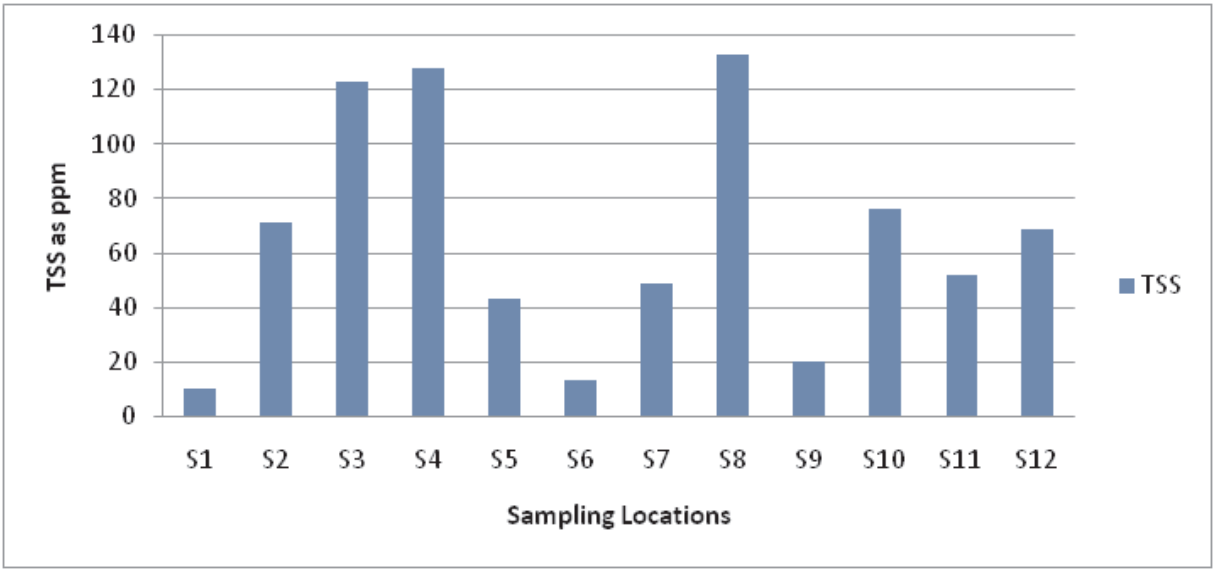
TDS:

TDS were recorded more or less similar in from all 12 samples. When it is compare with the permissible limits ICMR 3 times above the limit. Water samples which are with more dissolved salts will affect the taste of the water.



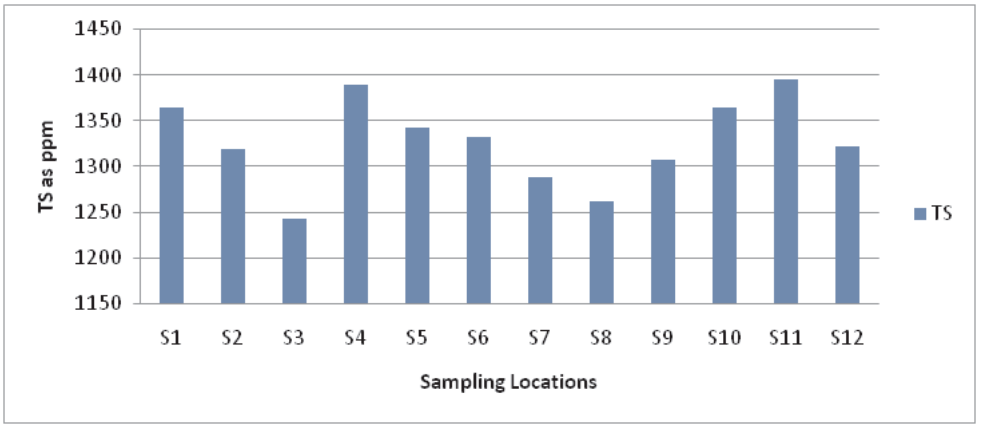
TOTAL SUSPENDED SOLIDS

Lot of variations was observed among the recorded results. The few readings were recorded in S1 (Department of civil Engineering), S6 (Tarnaka) and S9 (Shivam). Higher readings were recorded in S3 (Gouthami hostel), S4 (University college of commerce and S8 (DD colony) rest of the readings were moderate.



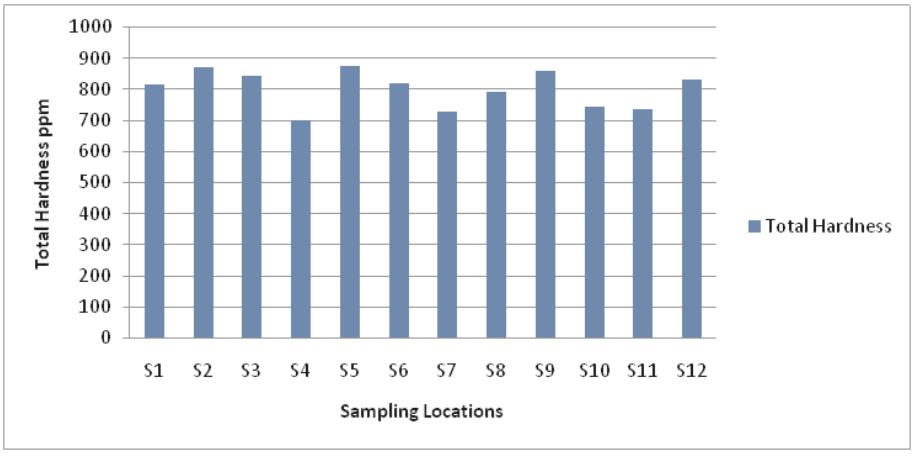
TOTAL SOLIDS:

There was no proper relation between TDS and TS. TDS was highest in S2 (ladies hostel) where as TS has highest in S11 (Jamia osmania) sample.



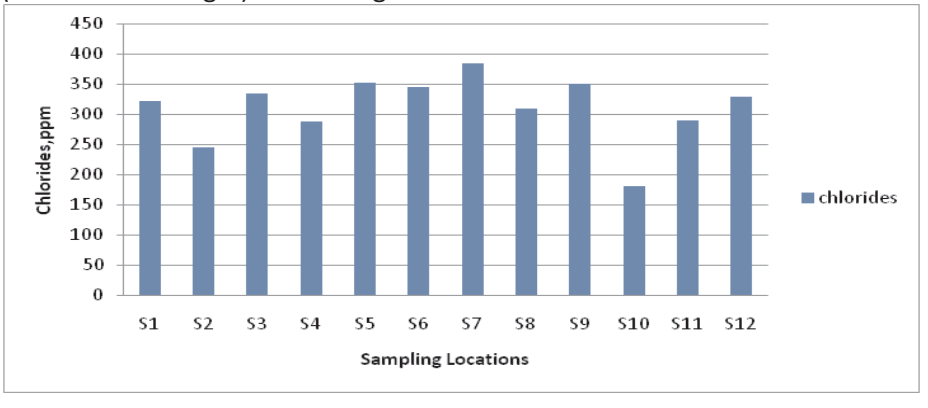
TOTAL HARDNESS:

All the 12 samples were ranged from 700 to 800ppm all of them were above the permissible limits set by BIS and ICMR. Few samples were recorded high Ca hardness S1 sample (Department of civil engineering), S2 (ladies hostel), S8 (DD colony), S9 (shivam) and S4 (university college of commerce), S5 (university college of science), S6 (tarnaka), S7 (hubsiguda), S11 (jamia osmania) were showed high Mg hardness. Both Ca and Mg hardness was higher than the permissible limits of BIS and ICMR except S11 (jamia osmania) 71ppm.



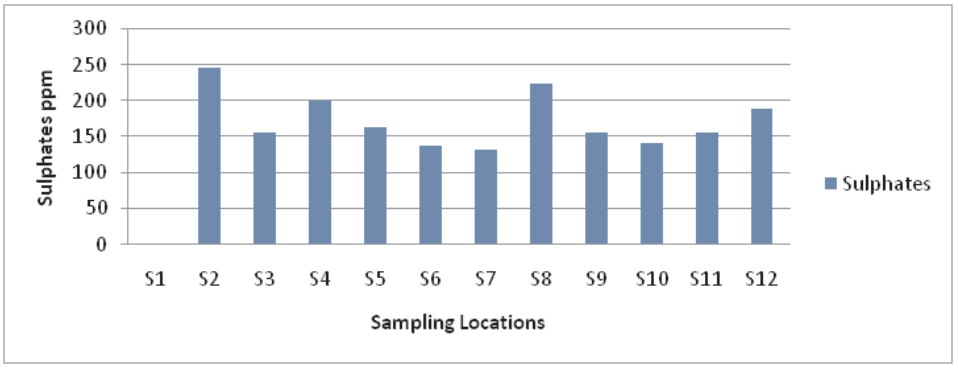
CHLORIDES:

Chloride is a widely distributed element in groundwater of the all most all samples. Higher consumption in water can cause significant increase in BP, heart stroke, hyper tension, asteaphorosis, renel stone and asthama in human beings S1 (Department of civil engineering), S3 (Gouthami hostel), S5 (university college of science), S6 (tarnaka) and S12 (Manikeshwar nagar) showed higher values of chlorides.



SULPHIDES:

Natural water contain sulphate ion and they are soluble in water. Many sulphate ions are produced by oxidation process are the ores. They also present in the different industrial wastes. As per Indian standard permissible limits is 200 except S2 (ladies hostel), S7 (hubsiguda) all other sample concentration were within the permissible limits.



DISCUSSION

Physicochemical parameters of groundwater were studied and concluded that highest values of conductivity was due to high concentration of ionic constituents present in a water body 6, 7, and 8. Similarly 34 ground water samples were studied for physic chemical parameters and found that samples number 8 was recorded maximum in all the physicochemical parameters 9. Study was also conducted in 10 the groundwater geochemistry and physicochemical parameter were analyzed to understand the health aspects after consumption of this water. Watershed area was taken and studied the 11 fluoride dynamic in granite aquifer in Nalgonda district and reported that the fluoride content was above the permissible limit. Ground Water quality index in Karnataka state was studied and concluded that all the physicochemical parameters especially TDS, Hardness, Chlorides are above the permissible limits about 63.5% of water samples are poor in quality12. Similar trends were observed by13.

CONCLUSION

The 12 groundwater samples were analyzed and compared with BIS, ICMR and found that few of the parameter volumes were within the permissible limits and few of the parameter was above permissible limits. The samples which got high Total dissolved solids shown high Electrical conductivity and followed the relation between dissolved salts and the Electrical conductivity and similar trend was observed the samples which are which high salts showed more total hardness and the total hardness was much above the permissible limits set by BIS and ICMR. Sample S6 (tarnaka) showed maximum chloride contamination and then S5 (university science college), S3 (Gouthami hostel) and S12 (Manikeshwar nagar) showed similar range of chloride concentration. 9 samples were within the permissible limits of sulphate concentration set by BIS and ICMR where as 3 samples just above the permissible limit. With the study it is clear that few of the samples was exceeded the permissible limits such samples bettor not use for drinking purpose.

REFERENCES

S.P Gorde and M.V Jadhav, Assessment of water Quality parameters: A Review, journal of Engneering Research and Applications, 3(6), 2029-2035 (2013).

R Kavitha. and K Elangovan., Review article on Ground water quality characteristics at Erode district, (india), of I.J.E.S.,1(2), (2010).

C Ramakrishna and et al .,studies on ground water quality in slums of vishakapatnam, Asian Journal of chemistry, 21(6),4246-4250(2009).

B Rajappa .S Manjappa . E.T Puttaiah,D.P Nagarjuna.,Physico chemical analysis of underground water of Haritha

Taluk of Davanagere District, Karnataka,India, Advances in Applied sciences reasearch, 2011, 2(5); 143-150.

D.F Singh, proc Acad Environ Biol.,1992,1(1), 61-66.

C Sarala , P Ravi babu.,Assessment of Groundwater quality parameters in and around jawaharnagar, Hyderabad,. International journal of scientific reasearch publication. volume 2, Issue 10, October 2012 pp 1-6.

K Brindha, G Jagadeshan, L Kalpana, L Elango(2016) fluoride in weathered rock aquifers of southern india: managed aquifer recharge for mitigation. Environ Sci Pollut Res. doi;10.1007/s11356-016-6069-7

G jagadeshan, L Kalpana, L Elango (2015) major ion signatures for identification of giochemical reactions responsible for release of flouride from geogenic sources to groundwater and associated risk in Vaniyar river basin, Dharmapuri district, tamil nadu, India. Environ Earth Sci 74:2439-2450

A Narsimha, V Sudarshan (2017) assessment of flouride contamination in grounwater from Basara, adilabad district, Telangana state, India: Apple Water Sci.doi:10.1007/s13201-016-0489-x

WM Edmunds, PL Smedley (1996) Groundwater geochemistry and health an overview. In: Appleton JD, Fuge R, McCall GJH (eds) Environmental geochemistry and health, vol 113. London geological society special publication, London, pp 91-105.

DV Reddy, P Nagabushanam, BS Sukhija, AGS Reddy, PL Smedly (2010) flouride dynamics in the granitic aquifer of the wailapally watershed, nalgonda District, India. Chem Geol 269:278-289

C.R Ramakrishnaiah, C Sadashivaiah, Ranganna.,Assessment of water quality index for the groundwater in tumkur taluk, Karnataka state, india.,E-jzournals of chemistry 2009, 6(2), 523-530.

G Geetha, Palani samy, P Sivakumar, P Ganeshkumar, M Sujatha.,Assessment of underground water contamination an effect of textile effluent on Noyyal river basin in and around Tirppur town, Tamilnadu,Int.J.Curr.Microbial.App.Sci(2014),3(9) pp 696-705.