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STUDY ON PHYSIC-CHEMICAL PARAMETERS DETERMINATION OF GROUND WATER IN PENTA SREERAM PURAM AREA, GANTYADA MANDAL, VIZIANAGARAM DISTRICT, ANDHRAPRADESH

Physics

G.V.S. JAYAPAL RAO

Department of Physics, Maharajah's College (Aided & Autonomous), Vizianagaram-535002, Andhra Pradesh (India)

ABSTRACT

The study is an assessment of the ground water quality in Penta sree rampuram area, Gantyada mandalam of Vizianagaram District, Andhra Pradesh. This paper describes an assessment of the ground water quality is carried out in Penta sreeramapuram village by examining the various samples of ground water. Eight ground water samples are taken from boreholes, open wells in different locations and are analyzed for Total hardness, Chloride, Total Dissolved Solids (TDS), Total alkalinity, Total acidity. The results were compared with World Health Organization (WHO) and IS: 10500 standards. The usefulness of these parameters is predicting ground water quality characteristics are discussed. Thus an attempt has been made to find the quality of ground water in Penta Sree Rampuram area suitable for drinking purposes or not.

KEYWORDS:

Ground water, Alkalinity, Acidity, Dissolved solids, Hardness.

INTRODUCTION

Water is a prime need for human survival and industrial development. For many rural and small scale communities, ground water is the only source of drinking water. Assessment of ground water for drinking and irrigation has become a necessary and important task for present and future ground water quality management. Ground water quality depends on the quality of recharged water, atmospheric precipitation, inland surface water and subsurface geochemical processes. Temporal changes in the origin and constitution of the recharged water, hydrologic and human factors may cause periodic changes in ground water quality. Water pollution not only affects water quality but also threats human health, economic development and social prosperity. So, the assessment of water quality is very important factor for knowing the suitability for various purposes .The geology of a particular area has a great influence on quality of water and its environment. The quality of ground water varies due to a change in chemical composition of the underlying sediments and aquifer.

MATERIALS AND METHODS

In the present investigation ground water samples were collected from eight locations in the month of December 2016. Samples were collected in polythene bottles, pre-cleaned by washing with non-ionic detergents, rinsed with water, 1:1 hydrochloric acid and finally with de-ionized water . Before sampling, the bottles were rinsed three times with sample water. Tube wells were operated at least five minutes before collection of the water samples. The water quality parameter estimation was done using standard methods and techniques. Samples were brought to the laboratory for analysis of physic-chemical parameters. Some parameters like alkalinity, acidity and total hardness was estimated titrimetrically. Chloride content was estimated by argentometric method.

RESULTS AND DISCUSSIONS

The results obtained from analysis of different ground water samples are shown in Table-1. The statistical evaluations are given in Table-2.

Table 1: Parameters at different Sampling stations

Parameters	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
Temp^0 C	28.7	29.2	28.8	28.1	28.2	28.6	28.9	29.1
Alkalinity	289	69	85	271	251	96	55	67
Acidity	117	78	27	96	35	49	09	19
Total hardness	450	470	538	270	320	126	54	108
TDS	1170	1260	1240	1080	810	720	560	950
Chloride	69.3	99.7	70.4	86.4	107.1	105.5	121.5	118.7

Table 2: Descriptive statistics of parameters

Parameters	Min	Max	Mean	SD
Alkalinity	55	289	147.9	102.6
Acidity	9	117	53.8	39
Total hardness	54	538	292	183.8
TDS	560	1260	973.8	257.9
Chloride	69.3	121.5	97.3	20.1

In the present investigation most of the water samples are colorless and odorless. However some water samples are slightly colored due to muddiness. The temperature of water samples is varied from 28.1^{0}C to 29.2^{0}C the variation of the water temperature having more effect directly or indirectly on all life processes.

The main sources of natural alkalinity are rocks, which contain carbonate, bicarbonate, hydroxide compounds and phosphates. The value of alkalinity in study area is ranged from 55 to 289 ppm with mean value of 147.9 ±102.6. Alkalinity in itself is not harmful to human being, but in large quantity, alkalinity imparts bitter taste to water and may cause eye irritation in human.

The acidity may result due to presence of carbon dioxide in the atmosphere, an indication of high population and industrialization. The studied ground water samples show the acidity in the range 09-117ppm.

The mean value of total hardness of studied ground water samples is 292 ppm with the standard deviation of ±183.8 ppm which indicates that most water samples are hard.

TDS is an important parameter which imparts a peculiar taste to water and reduce its potability. Desirable limit of TDS is 500mg/l (IS: 10500 standards). The mean value of TDS of studied ground water samples is 973.8 ppm with the standard deviation of ±257.9. All the values obtained are much higher than the limits.

Chloride is an important quality parameter that affects the aesthetic property of water including taste and renders it unsuitable for drinking purpose if present in high concentration. The chloride concentration in study area ranged from 69.3 to 121.5 with mean values of 97.3 ± 20.1 ppm. The values in the present study are on lower side considering WHO maximum limit of 250ppm.

CONCLUSION

The objective of present work was to study the water quality of ground water in Penta Sree Rampuram area of Vizianagaram so as to assess its suitability for domestic purpose. Continuous monitoring of ground water is necessary for the health of human, animals and crops. Water GW7and GW8 are safe for drinking purposes and rest of samples except GW1,2,3 may be used for drinking purposes after boiling or some treatment. GW 1, 2, 3 is not used for drinking but can be used for irrigation.

REFERENCES

1. R Reza and G Singh, World applied Sciences Journal 2010, 9(12):1392-1397.
2. S Ramakrishna and Y Babu Rao, Environmental and water quality studies in AP State –A case study 1991.
3. Indian standard methods of sampling and test (physical and chemical) for water and waste water part I sampling IS3025 (part-I) 1987 (Reaffirmed 1998).
4. APHA. Standard methods for the examination of water and waste water (17th ed.) Washington, DC 1989.
5. A Singh, S Malik and M Bhattacharya, Physico-chemical analysis of ground water in Gandhi nagar area, District Bhopal, Madhya Pradesh. Der Chemica Sinica 2011, 2(6):269-272.

6. R. K Trivedi, PK Goel, Chemical and Biological methods for water pollution studies, Environmental publication, Karad, India 1986.
7. D.B. Botkin and Keller. Water pollution and treatment. John Wiley and Sons. In Environmental Science Earth as a living plane 1995.
8. KR Buridi and RK Gedala. Study on Determination of Physicochemical Parameters of Ground Water in Industrial Area of Pydibheemavaram, Vizianagaram District, Andhra Pradesh, India. Austin J Public Health Epidemiol 1(2), 1008, 2014.