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Seasonal Variations in Drinking water quality of some of the bore well waters in Hyderabad metro city after construction of the metro pillars

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Abstract: The current study has been made for the investigation of certain seasonal variations of various water quality parameters in drinking water from 5 zones of Hyderabad metro city after construction of metro pillars. Each zone 10 samples from bore wells collected during the year 2012-2017 analyzed various parameters such as PH, EC, DO, Alakalinity, Chloride, TDS, Total Hardness, Calcium, Magnesium, And Sulphate etc.

Before 2012 the same Zones bore well water samples analyzed for the above parameters and after construction of pillars again samples were taken in the same regions and observed lot of changes in the parameters.

Certain parameters were higher than permissible limit recommended by WHO &BIS, in this study we noticed during and construction the bore well water quality has changed

Water is elixir of human life. It is a single source for human existence. Ground water is a major source of fresh water, which fulfills about 97% of fresh water requirements. Last several decades, it has become a confronting environmental issue i.e., Ground water quality is worst. The quality of the water is main concern for human welfare. It is directly related to human as well as environmental life. Under ground water, quality depends upon geological origin and presence of chemical substances as studied by number of workers.

Hyderabad is the hi-tech industrial city, suffering from various pollution problems. Day to day various developmental activities in major sectors like transportation, industrial establishment, urban sector expansion etc, are polluting the surface and ground water. Ground water is highly susceptible, to pollution due to natural as well as anthropogenic activities. There are some other natural events, which leads to ground water pollution are amount of rainfall, climate, depth of water table, soil texture, filtration rate etc.

Major part of Hyderabad city has been damaged by the innovation of transport system that is metro rail project. A part from the benefits we are getting by this metro rail system, many damages in those areas are done to the environment. One of it is, the quality, the color of the ground water has been drastically changed. Lot of pollution reached even to the ground water level. The other is the people of the Hyderabad suffered a lot, due to the traffic, changes in the U-turns and water accumulations because of rains. Another reason, for this water pollution is domestic and industrial waste. In some studies, it was found that, 80% of the pollution is because of domestic waste.

Materials and methods:

The samples selected from bore wells of Hyderabad city were taken in pre cleaned 5-liter plastic can, for assessment of drinking water quality during three seasons i.e., summer, rainy and winter of following years 2012 to 2017. Water quality parameters like pH, electrical conductivity, total dissolved solids. Alkalinity

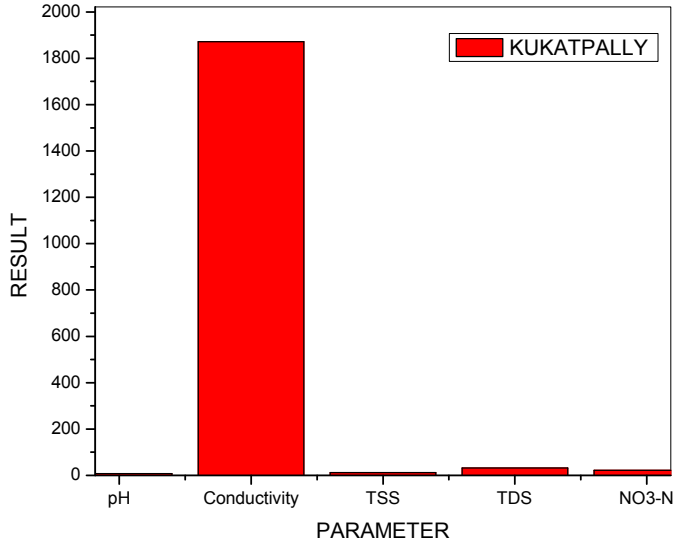
chlorides, hardness, calcium, magnesium, sodium and sulphate were analyzed and estimated by using standard methods APHA 1998.

Study Area:

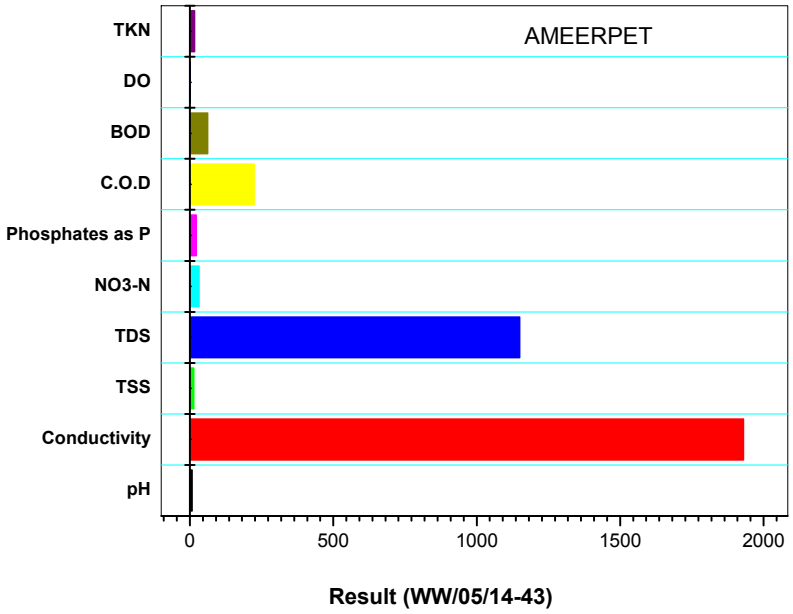
Hyderabad latitude is 17.3850° N, 78.4867° E, longitude of Hyderabad is 78.491684. This study area is selected for water quality analysis, which is nearer to residential areas, where metro rail project is proposed within one-kilometer area. In and around the city, lot of solid waste dump and domestic waste near waster sources contaminate the groundwater. During the constructions, contaminates are seeped in the pillar regions of metro and observed that various bore well water are deteriorated. In this paper, we aimed at study the drinking water quality and nature of pollutants in water, the six representative sampling sites of bore wells were selected in and around metro rail area.

Results and Discussions

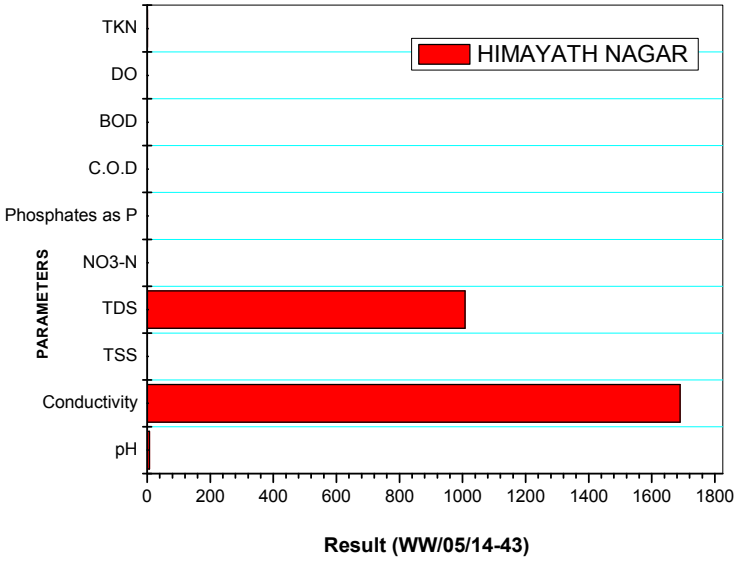
The result of the study given in figures in 1 – 10. The pH value varied from 6.9 to 7.24, 7.49 to 7.89 respectively. pH is very important in regulation of enzyme systems. Sampling listed to show distinct variation of pH in different seasons of the year. The pH was found to be minimum, before starting metro project and after the construction is over found to be maximum in all sites during rainy season. The observed pH value in the sampling sites after construction are not within the limits of WHO i.e., 6.5 to 8.5.



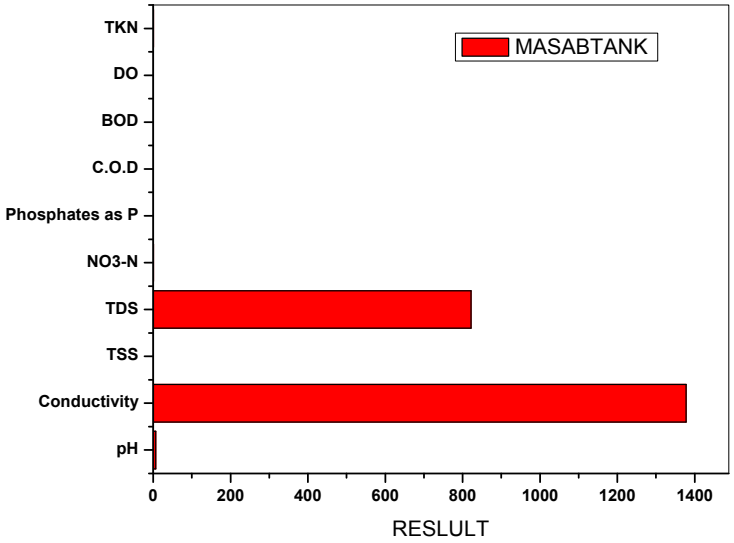
DO is also fluctuated in the ground water sample. The maximum DO is observed in rainy season (4.7 to 5.27 mg /L), which might be due to percolation of rainwater. Rainwater is rich in DO content. Raising temperature causes low solubility of oxygen resulting in decrease of DO content during summer season. EC is an excellent indicator of TDS. Excellent measure of salinity that affects the taste of drinking water WHO 1984. This study is showing EC values were more in summer season and minimum in winter season. The findings were well agreed with various research workers.



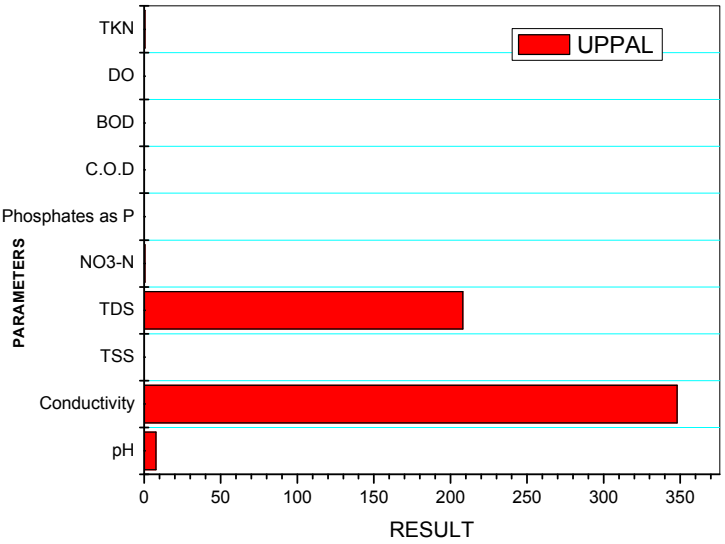
Seasonal variation of TDS in ground waters observed in the study area ,in all the 6 sites has been observed ranging from 556 and 958mg/l According to WHO max limit for Permissible TDS is 500mg/LThe TDS values in all the sites are beyond permissible limits in summer .Water containing High TDS may pose GIT disturbances and constipation effects. The total hardness of the ground water samples varied from 316 to 512mg/l in summer season. Maximum value was recorded during summer seasoning the two areas 957mg/l in the month of May, and minimum value during winter season559 mg/l. According to WHO permissible limit of total hardness in drinking water is 300mg/l.

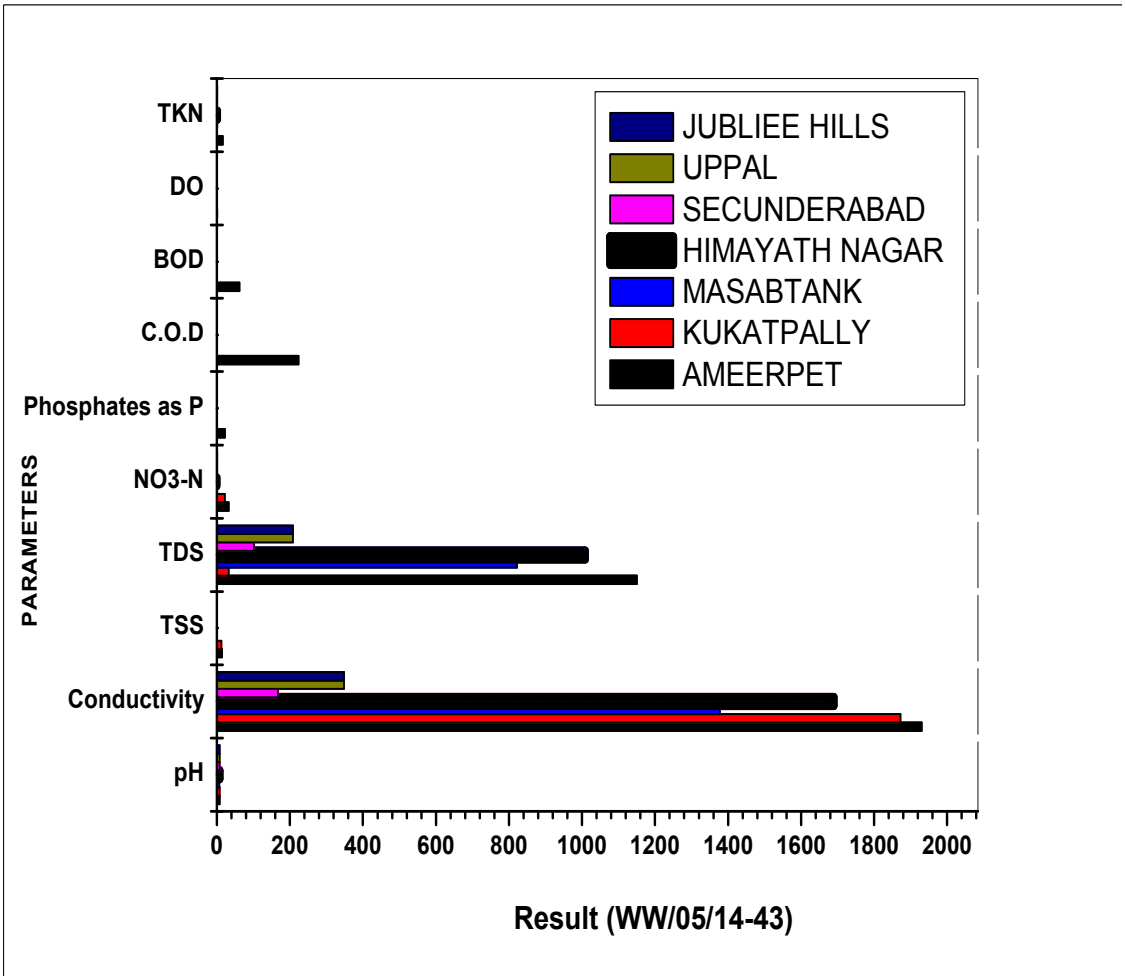


For the observation it is known that higher hardness value in summer season is mainly attributed to rising temperature there by increasing the solubility of calcium and magnesium salts. The total hardness values of all sampling sites are below the permissible limit



The calcium concentration in the present study area ranged from 63.55 to 98.5mg/l in summer season, and 37.55 to 76.66mg/l in winter season. According to WHO and BIS, permissible limit of calcium is 75 mg/l.

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