Research Article

Assessment of Ground Water Quality in Shamshabad Block of Agra District

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Abstract In the present investigation ten ground water samples were collected from Shamshabad block of Agra district, Uttar Pradesh to assess their physic – chemical properties. By the observations regarding the quality parameters such as E.C., pH., TDS, Cations, Anions and Heavy metals concentration, we can say that these samples can be considered under the category of very good to medium quality and can be used for drinking purpose as well as for the use in irrigation of the crops.

Introduction

Water is often called the universal solvent because of its ordinary ability to dissolve a broad range of substances. It is considered as one of the most important and basic input required for crop production. Supplementary irrigation is need or essential for about one third of the land surface in India as they falls under arid and semi – arid climate region. The semi arid climatic condition of Agra region needs the application of supplemental water for the purpose of crop production. As it is quite known that the underground tube- well water contains high concentrations of salts and minerals and day by day their amount is increasing by the uncountable use of chemical fertilizer during crop production. By the use of this contaminated or higher concentrated salt water in irrigation there might be adverse effects on crop production as well as deterioration in soil quality. It necessitates continuous monitoring of ground water for assessing the possible damage by salinity and alkalinity induced soil health [1]. Keeping in view these facts the quality appraisal of the underground water of Shamshabad block of Agra district was done.

Materials and Methods

Ten underground water samples were collected for physic-chemical characteristics and trace elements analysis. Each selected source was run for sometime and then the samples were collected in thoroughly cleaned plastic bottles properly labeled and brought to the laboratory for further chemical analysis. These underground water samples were analysed for E.C, pH, cations and anions using the methods described by Richards [2] and trace element analysis was carried out by an atomic absorption spectrophotometer [3].

Results and Discussion

The pH of water samples were ranged from 7.72 – 8.04, the corresponding ranges for TDS were 661 – 871 mgL^{-1}. The calcium concentration in these water samples had a wider range of 78 – 104 mgL^{-1}, followed by Mg 46 - 71 mgL^{-1}. The concentration of NA in water was from 96 to 114 mgL^{-1}. Mahananda *et al*., [4] also reported similar results. The average concentration of soluble salts (EC) ranged from 1089 – 1117 µmhocm^{-1}, K$^+$ from 15 to 21 mgL^{-1}, Cl from 79 – 14 mgL^{-1}, SO$_4$ from 116 - 161 mgL^{-1}, NO$_3$ from 20 - 27 mgL^{-1}, PO$_4$ from 3.36 – 5.46 mgL^{-1}, F$^-$

from $1.14 – 1.51$ mgL^{-1}, COD from $150 - 3108$ mgL^{-1}, SiO$_2$ from $10 - 16$ mgL^{-1}, Cr^{3+} from $0.026 – 0.041$ mgL^{-1}, Pb^{2+} from $0.02 – 0.035$ mgL^{-1}, Ni^{2+} from $0.01 – 0.02$ mgL^{-1}, Fe^{3+} from $0.10 – 0.48$ mgL^{-1}, Zn^{2+} from $0.04 -0.28$ mgL^{-1} and Cu^{+2} from $0.06 – 0.28$ mgL^{-1}. Similar results were also reported by Krishan *et al.*, [5] and Tiwari *et al.*, [6]. Based on the results of the present investigation it can concluded that maximum number of underground water samples of Shamshabad block had all the parameters within the permissible limit as per standard ISI [7].

Table 1: Physic- Chemical parameters and trace elements in Shamshabad block of Agra district

Sample No	pH	EC	TDS	Ca^{2+}	Mg^{2+}	Na$^+$	K$^+$
Shm 1	7.78	1141	748	104	76	101	22
Shm 2	7.83	1325	872	105	77	115	20
Shm 3	7.88	1331	816	99	71	108	21
Shm 4	7.73	1236	782	95	65	97	19
Shm 5	8.05	1576	831	98	63	104	20
Shm 6	7.83	1227	701	94	67	98	21
Shm 7	7.77	1184	691	81	58	97	21
Shm 8	7.73	1090	662	83	54	98	17
Shm 9	7.88	1234	688	81	47	103	16
Shm 10	7.75	1190	708	79	49	85	17

Sample No	Cl$^-$	SO$_4^{-2}$	NO$_3^-$	PO$_4^{-3}$	F$^-$	COD	SIO^{2-}
Shm 1	146	142	26	3.82	1.52	31	16
Shm 2	125	162	26	4.90	1.44	30	17
Shm 3	13	155	27	5.47	1.48	32	15.2
Shm 4	109	149	26	4.76	1.41	29	13.3
Shm 5	112	145	22	4.42	1.49	25	15.8
Shm 6	105	120	22	3.98	1.27	22	13.9
Shm 7	98	130	28	3.59	1.27	19	12.4
Shm 8	94	130	23	3.59	1.25	17	12.6
Shm 9	90	120	24	3.37	1.15	16	11.5
Shm 10	80	117	21	3.58	1.15	16	10.9

Sample No	Cr^{3+}	Pb^{2+}	Ni^{2+}	Fe^{3+}	Zn^{2+}	Cu^{2+}
Shm 1	0.036	0.035	0.02	0.39	0.29	0.28
Shm 2	0.042	0.034	0.019	0.49	0.17	0.25
Shm 3	0.038	0.033	0.018	0.33	0.11	0.24
Shm 4	0.038	0.036	0.015	0.40	0.22	0.17
Shm 5	0.034	0.035	0.018	0.33	0.11	0.17
Shm 6	0.033	0.029	0.015	0.28	0.10	0.15
Shm 7	0.028	0.025	0.012	0.21	0.09	0.13
Shm 8	0.029	0.028	0.012	0.17	0.06	0.09
Shm 9	0.027	0.023	0.02	0.14	0.07	0.08
Shm 10	0.027	0.025	0.02	0.11	0.05	0.08

References

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