iJRASET
International Journal For Research in Applied Science and Engineering Technology

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 5 **Issue:** XII **Month of publication:** December 2017

**DOI:**

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor :6.887*
*Volume 5 Issue XII December 2017- Available at www.ijraset.com*

# Assessment of Ground Water Quality in Medchal-Malkajgiri District

Srisailam Gogula[1], David Wilson Narisinga[2], Mohammed Vaseem[3], Sunder Kumar Kolli[4]
[1, 2, 3] *Department of Chemistry,Govt. City College, Hyderabad, Telangana.*
[4]*Department of Chemistry, Annamacharya Institute of Technology Sciences, Hyderabad*

***Abstract:*** ***Water is the most important substance in our daily life. Without water, life would not have beenpossible. The magnitude of water problem is increased due to poor drainage system, unplanned industries, increase of pollution, influxes of people from rural areas and other human activities. Due to rapid increase in population, urbanization and industrialization in Hyderabad have resulted the drastic increase in water pollution, which is one of the largest and smart city in India. In this study the ground water samples are collected in different seasons i.e., pre-monsoon and post-monsoon in the year 2016 for analysis from various places of Rangareddy district (Medchal) in Telangana State. The Physico-chemical parameters such as pH, total dissolved solids (TDS), chloride ($Cl^-$), fluoride ($F^-$), nitrate($NO^-_3$), Sulphate($SO_4^{-2}$), hardness ($CaCO_3$, $MgCO_3$), sodium(Na), potassium(K) are analyzed with different analytical methods used by technical instruments. The results were compared with standard values given by World Health Organization (WHO). The present study revealed that the parameters of water which is too higher than the standard limits.***
***Keywords: Physicochemical parameters, Water pollution, Total Hardness, Fluoride and Nitrate.***

## I. INTRODUCTION

India is the biggest developing country having 1.3 billion population, it needs to provide more facilities in various sectors for the peoples' sustainability. It is developing in agriculture in rural level, organizations and industries at urban areas. Urbanization is more because growth rate is more at urban areas like Bengaluru, Hyderabad, Amaravati etc. Hyderabad is situated at the banks of Musi river and it has great history, it is the capital city of Telangana state and Andhra Pradesh. Hyderabad city has good climate and it provides many resources for the people to settle their career in various fields, so many are coming to Hyderabad city from various places of India mostly from Telangana and Andhra Pradesh states and the Hyderabad city is ranked as the best city in India in living standards by Mercer's Quality of Life Index ranking in 2017, thus many choose the city as permanent place as it gives multi careers. It iswell developed in various sectors like IT, Pharma, educational etc. and it has major industrial areas in and around the city.Medchal is also one of the industrial area in city, which is carved out of erstwhile Ranga reddy district, now it is re-organized as a district by the Telangana government in 2016 named as Medchal-Malkajgiri district.Generally due to urbanization[1-5] and industrialization air and water gets pollution, especially water quality reduces, which becomes more dangerous[6]. Water is essential for human life and needs. Natural and ground water is more affected at such areas like Medchal.

## II. MATERIALS AND METHODS

Samples were collected from various selected sites of Medchal-Malkajgiri district of Hyderabad city in both pre- monsoon and post monsoon seasons, general analytical methods were used to assess the water quality of samples such as Electrical Conductivity meter, pH meter, Ion meter, UV Spectrophotometer, Nephelo meter and Flame photometer was used to test the water quality parameters in both the seasons. While collecting the samples location of sampling area noted and numbering is given for the sampling bottles from 1 to 20, Latitude and Longitudes are also noted and mentioned below in the table-1.

Table1: Latitude and Longitudes values of sampling sites

| S. No | Name of the site | Latitude & Longitude | S. No | Name of the site | Latitude & Longitude |
|---|---|---|---|---|---|
| 1 | Medchal | 17.6305° N, 78.4842° E | 11 | Kukatpally | 17.4849° N, 78.3996° E |
| 2 | Jeedimetla | 17.5172° N, 78.4612° E | 12 | Shapur | 17.5394° N, 78.2675° E |
| 3 | Shamirpet | 17.5895° N, 78.5706° E | 13 | Fathenagar | 17.4573° N, 78.4517° E |
| 4 | Kapra | 17.4888° N, 78.5718° E | 14 | Bowenpally | 17.4765° N, 78.4884° E |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Keesara | 17.5281° N, 78.6538° E | 15 | Uppal | 17.3984° N, 78.5583° E |
| 6 | Ghatkesar | 17.4453° N, 78.6853° E | 16 | Nagole | 17.3715° N, 78.5695° E |
| 7 | Alwal | 17.4981° N, 78.5027° E | 17 | Malkajgiri | 17.4491° N, 78.5338° E |
| 8 | Quthbullapur | 17.4980°N, 78.4622°E | 18 | Begumpet | 17.4447° N, 78.4664° E |
| 9 | Dundigal | 17.6269N, 78.4013° E | 19 | Lothukunta | 17.4958° N, 78.5128° E |
| 10 | Balanagar | 17.4650° N, 78.4510° E | 20 | Cherlapally | 17.4681° N, 78.5974° E |

## III. RESULTS AND DISCUSSION

Water samples are analyzed in different seasons i.e. April-May month (pre- monsoon) and November-December month (post monsoon) in the year of 2016. Results are represented in the Table 2as pre- monsoon analytical data, Table 3 as post monsoon data. This data reveals that at Medchal and Balanagar have more parameters exceeding the drinking water quality limits and they are higher than all sites in or at the time of pre- monsoon, it is may be the reason that the site Medchal is having major water polluting sources i.e. many industries are located there over. Medchal and Quthbullapur are having parameters with exceeding limits than other sites in post monsoon season. At all proposed sites maximum number of parameters is exceeding the standard limits given by World Health Organization given below in table 4. Nitrate, Chloride and Total Hardness is too high at the proposed sites, excess of Fluoride is present which effects health. Total dissolved solids, Chloride, Fluoride, Nitrate and Total Hardness is compared with World Health Organization standard value sat both pre-monsoon and post-monsoon seasons and represented by graphical method at proposed sites which is shown in figure 1 to figure 5, because these parameters directly effect on human health mostly. These chemical examinations of all water samples of proposed sites given us result of drinking water and how much they polluted. The pollution causes major health problems to the people as water is major source of human living as they use this water for drinking and domestic purpose. In the month of April and May ground water levels are decreased due to summer or less rains, as ground water levels are decreased water pollution becomes more. Inpre- monsoon season water samples are more contaminated. Due to industrialization around the city of Hyderabad like Medchal, Jeedimetla, Balanagar, Kukatpally etc. water pollution increased in pre-monsoon season, it might be cause after monsoon rains also many sites arehaving pollution. The above analysis results reveal thatPre- monsoon season is having more pollution or contamination than post monsoon at selected stations.

Table 2: Analytical pre- monsoon values of water samples at proposed sites

| S No | PH | EC | TDS | $HCO_3$ | Cl | F | $NO_3$ | $SO_4$ | Na | K | Ca | Mg | TH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.84 | 2570 | 1645 | 153 | 640 | 2.63 | 58 | 132 | 209 | 3 | 192 | 88 | 840 |
| 2 | 7.53 | 1586 | 1015 | 315 | 240 | 1.85 | 48 | 51 | 137 | 3 | 128 | 44 | 500 |
| 3 | 7.67 | 863 | 552 | 244 | 90 | 1.73 | 7.1 | 30 | 25 | 2 | 96 | 34 | 380 |
| 4 | 7.49 | 583 | 373 | 190 | 30 | 1.55 | 10 | 20 | 25 | 1 | 48 | 29 | 240 |
| 5 | 7.9 | 568 | 364 | 215 | 10 | 2.41 | 94 | 18 | 30 | 0.5 | 48 | 24 | 220 |
| 6 | 7.5 | 1643 | 1052 | 392 | 200 | 0.99 | 8.5 | 105 | 180 | 30 | 112 | 29 | 400 |
| 7 | 7.45 | 1361 | 871 | 382 | 140 | 1.87 | 8.95 | 60 | 76 | 1 | 72 | 83 | 520 |
| 8 | 7.3 | 2150 | 1376 | 330 | 330 | 1.65 | 50 | 90 | 200 | 8 | 240 | 10 | 640 |
| 9 | 7.72 | 2000 | 1278 | 373 | 250 | 1.4 | 48.5 | 80 | 199 | 53 | 176 | 58 | 680 |
| 10 | 7.56 | 2550 | 1635 | 632 | 300 | 0.9 | 46 | 109 | 390 | 7 | 144 | 15 | 420 |
| 11 | 8.27 | 1051 | 673 | 306 | 90 | 1.09 | 7.02 | 60 | 105 | 2 | 40 | 49 | 300 |
| 12 | 8.26 | 790 | 505 | 205 | 70 | 0.46 | 68 | 60 | 35 | 2 | 40 | 53 | 320 |
| 13 | 8.31 | 1074 | 687 | 131 | 180 | 0.4 | 15.75 | 68 | 83 | 1 | 48 | 59 | 360 |
| 14 | 8.46 | 758 | 485 | 124 | 80 | 0.65 | 5 | 107 | 83 | 2 | 24 | 36 | 200 |
| 15 | 7.95 | 1625 | 1043 | 184 | 250 | 2.1 | 56 | 135 | 127 | 3 | 58 | 110 | 420 |
| 16 | 7.67 | 1011 | 648 | 355 | 60 | 2.6 | 86 | 50 | 115 | 1 | 86 | 74 | 360 |
| 17 | 7.99 | 740 | 474 | 245 | 50 | 1.73 | 5.35 | 30 | 43 | 1 | 72 | 24 | 280 |
| 18 | 8.48 | 463 | 296 | 87 | 40 | 1.32 | 2.10 | 51 | 55 | 3 | 40 | 15 | 120 |
| 19 | 8.08 | 1353 | 815 | 281 | 180 | 1.36 | 10.04 | 95 | 126 | 7 | 48 | 66 | 400 |
| 20 | 7.37 | 1273 | 866 | 300 | 130 | 1.66 | 50 | 72 | 119 | 4 | 96 | 54 | 380 |

Table 3: Analytical post monsoon values of water samples at proposed sites

| S NO | PH | EC | TDS | $HCO_3$ | Cl | F | $NO_3$ | $SO_4$ | Na | K | Ca | Mg | TH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.51 | 2700 | 1728 | 250 | 645 | 2.7 | 82 | 113 | 215 | 3 | 252 | 60 | 880 |
| 2 | 7.43 | 1736 | 1019 | 330 | 225 | 2.2 | 51 | 48 | 74 | 3 | 128 | 58 | 620 |
| 3 | 7.82 | 850 | 534 | 285 | 50 | 0.82 | 5.2 | 29.5 | 45 | 0.4 | 64 | 39 | 320 |
| 4 | 7.5 | 502 | 321 | 151 | 20 | 0.55 | 14.8 | 18 | 24 | 0.5 | 56 | 15 | 200 |
| 5 | 7.45 | 675 | 435 | 233 | 30 | 3.75 | 86 | 22 | 28 | 0.6 | 64 | 29 | 280 |
| 6 | 7.38 | 1655 | 1059 | 275 | 190 | 0.62 | 50.5 | 96 | 102 | 26.5 | 144 | 53 | 580 |
| 7 | 7.5 | 1474 | 943 | 370 | 180 | 1.56 | 11 | 65 | 84 | 1.5 | 112 | 68 | 560 |
| 8 | 7.05 | 2100 | 1345 | 44 | 490 | 0.63 | 54.85 | 100 | 100 | 3 | 264 | 33 | 840 |
| 9 | 7.5 | 1800 | 1155 | 384 | 200 | 0.86 | 42 | 84 | 180 | 60.4 | 104 | 44 | 440 |
| 10 | 7.83 | 1845 | 1180 | 264 | 80 | 2.21 | 58.6 | 31 | 86 | 12 | 44 | 44 | 340 |
| 11 | 7.57 | 1287 | 824 | 271 | 160 | 0.99 | 9.70 | 102 | 105 | 1.94 | 75 | 58 | 420 |
| 12 | 7.74 | 1367 | 875 | 254 | 190 | 0.42 | 15.95 | 97 | 115 | 0.8 | 56 | 19 | 220 |
| 13 | 7.42 | 1140 | 902 | 220 | 230 | 0.4 | 15.56 | 94 | 88 | 1 | 120 | 53 | 520 |
| 14 | 7.65 | 896 | 573 | 300 | 60 | 0.75 | 4 | 45 | 92 | 8 | 40 | 34 | 240 |
| 15 | 7.72 | 1745 | 797 | 133 | 110 | 1.75 | 67 | 54 | 85 | 2 | 88 | 34 | 360 |
| 16 | 7.41 | 1630 | 922 | 340 | 100 | 1.92 | 63 | 59 | 113 | 3 | 84 | 38 | 360 |
| 17 | 7.58 | 688 | 440 | 151 | 80 | 1.50 | 6.1 | 53 | 31 | 1 | 40 | 53 | 320 |
| 18 | 7.75 | 740 | 475 | 162 | 80 | 1.82 | 4.20 | 74 | 67 | 3 | 64 | 68 | 440 |
| 19 | 7.85 | 1410 | 902 | 234 | 190 | 0.76 | 26.93 | 95 | 116 | 0.75 | 32 | 97 | 480 |
| 20 | 8.1 | 1520 | 972 | 328 | 200 | 2.75 | 45 | 72 | 249 | 2.5 | 16 | 44 | 420 |

Table 4: World Health Organization (WHO) standards of drinking water quality parameters

| PH | EC | TDS | $HCO_3$ | Cl | F | $NO_3$ | $SO_4$ | Na | K | Ca | Mg | TH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.5 | 2000 | 500 | 500 | 200 | 1 | 45 | 200 | 200 | 12 | 75 | 30 | 200 |

The study of given parameters of selected sites reveals that they effected with higher contamination, the comparison is given below by graphical method, we have discussed about highly effected and health impacted parameters which are Total dissolved solids, Chloride, Fluoride, Nitrate and Total Hardness of proposed sites at both seasons and these values are compared with standard values given by World Health Organization. In the represented graphs sites were taken on X- axis and volume of parameters (mg/L) was taken on Y- axis.

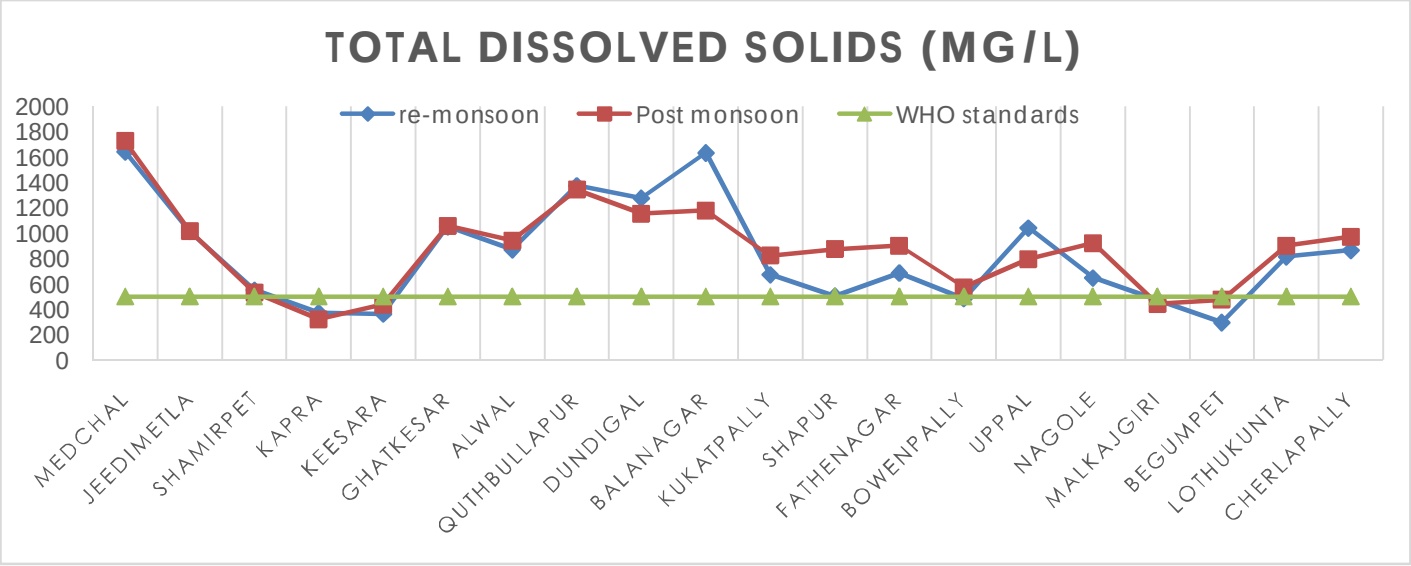



Figure1: Comparison of Total Dissolved Solids values at proposedsites

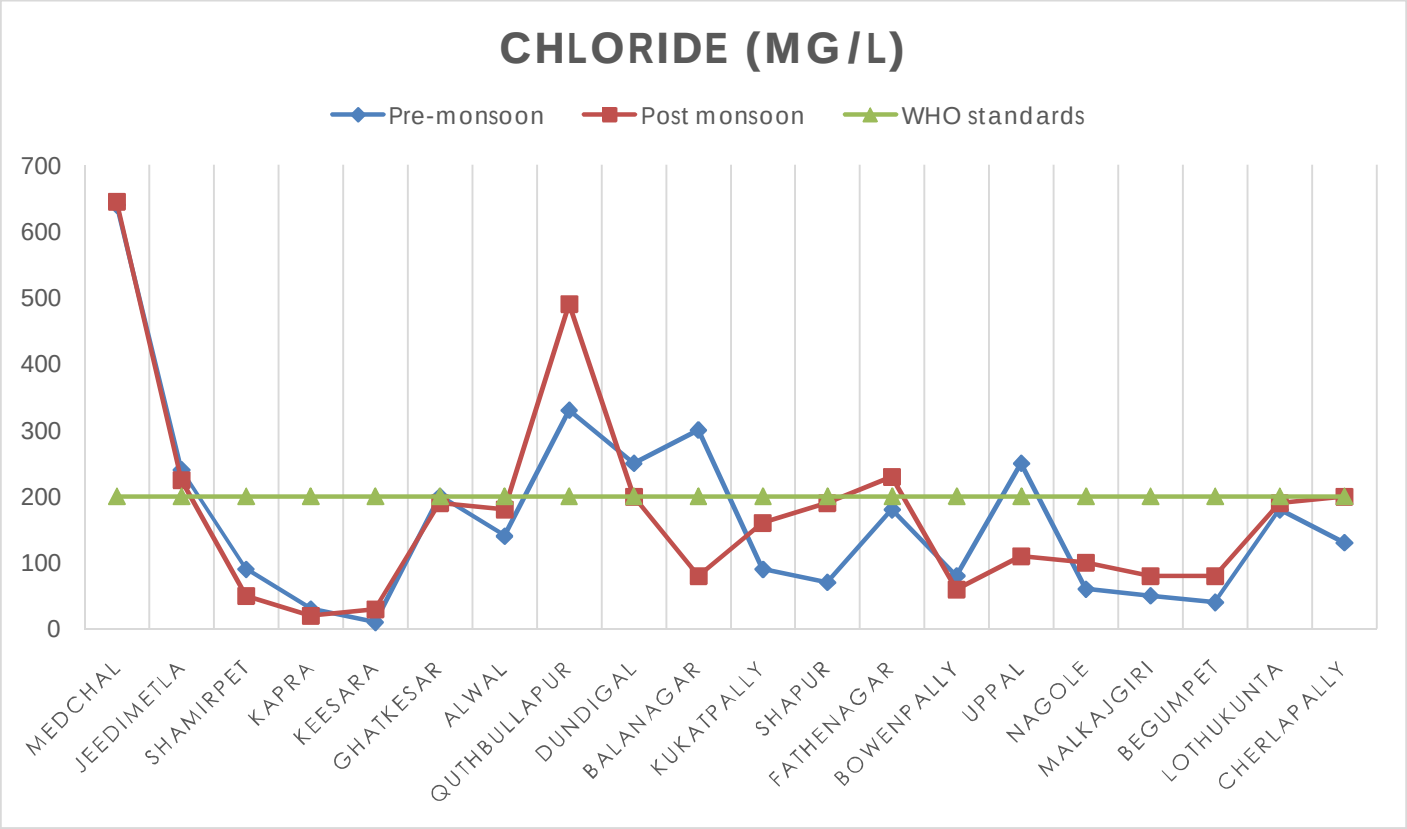



Figure 2: Comparison of Chloride values at proposed sites

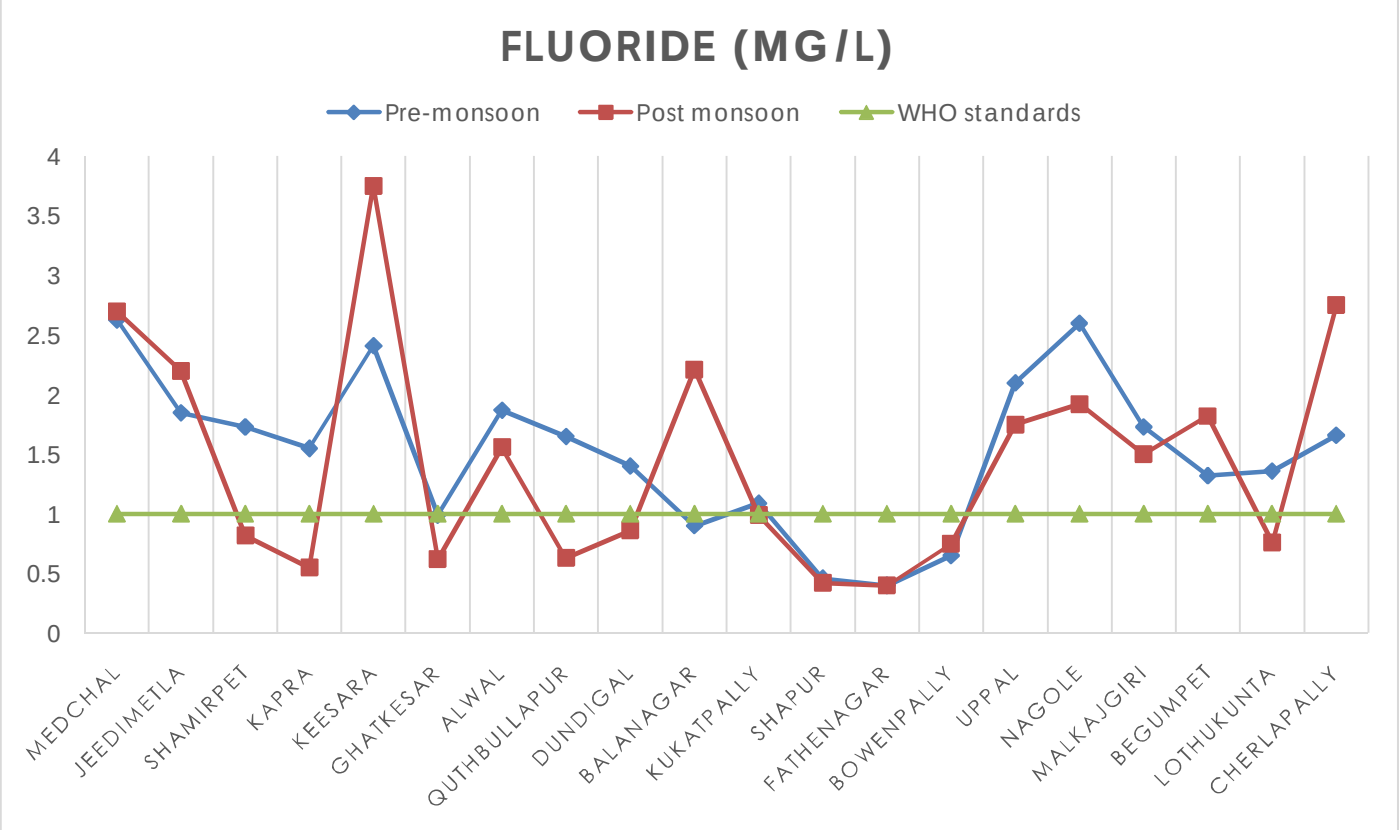



Figure 3: Comparison of Fluoride values at proposed sites

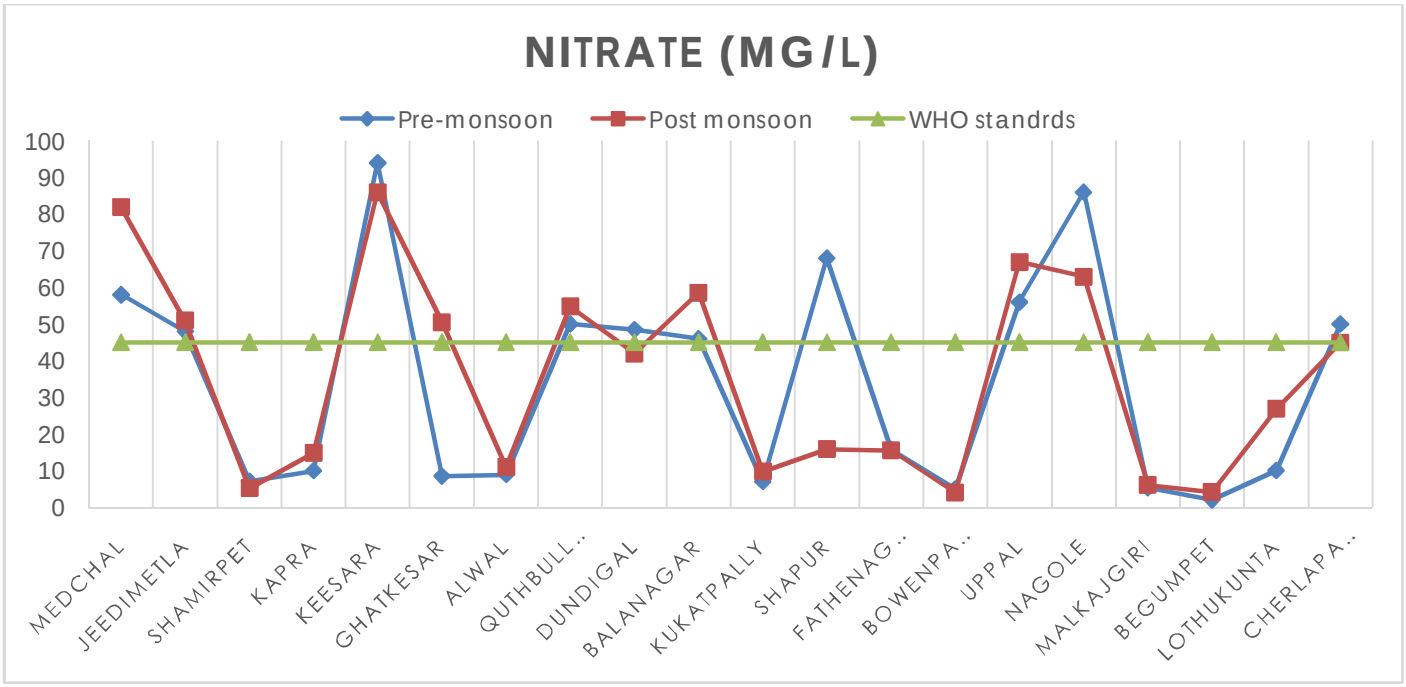



Figure 4: Comparison of Nitrate values at proposed sites

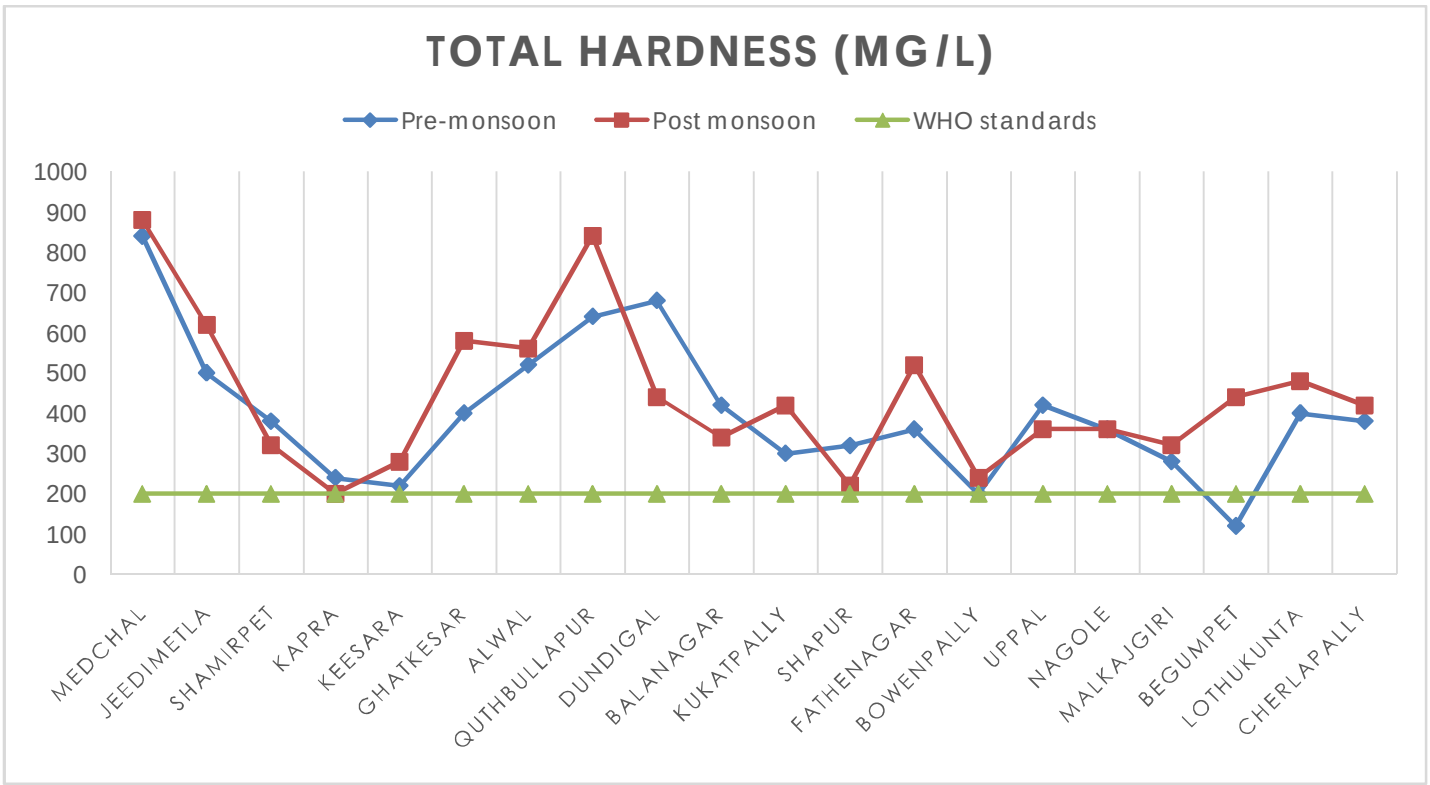



Figure 5: Comparison of Total Hardness values at proposed sites

## IV. CONCLUSION

The study of chemical analysis of selected area water samples in various parameters such as pH, EC, Total Dissolved Solids (TDS), Bicarbonate ($HCO_3$), Chloride (Cl), Fluoride (F), Nitrate ($NO_3$), Sulphate ($SO_4$)and Total hardness (TH) are exceeded drinking water quality limits at many sites. Total dissolved solids are most at Medchal,Jeedimetla, Quthbullapur and Balanagar. High content of Nitrate is present at Jeedimetla, Quthbullapur, Balanagar, Keesara, Uppal and Nagolewhich is too

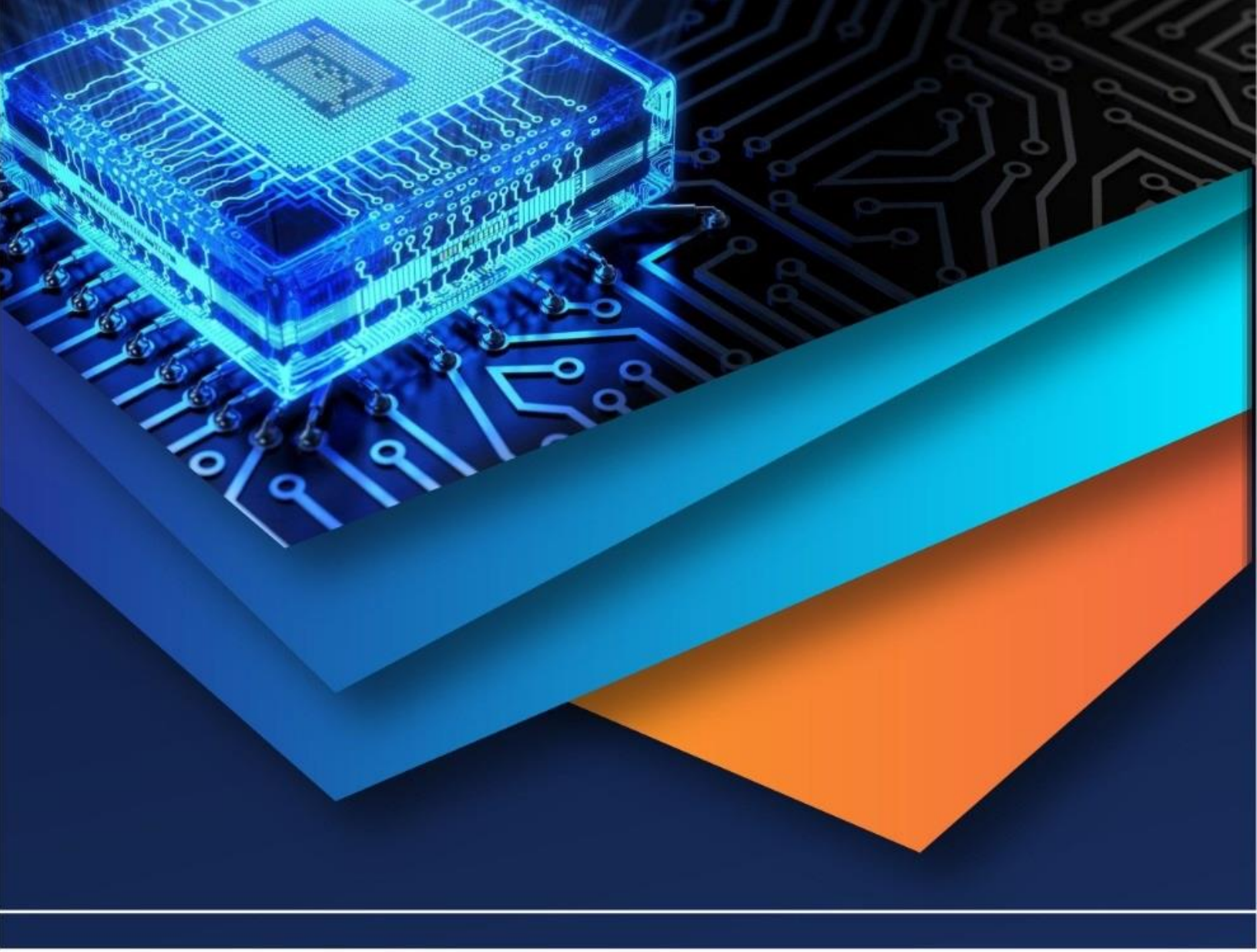
harmful for human health. Chloride is high contaminated at Medchal, Jeedimetla, Quthbullapur, Balanagar and Uppal. More Fluoride is present at Medchal, Jeedimetla, Quthbullapur, Balanagar, Keesara, Alwal, Uppal, Nagole and Cherlapally. Hardness is more at all sites except Kapra, Keesara, Bowenpally and Begumpet.With minor treatment to water at sites Shamirpet, Ghatkesar, Alwal, Kukatpally can be used to drink. At Medchal, Jeedimetla, Quthbullapur, Balanagar, Uppal and Nagole need more treatment, without treatment these water is not useful for domestic purpose, so the people themselves have to take care, because water is the major source for living beings and environment also effected at this condition. Hence here water polluting agents must be controlled, treatment and care should be taken. Pollution control board should actively participate to control water pollution to save health of the people and as well as responsibility has to be taken up by the government.

## V. ACKNOWLEDGEMENTS

The authors are thankful to Dr. C Manjulatha, Principal, Mrs. G Vijaya Jyothi, Head of the department, Chemistry, Govt. City College, Hyderabad and Ground Water Board, Govt. of Telangana, Khairtabad, Hyderabad for providing the facilities to analyze the samples of selected areas.

## REFERENCES

[1] KaranthK. R. (1987). Groundwater assessment, Development and management, Tata-McGraw Hill Publishing Company Limited, New Delhi: 720.
[2] LahlouZ.M. (2002). Water quality in distribution systems. Tech Brief. A national drinking Water Clearinghouse fact sheet. West Virginia University.
[3] Minhas P. S., Samra J. S. (2003). Quality assessment of water resources in Indo-Gangetic basin part in India', Central Soil Salinity Research Institute, Karnal, India: 68.
[4] SemenzaJ., RobertsL., Henderson A., BoganJ., Rubin C. (1998). Water distribution system anddiarrheal disease transmission: a case study in Uzbekistan. American Journal of Tropical Medicine and Hygiene. 59(6), 941-946.
[5] UNCED (1992). Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources. The United Nations Conference on Environment and Development. Chapter 18, Agenda 21.
[6] Srisailam Gogula, Sunder kumarkolli “Effect of Musi river pollution on human Anthropogenic activities”,Research Journal of Chemical Sciences, E-ISSN 2231-606X, Vol. 6(12), December (2016).



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY