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Hydrogeochemical Studies in and Around Hayat Nagar, Ranga Reddy District, Telangana State

Dr.J.Vijaya Kumar[1], J.Rajitha[2], P.Yugendhar Reddy[3], Shyam Perka[4]

[1, 2, 3]Department of Geology, Osmania University, Hyderabad
[4]Department of Chemistry, Osmania University, Hyderabad

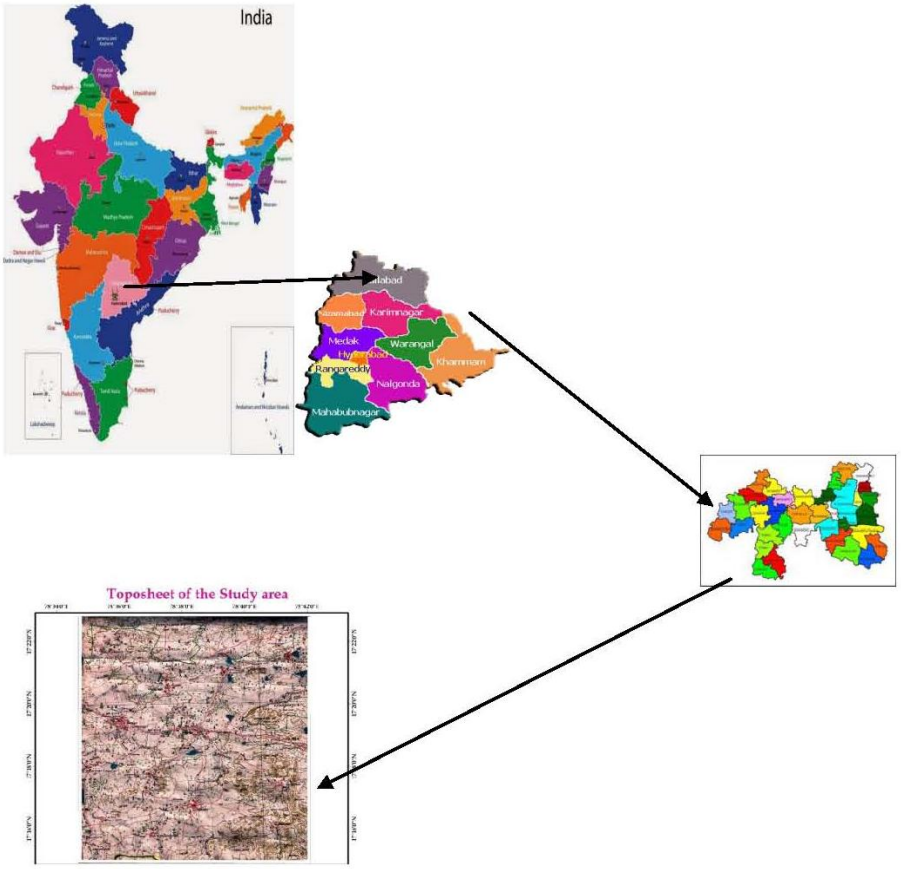
Abstract: *Hayathnager is situated in RangaReddy district, Andhra Pradesh, India. 21 groundwater samples were collected from open and bore wells in the area and analyzed for physicochemical parameters (pH, EC, TDS, TH, Ca^{+2}, Mg^{+2}, Na^{+}, K^{+}, CO^{-2}_3, HCO^{-}_3, SO^{-2}_4, NO_3, Cl^{-}) in the laboratory to measure the concentration of the quality. The results showed that the concentrations are more than permissible limits for drinking purpose in most of the samples. The pollution of ground water quality may be due to discharge of municipal wastages.*

1. INTRODUCTION

Chemical quality of groundwater is as important as the quantity. The study area is expanding at a fast phase and now has the distinction of one of fastest growing urban centers, facing the problem of groundwater depletion and quality reduction.

The contamination of groundwater from municipal and industrial activities has been detected in recent years. The monitoring is required in the area where the contamination of the groundwater is expected. Keeping in view of the importance of groundwater quality, Hydro geochemical studies are carried out in and around Hayathnagar area, Ranga Reddy district, Andhra Pradesh. Hayathnagar is geographically located at Northern latitudes from 17^0 19' 26" and Eastern longitudes from 78^0 36' 15" (Map.1).The average maximum and minimum temperature is being 40^oC and 28^orespectively

2. GEOLOGY OF THE AREA



Map1. *Location map of the study area*

The study area comprises crystalline rocks of Archaean age consisting of essentially granites. They are hard and compact and range in texture from fine to coarse with least intergranular porosity.

The granites are primarily two type's namely pink and gray granites. They owe their color to the presence of characteristic of feldspar mineral. It is rather difficult to demarcate between the two granites.

The gray granites of the area contains quartz, microcline, orthoclase and plagioclase as essential minerals whereas hornblende and biotite as accessory minerals. Pink granites grade porphyritic to medium grained whereas gray granites are of medium grained. The color of the pink granite is mainly due to the presence dominance feldspar.

3. METHODOLOGY

For the quality assessment, 21samples are collected from the study area. The parameters like pH, EC and TDS values are noted with digital meters in the field itself and analysis of major and minor elements have been done in the laboratory as per the standard procedures (APHA, 1980)

The chemical analysis data of water samples are presented in Table No.1

Table1. *Analytical results (ppm) of ground water samples*

S No.	pH	Ec	TDS	TH	Ca	Mg	Na	K	HCO_3	Cl	SO_4
1	7.21	1104	707	220	52	22	136	12	268	117	8
2	7.21	1076	689	230	32	36	151	6	476	96	6
3	7.54	1577	1009	170	20	29	140	12	256	126	12
4	7.31	2302	1473	240	28	41	162	17	342	156	17
5	7.43	968	620	190	28	29	145	11	403	92	11
6	6.83	4325	2768	1650	101	336	154	43	525	813	43
7	7.28	1908	1221	350	96	26	40	12	212	97	12
8	6.83	5196	3325	680	208	38	156	40	391	436	40
9	7.08	1864	1193	310	92	19	42	12	178	59	12
10	7.12	892	571	90	16	12	75	4	226	14	4
11	7.33	1488	952	240	32	29	86	11	315	94	11
12	7.28	1520	973	190	28	36	140	13	354	99	13
13	7.07	2143	1372	180	16	34	198	11	398	131	11
14	7.3	1023	655	150	16	26	144	6	390	28	13
15	7.4	452	283	130	24	17	89	1	281	14	11
16	6.94	609	398	140	32	14	73	7	232	57	6
17	7.53	827	529	190	28	29	99	6	366	75	1
18	7.29	1087	696	220	28	36	154	11	342	128	6
19	7.2	1711	1095	150	24	22	148	7	342	149	11
20	7.05	450	288	130	28	14	68	7	244	18	7
21	7.29	632	404	150	44	10	36	6	159	43	7

4. RESULTS AND DISCUSSION

The pH values are within the permissible limits (ISI, 1983) of drinking water. The conductivity measurement provides an indication of ionic concentrations. The EC of the ground water in the study area are varying between 450 to 3170 µ Siemens/cm at 25^0. The maximum limit of EC in drinking water is prescribed as 1500 µSiemens/cm (WHO, 1983). 9 samples of the study area (3,4,6,7,8,9,12,13,19) are exceed the limit. The TDS values of the area ranges from 283mg/l to 2034 mg/l. Based on TDS, water is into as desirable for drinking(upto 500 mg/l), permissible for drinking (500-1000 mg/l), useful for irrigation (1000-3000 mg/l) and unfit for drinking and irrigation (above 3000 mg/l) as per ICMR(1975) and Wilcox(1955). In the present area of investigation, 4samples are in desirable, 9 sample are in permissible for drinking, 7 are useful for irrigation and one sample fall under unfit for drinking and irrigation category. Hardness is an important criteria for determining the usability of water for domestic, drinking and many industrial supplies. Total hardness of the ground water in the study area is varying between 90 and 1650 mg/l. The limit of the TH for drinking water is specified as 300 mg/l (ISI, 1983). 4 samples of the study area (6, 7, 8, 9) are exceeding the limit. In majority of the samples, the concentrations of cations and anions are exceeding the maximum permissible limit. The limit of Mg concentration for drinking water is specified at 30 mg/l. 7 samples

of the study area (2, 4, 6, 8, 12, 13 and 18) are exceeding the limit. Ca concentration of the ground water is varying between 16 and 20 mg/l. As per ISI (1983), the limit of the Ca for drinking water is specified at 75 mg/l. 4 samples of the study area (6, 7, 8 and 9) are exceeding the limits. The concentration of K in the area is varying from 1 to 13 mg/l. Cl concentration of the ground water is varying from 14 to 813 mg/l. The limit of the Cl concentration for drinking water is specified as 250 mg/l. 2 samples of study area (6, 8) are exceeds the desirable limits.

5. CONCLUSIONS

Hydro geochemical studies are carried out in and around Hayathnagar area of Ranga Reddy district and analyses reveal that the parameters like TDS, EC, Cl, TH, Ca, Mg are less than permissible in the most of the samples. Field survey in study area is showed that wastages giving rise to contaminate water at some places. To mitigate this, the periodical monitoring of water quality is recommended for this area**.**

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