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GROUNDWATER QUALITY STUDY IN INDUSTRIAL AREA OF PANCHKULA CITY, HARYANA, INDIA

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Research Paper

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ABSTRACT

Water is a natural gift of nature to the planet earth. About two third part of the earth is water, but the useable fresh water is very less generally present as groundwater and surface water. The developmental activities mainly industrial, domestic and agricultural practices are deteriorated the groundwater and surface water. In the present study groundwater quality mainly for drinking purpose in Industrial Area of Panchkula city, Haryana, India have been studied. Seven groundwater samples collected from different parts of the study area. Groundwater samples analysed using field water testing kit prepared by Tamilnadu Water Supply and Drainage Board, Chennai for twelve chemical parameters-pH, alkalinity, hardness, chloride, total dissolved solids (TDS), fluoride, iron, nitrite, nitrate, phosphate and residual chlorine. The chemical analysis results of groundwater samples shows that in the study area pH is 7 in all the seven groundwater samples, alkalinity 150 mg/l to 260 mg/l, hardness 30 mg/l to 350 mg/l, chloride 40 mg/l to 350 mg/l, total dissolved solids 384 mg/l to 804 mg/l, fluoride 0.5 mg/l to 1 mg/l, iron 0 mg/l to 0.3 mg/l, nitrite 0.2 mg/l in all the groundwater samples, nitrate 0 mg/l to 20 mg/l, phosphate and residual chlorine are absent in all the seven groundwater samples. The results shows that grundwater is desirable to permissible according to BIS drinking water standards. The study is highly useful for monitoring groundwater quality for drinking purpose in the study area.

Keywords: Groundwater, quality, industrial area, Panchkula, Haryana.

INTRODUCTION

Water is important for living beings for survival and running non-living processes on the planet Earth. Since the formation of the earth and water, the quality was deteriorated by natural processes which are generally restricted to a particular area because of less dynamic movement due to less withdrawal gradient of groundwater. But in the present scenario the anthropogenic activities are affecting the groundwater quality locally as well as regionally due to industrial, domestic and agricultural practices. Workers have done lot of work on groundwater quality study in different types of geological and geomorphological environments Mahadevaswamy et al. (2011), Rameeza et al. (2012), Tamma Rao et. al (2013), Nagaraja Gupta and Sadashivaiah (2014). Karpagam and Ramesh (2015), Inayathulla and Madhusudhan (2016), Sharma et al. (2016).

STUDY AREA

The present study has been carried out in Industrial Area of Panchkula City, Haryana.

OBJECTIVE

Main objective of the study was to study groundwater quality for drinking purpose in the industrial area of Panchkula city.

MATERIALS AND METHODS

Seven groundwater samples collected from different parts of the industrial area of Panchkula city in plastic bottles.

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Groundwater samples analysed using field water testing kit prepared by Tamilnadu Water Supply and Drainage Board, Chennai for twelve chemical parameters-pH, alkalinity, hardness, chloride, total dissolved solids, fluoride, iron, ammonia, nitrite, nitrate, phosphate and residual chlorine (Table 1).

Results of chemical analysis of groundwater samples were compared with BIS drinking water standards (IS 10500:2012) to know the suitability of groundwater for drinking purpose. Chemical analysis data were entered in excel software and prepared bar graphs of chemical analysis of samples.

Table1: Location of Ghaggar River water samples.

Sample Location	Latitude	Longi-tude	pH	Alka-linity	Hard ness	Chlo-ride	TDS	Fluo-ride	Iron	Ammonia	Nitrite	Nitrate	Phosphate	Residual Chlorine
TW-1	30.684379	76.831084	7	150	170	350	804	1	0	0.5	0.2	0	0	0
TW-2	30.685427	76.834441	7	250	30	40	384	1	0	0.5	0.2	20	0	0
TW-3	30.682712	76.835739	7	260	250	50	672	1	0	0.5	0.2	0	0	0
TW-4	30.67917	76.83861	7	240	350	50	768	1	0	0.5	0.2	0	0	0
TW-5	30.669763	76.839662	7	250	330	60	768	0.5	0.3	0.5	0.2	20	0	0
TW-6	30.675187	76.834802	7	250	300	50	732	0.5	0	0.5	0.2	20	0	0
TW-7	30.673918	76.843958	7	250	300	50	732	0.5	0	0.5	0.2	20	0	0

Table 2: Drinking water standards (IS 10500:2012).

S.No.	Constituent	Potable		Non-Potable
		Desirable	Permissible	
1	pH	6.5 to 8.5	--	< 6.5 to > 8.5
2	Total Hardness (mg/l)	<200	200-600	> 600
3	Iron (Fe) (mg/l)	<0.3	--	> 0.3
4	Chlorides (Cl) (mg/l)	<250	250-1000	> 1000
5	Total Dissolved Solids (TDS) (mg/l)	<500	500-2000	> 2000
6	Nitrate (NO3) (mg/l)	< 45	--	> 45
7	Fluoride (F) (mg/l)	< 1.0	1.0-1.5	> 1.5
8	Residual Chlorine (RC) (mg/l)	< 0.2	0.2-1	> 1.0
9	Ammonia (mg/l)	< 0.5	--	> 0.5
10	Alkalinity (mg/l)	< 200	200-600	> 600
11	Nitrite (mg/l)	<1.0 mg/l	-	>1.0 mg/l
12	Phosphate (mg/l)	<1.0 mg/l	-	>1.0 mg/l

i.pH

In the study area in all the seven groundwater samples pH is 7 which falls under desirable limit of drinking water standards. (Fig. 1, Table1,Table 2).

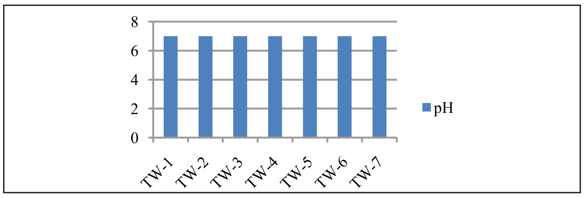

Fig. 3: pH in Ghaggar River water samples.

ii. Alkalinity

In the study area alkalinity in groundwater varies from 150 mg/l to 260 mg/l. In one groundwater sample TW-1 alkalinity is desirable and in six samples (TW-2,TW-3,TW-4,TW-5,TW-6,TW-7) alkalinity is permissible as per drinking water standards. (Fig. 2, Table 1,Table 2).

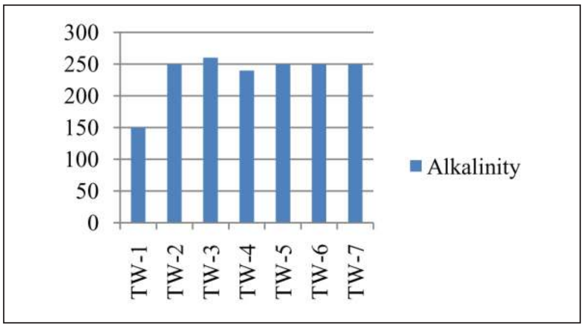

Fig. 2: Alkalinity in groundwater samples.

iii. Hardness

In the study area hardness in groundwater varies from 30 mg/l to 350 mg/l. In two groundwater samples TW-1 and TW-2 hardness is desirable and in five groundwater samples (TW-3,TW-4,TW-5,TW-6,TW-7) hardness is permissible as per drinking water standards. (Fig. 3, Table 1,Table 2).

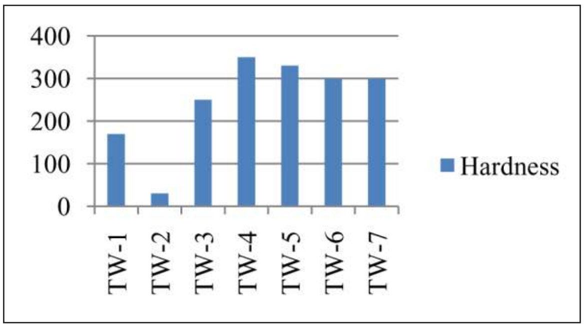

Fig.3: Hardness in groundwater samples.

iv. Chloride

In the study area chloride in groundwater varies from 40 mg/l to 350 mg/l. In six groundwater samples TW-2, TW-3,TW-4,TW-5,TW-6,TW-7 chloride is desirable and in one groundwater sample TW-1 chloride is permissible as per drinking water standards. (Fig. 4, Table1,Table 2).

v.Total Dissolved Solids (TDS)

In the study area total dissolved solids (TDS) in groundwater varies from 384 mg/l to 804 mg/l. In six groundwater samples TW-1, TW-3,TW-4,TW-5,TW-6,TW-7 TDS is permissible and in one groundwater sample TW-2 TDS is desirable as per drinking water standards. (Fig.5, Table1,Table 2).

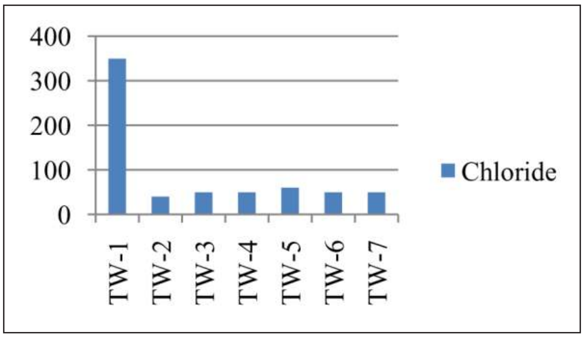

Fig.4: Chloride in groundwater samples.

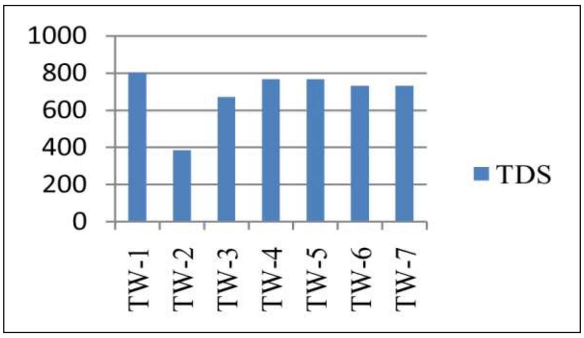

Fig. 5: Total Dissolved Solids (TDS) in groundwater samples.

vi.Fluoride

In the study area fluoride in groundwater varies from

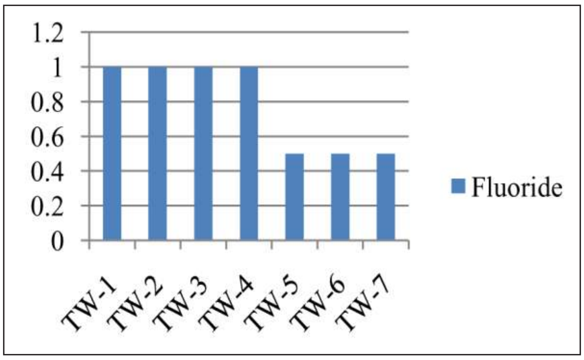

Fig. 6: Fluoride in groundwater samples.

drinking water standards. (Fig. 9, Table1,Table 2).

x.Nitrate

In the study area nitrate in groundwater varies from 0 mg/l to 20 mg/l. In all the seven groundwater samples TW-1, TW-2, TW-3,TW-4,TW-5,TW-6,TW-7 nitrate

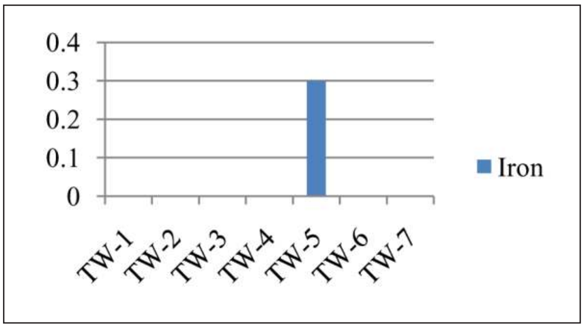

Fig. 7: Iron in groundwater samples.

is desirable as per drinking water standards. (Fig. 10, Table 1,Table 2).

xi.Phosphate

In the study area phosphate is nil in all the seven

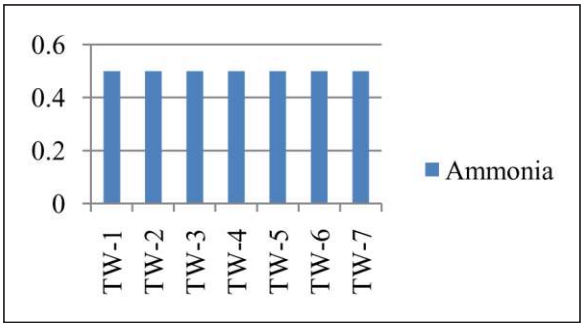

Fig. 8: Ammonia in groundwater samples.

groundwater samples TW-1, TW-2, TW-3,TW-4,TW-5,TW-6,TW-7 which is desirable as per drinking water standards. (Fig. 11, Table1, Table 2).

xii. Residual Chlorine

In the study area residual chlorine is nil in all the seven groundwater samples TW-1, TW-2, TW-3, TW-4, TW-5, TW-6, TW-7 which is desirable as per drinking water standards. (Fig. 12, Table1,Table 2).

CONCLUSIONS

In the study area all the seven groundwater samples have desirable to permissible limit of drinking water standards and groundwater is suitable for drinking purpose. The study can be used for monitoring

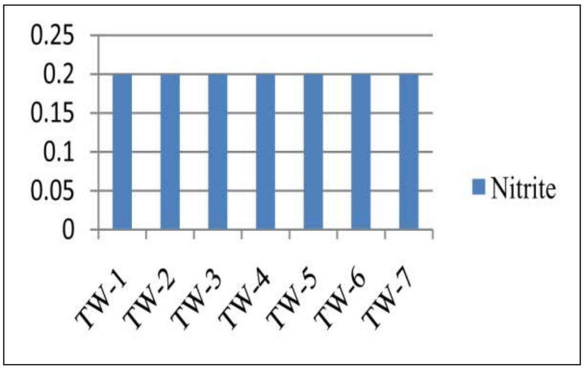

Fig. 9: Nitrite in groundwater samples.

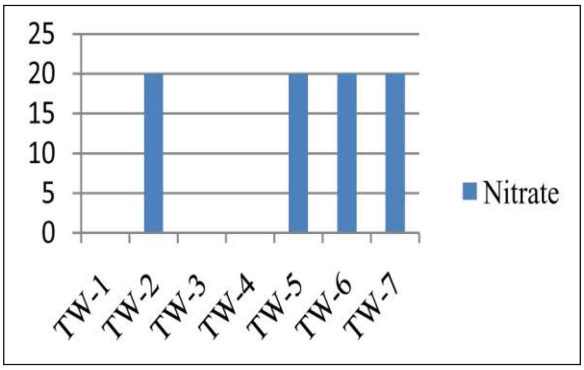

Fig. 10: Nitrate in groundwater samples.

groundwater quality in the study area.

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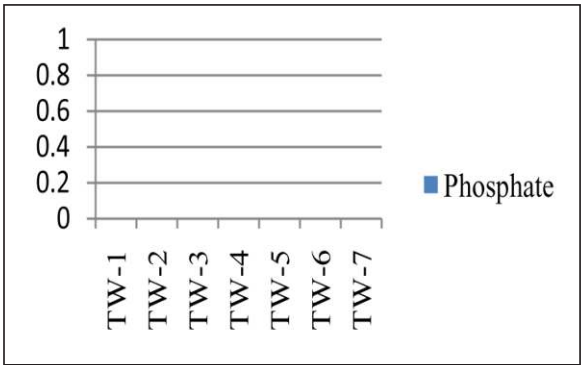

Fig. 10: Nitrate in groundwater samples.

Groundwater quality analysis in and around bidadi industrial area, ramanagar district, Karnataka,

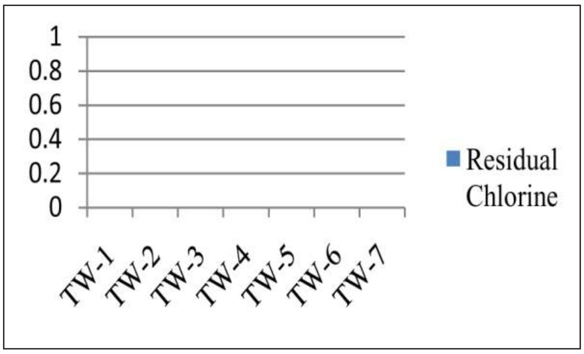

Fig.12: Residual Chlorine in groundwater samples.

CONCLUSIONS

In the study area all the seven groundwater samples have desirable to permissible limit of drinking water standards and groundwater is suitable for drinking purpose. The study can be used for monitoring groundwater quality in the study area.

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EFFICACY OF IMMUNOLOGICAL PROTOCOL TO APPRAISE THE DIAGNOSIS OF AMPHISTOME INFECTION IN LIVESTOCK

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Review Paper

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ABSTRACT

Parasites are a major cause of disease in domestic ruminants. More than half the livestock population live in misery and suffer vast economic losses due to parasites. Among the parasitic diseases, amphistomosis is one of the major parasitic diseases causing heavy economic losses to livestock industry. Livestock production can be increased by the reduction of losses due to disease and development of new immunological approaches. Immunodiagnosis of parasitic diseases requires highly sensitive and specific tests. In many cases the identification of helminth parasites concerns their epidemiology and it is important to distinguish between species and subspecies. Conventional techniques including serology and microscopy do not always meet these requirements. However, microscopy still remain the mainstay of several diagnostic laboratories.Development of diagnostic tools have opened new avenues for a vast improvement in parasitic disease detection. A number of new serology-based assays that are highly specific and sensitive have emerged, such as agar gel precipitation, agglutination, immunodiffusion (ID), counter current immunoelectrophoresis (CCIEP), FAST-ELISA, Dot-ELISA, Sandwich-ELISA, Plate-ELISA, SDS-PAGE, Western blotting, immunoblotting etc. These approaches have revealed potentiality in parasitic disease diagnosis such as amphistome infection with increased specificity and sensitivity. The use of immunodiagnostic approaches in the identification of paramphistome infection in livestock is discussed.

Keywords: Efficacy, Appraise, Immunological protocol, Amphistomosis, Livestock.

INTRODUCTION

Parasitic diseases remain the threat to global healthcare sector, with considerable mortalities and morbidities associated with the disease. Amphistomes are an important *group* of parasites which causes amphistomosis. It is a disease of domestic and wild ruminants caused by digenetic trematodes of the superfamily *Paramphistomoidea* (Lotfy *et al.* 2010), which includes many genera such as *Paramphistomum*, *Calicophoron*, *Cotylophoron*, *Explanatum*, *Gigantocotyle*,*Carmyerius* etc (Hajipour*et al.*, 2020).The effective control and treatment of amphistome parasitic diseases requires rapid, reliable and highly sensitive immune-molecular diagnostic tests, which can also serve to monitor the effectiveness of the therapeutic and prophylactic protocol.

Against some of the antigens, the body is capable of generating other complex protein molecules such as antibodies that neutralize the antigens by binding to them. Techniques that measure these antibodies or antigens provide alternative tools for diagnosis. This method of diagnosis, which uses the immunological binding reaction between antibodies and antigens, is known as immunodiagnosis. Intact immunity is fundamental for survival (Huston, 1997). Certain technological advances in the field of molecular biology were made possible in part by earlier progress in the field of immunology (Smith, 2001). It has facilitated the advances made in the field of molecular biology, the latter in turn has contributed to a better understanding of the basis for antibody diversity. An understanding of the genetic mechanisms responsible for

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