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Physico-chemical analysis of ground water in municipal area of shahdol Madhya Pradesh, India

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Abstract
Physico-chemical characteristics of Shahdol were studied. The study was made in the month of April 2018. Seven sampling points were selected for the study. The parameters studied were temperature, pH, chloride, sulphate, total hardness, total alkalinity, turbidity, and TDS.

Keywords: physico-chemical, water quality, TDS, shahdol

1. Introduction
"Water is life". This line gives importance of water. Main source of water is rain. After rainy season, sources of water are surface water and ground water only. Ground water is the most important source of water supply for drinking, irrigation and industrial purposes. The natural quality of ground water tends to be degraded by human activities. Water is polluted in all the surface of earth and Shahdol is no exception to this phenomenon.
Among the various means of pollution of ground water reservoirs, the main causes for the pollution of water are city drainage, domestic waste, industrial waste etc. All metabolic and physiological activities and life processes of aquatic organisms are generally influenced by such polluted water and hence, it is essential to study physico-chemical characteristics of water.

2. Experimental
Water samples were collected in cleaned borosilicate bottles washed with acetone in month of March at selected sampling sites see Fig. 1 (S_1, S_2, S_3, S_4, S_5, S_6, S_7) between 10.00 a.m. to 11.15 a.m. at different depths and brought to the laboratory of Industrial Chemistry for study of characteristics of water. Different procedures were used as reported in the literature (APHA, 1995; Bansal, 1998; Goel, 2002; Krishnan, Kannan, 1991; ISI, 1991; AK *et al*. 2002; WHO, 1984 and Sharma, 2004) [1-8].
Temperature of the water was measured in Equip-tronics digital auto temperature meter. Borosilicate glass wares, distilled water and E-Merck reagents were used throughout the testing. pH values of water samples under investigation were measured using Equip-tronics pH meter, Type No. 611. The pH was standardized by buffer solutions of 4.0 pH and 9.2 pH by E-Merck buffer tablet.
The chloride ions were generally determined by titrating the water samples against a standard solution of $AgNO_3$ using potassium chromate as an indicator. Sulphate was estimated by UV-visible Spectrometer, type-II. Total hardness was determined by complexometric titration with EDTA using eriochrome black-T as an indicator. Total alkalinity of the water was determined by titrating with N/50 H_2SO_4 using phenolphthalein and methyl orange as indicators.
Turbidity was measured by digital turbidity meter, Type No. 611. TDS was estimated by digital TDS meter, Type No. 703.

Fig 1: Different locations of water samples in Shahdol municipal area (M.P.)

3. Results and discussion
The pH of the water indicates the degree of deterioration of water quality. The desirable pH range necessary for drinking water is from 7.0 to 8.5. The pH value of water sample in the study area ranged from 7.4 to 8.1. This shows that pH of water sample was slightly alkaline.
The concentration of chlorine in the sample was found to 312 to 354 mg/L. High chloride contents have poisonous effects on plants, animals and human beings. The concentration of sulphate was found to be 186 to 252 mg/L.

Table 1: Characterization of Sarfa river water

S.No.	Parameters	S_1	S_2	S_3	S_4	S_5	S_6	S_7	Avg.	SD
1.	Temp. (°C)	28	29	27	30	28	27	30	28.4	1.3
2.	pH	7.3	7.4	7.6	8.1	8	7.8	7.6	7.69	0.3
3.	Chloride (mg/L)	352	322	332	328	354	338	312	334	15

4.	Sulphate (mg/L)	220	186	246	252	210	208	212	219	23
5.	Total hardness (mg/L)	288	222	304	246	268	228	316	267	37
6.	Total alkalinity (mg/L)	244	406	366	382	412	254	594	380	117
7.	Turbidity (NTU)	176	134	136	152	144	126	158	147	17
8.	TDS (mg/L)	770	754	862	868	890	802	702	807	69

S_1=Pandav Nagar, S_2 = Purana Busstand, S_3 = Sohagpur, S_4 = Itwari Mohalla, S_5 = Purani Basti, S_6 = Katthi tola, S_7= New Busstand.

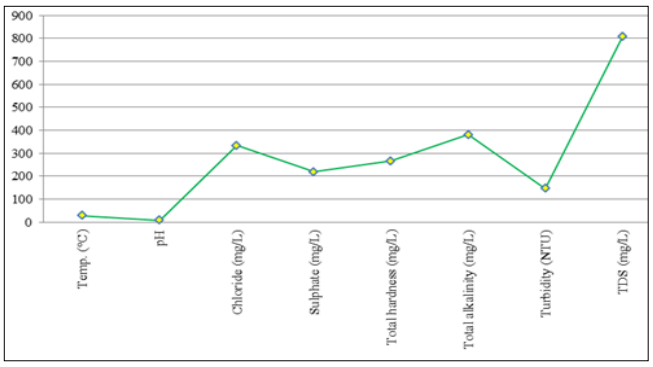

Fig 1: Graphics average analysis of Sarfa river water.

Total hardness was found in the sample water ranges of 222 to 316 mg/L, which shows that water is safe for drinking purpose. The desirable limit for total alkalinity is 200 mg/L. The values of total alkalinity of water samples varied from 244 to 594 mg/L.

Turbidity is one of the common forms of pollution. This prevents growth of the aquatic plants by reducing rate of their photosynthesis. This becomes obstacle for self purification of water. Turbidity in sample water was found between 126 to 176 NTU. The value of TDS was found in the water samples between 702 to 890 mg/L.

4. Acknowledgement

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5. References

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