



Study of Physico-Chemical Parameters of Ground Water Quality in Bilaspur District of Chhattisgarh state

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Abstract :-

The quality, quantity and availability of drinking water are one of the most important Environmental, social and political issues at a global level. Monitoring of drinking water quality and decision making is a challenge. ground water nature of Bilaspur region with regard to twelve physico-synthetic boundaries was analysed for consistently to survey its reasonableness for drinking purposes. Water samples were collected from three wellspring of drinking water (Hand pump water, Bore well water, Tap water). Twelve physico compound boundaries were dissected thinking about every one of the different seasons (Summer, Rainy, Winter) were conducted. A systematic study has been carried out between different analysed parameters and noticed qualities were contrasted and standard qualities suggested by Word Health Organisation (WHO). It was found that accessible water particularly tap water is not appropriate for general wellbeing.

Keywords:- Ground water, physicochemical, bore well, water quality.

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INTRODUCTION

Water is one of the most important forms of matter. it is essential for the survival of all living beings and plays an important role in our life¹. Nature of surface and ground water is deficient in any event, for costummering living and is getting disintegrated due to imprudent usage of water assets, dehumanizing way of association, industrialisation and other created exercises. Today numerous waterways get million litters of modern effluents². Ground water forms a major source of drinking water. Ground water is ultimate, most suitable fresh water resource with nearly balanced concentration of the of the salts for human consumption. high content of sodium in combination with cholorida and nitrate in water raises the blood pressure and often damage the Kidney of the body³. The modern civilization,

industrialization, urbanisation and increase in population have lead to fast degradation of our ground water quality. As the water is the most important component of Eco- system any imbalance created either in term of amount, which is presence of impurities added to it can hard the whole Eco-system⁴⁻⁶. The rapid growth of urban areas has further affected ground water quality due to over exploitation of resources and improper waste disposal practices. Hence, there is always need for end concern over the protection and management of ground water quality⁷. The study was conducted to know the physico-chemical properties of ground water and in different seasons and its impact on human life.

EXPERIMENTAL

In order to assess the quality of drinking water available or supplied and consumed by urban as



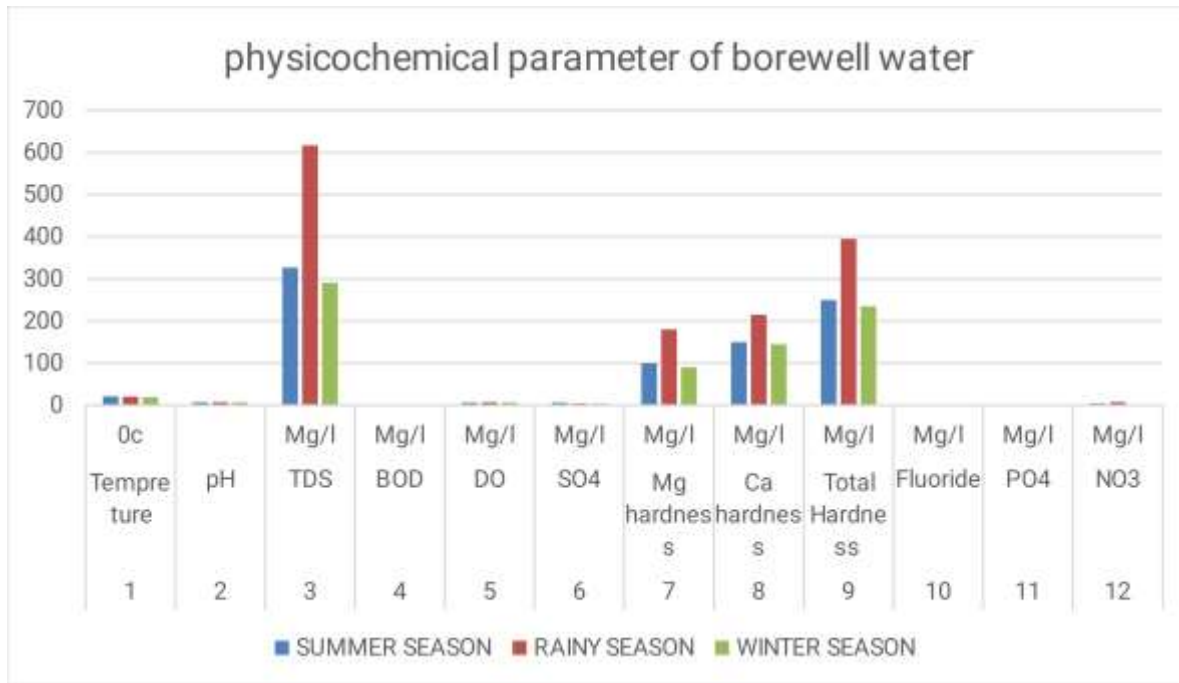
well as rural people resides within bilaspur district of Chhattisgarh state of India, an exhaustive survey for consideration of source of drinking water in practices and three categories of drinking water on the basis of their sources were taken in to consideration viz. Hand pump water (HW), Stored tank water/Tap water (TW) and Bore well water(BW). The samples of drinking water of each source from different sampling sites of all study area were collected periodically in all three seasons (summer, rainy and winter) during present course of investigation. Physico-chemical analysis of sample water was conducted in laboratory except two

parameters i.e. temperature and PH, which were examined at collection spots using mercury filled glass thermometer and digital PH meter respectively⁸. The collected water samples were analysed for various physicochemical parameters. The procedure for analysis was followed as per standard methods of analysis of water ⁹⁻¹⁰. All the chemicals and reagents used for the study were of analytical grade and instruments were of limits of precise accuracy. The range value of each parameters consider and compare with standard value as recommended by WHO.

Physicochemical Characteristics of Water Sample (Bore Well)

SN	PARAMETER	UNIT	SUMMER SEASON	RAINY SEASON	WINTER SEASON
1	Temperature	oC	21.2	20.5	19.3
2	pH		7.11	7.25	7.01
3	TDS	Mg/l	327	617	291
4	BOD	Mg/l	1.06	2.1	1.08
5	DO	Mg/l	6.3	7.1	6.5
6	SO4	Mg/l	6.21	4.3	4.11
7	Mg hardness	Mg/l	100	180	90
8	Ca hardness	Mg/l	150	215	145
9	Total Hardness	Mg/l	250	395	235
10	Fluoride	Mg/l	0.6	1.52	0.4
11	PO4	Mg/l	0.02	0.08	0.05
12	NO3	Mg/l	0.63	0.65	0.54

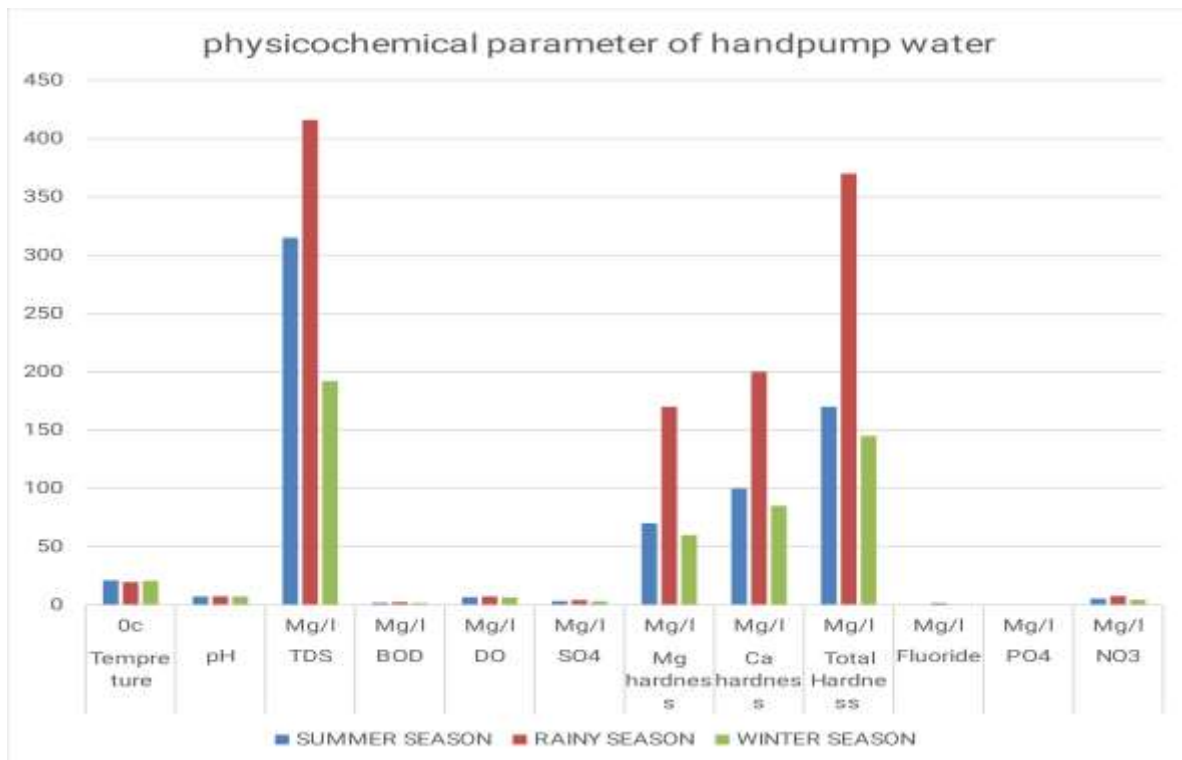




Physicochemical characteristics of water sample (Hand Pump)

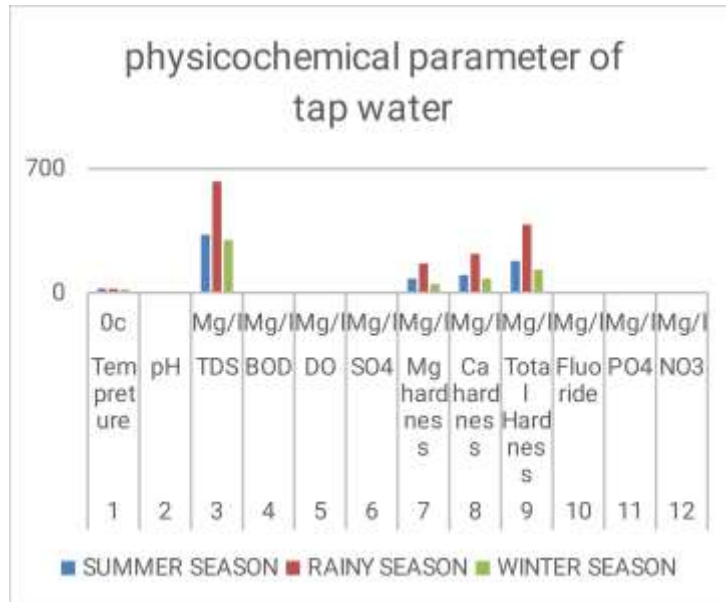
SN	PARAMETER	UNIT	SUMMER SEASON	RAINY SEASON	WINTER SEASON
1	Tempreture	oC	21.1	19.7	20.7
2	pH		7.32	7.41	7.21
3	TDS	Mg/l	315	416	192
4	BOD	Mg/l	1.89	2.42	1.74
5	DO	Mg/l	6.7	7.3	6.5
6	SO4	Mg/l	3.34	4.2	3.27
7	Mg hardness	Mg/l	70	170	60
8	Ca hardness	Mg/l	100	200	85
9	Total Hardness	Mg/l	170	370	145
10	Fluoride	Mg/l	0.52	1.6	0.6
11	PO4	Mg/l	0.04	0.07	0.05
12	NO3	Mg/l	0.62	0.82	0.56

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Physicochemical characteristics of water sample (Tap Water)

SN	PARAMETER	UNIT	SUMMER SEASON	RAINY SEASON	WINTER SEASON
1	Temperature	0c	23.12	22.02	18.02
2	pH		7.61	7.82	7.63
3	TDS	Mg/l	328	628	298
4	BOD	Mg/l	4.34	4.85	3.76
5	DO	Mg/l	6.21	7.42	6.34
6	SO4	Mg/l	4.43	4.47	3.98
7	Mg hardness	Mg/l	80	165	50
8	Ca hardness	Mg/l	100	220	80
9	Total Hardness	Mg/l	180	385	130
10	Fluoride	Mg/l	1.86	2.06	1.89
11	PO4	Mg/l	0.03	0.05	0.06
12	NO3	Mg/l	0.68	0.87	0.78



source of drinking water

PHYSICOCHEMICAL PARAMETER	UNIT	H.W	B.W.	T.W.	WHO STANDARD
TEM	0*C	19.70-21.10	19.3-21.20	18.02-23.12	15-21
PH		7.21-7.41	7.01-7.25	7.61-7.63	6.5-8.5
TDS	MG/L	192-416	291-617	298-628	1000
BOD	MG/L	1.74-2.42	1.06-2.10	3.76-4.85	2
DO	MG/L	6.5-7.3	6.3-7.1	6.21-7.42	4
SO4	MG/L	3.27-4.20	4.11-6.21	3.98-4.47	2.05
Mg	MG/L	60-170	90-180	50-165	150
CA	MG/L	85-200	145-215	80-165	200
TOTAL HARDNESS	MG/L	145-370	235-395	130-385	500
FLORIDE	MG/L	0.52-1.60	0.40-1.52	1.86-2.06	1.5
PO4	MG/L	0.04-0.07	0.02-0.08	0.03-0.06	NA
NO3	MG/L	0.62-0.82	0.54-0.65	0.68-0.87	10

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Result and Discussion

The examined physico-chemical parameters showed considerable variations in different samples. The temperature was found maximum during summer season and minimum winter season that ranges from 18.2 - 23.12oC. Tatal alkalinity was observed minimum in borewell water while maximum in tap water. Dissolved oxygen is a very important parameter of water quality and an index of physical and biological process going on in water. In the present study, DO was found from 6.21 - 7.42mg/l that is more than standard value. High DO level in community water supply is good because it drinking water taste better, however high DO level speed up corrosion in water pipe. The BOD of the samples was found ranges from 1.06 - 4.85 mg/l. The maximum value of BOD was observed in tap water while minimum in borewell water. Hardness is an important parameter in decreasing the toxic effect of poisonous element. The hardness was found to be in the range of 130 - 395mg/l. The variation in the value of Nitrate, Phosphate and sulphate was also observed, which are lesser than standard value as recommended by WHO similiary TDS were also found to be in the range of 192 - 628mg/l. Which is lesser than standard value. Fluoride in tap water higher than standard value (WHO).

Conclusion

The observed value of physico-chemical parameters show generally under the range of standard/recommedoned value. accept four

parameters that are DO, BOD, Mg, Floride. The value of these parameters in the most of the samples have found more than permissible limit. Through the present study we have confer the physico-chemical properties of drinking water used by the public of Bilaspur district and finding reveal the fact that the drinking water of this area , especially tap water is not suitable for human society. This study is alarming the management system of drinking water supply in this district. Although, The present investigation is essentially a primary work and needs to be further investigated to arrive at specified conclusion with respect to clinical implications.

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