

## PHYSICO-CHEMICAL PARAMETERS APPLY TO ANALYSIS OF DRINKING WATER FROM SOME SELECTED AREA OF BETUL DISTRICT, MADHYA PRADESH

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### ABSTRACT

Generally we have survey of Drinking Water some area in Betul, M.P. and where are having the population approximately 1,50,000 and the chief sources for water supply are the Handpumps, Borewells, Wells, Ponds, Dam and River etc. Such parameters applied for monitoring of Drinking Water qualities for practical and studies proposes. We are using some analytical parameter such as Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Alkalinity, Hardness, Chlorides and Fluoride quantities in domestic Drinking Water.

### INTRODUCTION

The Water is one of the most important and abundant compounds essential for all living organisms on the earth need water for their survival and growth (Patil. P.N, *et al*, 2012). Groundwater is the most important source of water supply for drinking, irrigation and industrial purposes. Increasing population and its necessities have led to the deterioration of surface and sub-surface water (Dhiviyaa Pranavam, 2011). The increasing human populations are use of water for municipal, industrial and irrigation needs, and man-made activity (Basavaraja, *et al* 2011) and discharge heavy and varied influences substances in natural water resources such as river, lake, sea etc. The natural resources are causing to polluting of water quality, and other unhygienic substance are slowly releasing from soil by rain fall on earth, move toward containing in water resources. In which are some geochemical deposits into water sources by slow natural degradation of fluorine contained in rocks (Dutta RK, *et al*, 2006; Paul E.D. *et al*, 2011).

The monitoring and assessment of water quality on continual basis has become essential on part

of the associated. Water quality can be defined on the basis of two criteria such as abiotic and biotic, consequently the water quality standards are also formulated based on this classification of water quality through estimation of various parameters under each criterion likewise compounds of calcium, chloride and fluorides etc. Such parameters applied for monitoring of drinking water qualities from twenty area of Betul, MP, for practical and studies proposes. We are using some analytical parameter such as Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Alkalinity, Hardness, Chlorides and Fluoride quantities in domestic Drinking Water.

### MATERIALS AND METHODS

We have first randomly selected twenty area of Betul District of Madhya Pradesh show in table1, collected Drinking Water samples in Sterilized Bottles from various Water resources like as Handpumps, Borewells, Wells, Ponds, Dam and River etc. We have applied some physico-chemical parameter for analysis of drinking water qualities. Temperature, Colour, Odour, pH,

Electrical Conductivity (EC), Total Dissolved Solids (TDS), Alkalinity, Hardness, Chlorides and Fluoride etc. first to know the Temperature of each samples at RT by thermometer in °C, The pH by calibrated pH meter at RT, EC Measured by conductivity instrument in  $\mu\text{S}/\text{cm}$ , TDS know by Disk filtration in mg/l (Gupta, *et al*, 2009) Titration Method used for Total alkalinity, Total hardness and The Ca concentration of Drinking Water know in mg/l (Manjare, *et al*, 2010; Saravanakumar, K. *et al*, 2011) and For chloride test, 0.0141N  $\text{AgNO}_3$  with  $\text{K}_2\text{Cr}_2\text{O}_7$  indicator is used and standard soap solution is used for hardness test. Standard 0.02N  $\text{H}_2\text{SO}_4$  with methyl orange indicator is used for alkalinity measured in mg/l (Sajal Kumar *et al*, 2012) and also SPADNS Method: Determination by SPADNS and zirconium-dye-lake reaction. Fluoride reacts with the dye-lake and samples were became change lightly colorless and take absorbance using a UV-Vis spectrophotometer for determining the fluoride measurement in mg/l of Drinking Water samples result show in table 1.

## RESULTS AND DISCUSSIONS

We have gated the results by some methods such with few modified, applied for analysis of Drinking Water of all resources of water have properties edible for living organisms

The pH values are normal Drinking Water ranges 6.5-8.5 on pH meter scale, if the pH value high or low from standard parameter that due to effect on mucous membrane, better taste corrosion affected aquatic life (Premlata, 2009). We have gain pH value of water from selected area its comparative show in (Figure 1), The maximum pH value 7.7 Selgaon and minimum 6.8 of Boregaon and Mahatgaon in session of summer, The most of bio-chemical and chemical reactions sharply due to change the pH value of Drinking Water. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with The factors like temperature bring about changes the pH of water ( Kamble, S. M. *et al*. 2009; Trivedi, R.N. *et al*, 2009; Patil. P.N, *et al*. 2012)

Commonly Drinking Water has EC range 500-800 $\mu\text{S}/\text{cm}$  at 25°C. The EC is used to measure

the concentration of dissolved solids substances in water (Navneet, *et al*, 2010). We have our research gain results of EC Highest 1292 $\mu\text{S}/\text{cm}$  of VVM and another 795 $\mu\text{S}/\text{cm}$  of Karbala Ghat and lowest 120 $\mu\text{S}/\text{cm}$  Hardu and another 239 $\mu\text{S}/\text{cm}$  Sapna Dam show in (Figure 2).

Total Alkalinity ranges 200-600mg/l. we gain research results of the Alkalinity values determined first maximum value 480mg/l of Sapna Dam and second maximum value 420mg/l of Karbala Ghat and first minimum value 110mg/l Selgaon and another second minimum value 120mg/l of two area Lakhapur and Churani, show in (Figure 6), semisolid line. The Alkalinity was value in summer due to increase in bicarbonates in the water.

Total hardness range 300-600mg/l. The maximum values 600mg/l of two areas VVM and Hardu and minimum value 100mg/l of Churani, show in (Figure 6), solid line. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water. (Hujare, M. S. 2008). The recommended limit of Ca are 75-200mg/l. our research experiments results are thus type's concentration of Ca maximum 200mg/l of Sapna Dam and minimum 36mg/l of Harnya and also look the Ca ion concentration show in (Figure 6), dots line.

The Recommended ranges of TDS are 500-2000mg/l. The TDS scale uses 2 $\mu\text{S}/\text{cm}$  = 1ppm = 1mg/l TDS. According to our research results maximum value 775.2mg/l of VVM and minimum value 143.4mg/l Sapna Dam, show in (Figure 3).

The values of chlorides in normal drinking water are range 250-1000mg/l. we have gain quantities of chlorides such results The maximum value 335mg/l of VVM and minimum value 23mg/l of Sapna Dam in summer, show in (Figure 4). The maximum value of chloride reaches in summer (Swarnalatha, *et al* 1998).

Recommended fluoride concentration in drinking water edible limit 1-1.5mg/l. we have gain experimental results as thus type the maximum 0.81mg/l of Mahatgaon and minimum value 0.032mf/l of Footatalab, details show in (Figure 5). Fluoride is typically added to drinking water to reduce tooth decay when the quantities approximate 2-4mg/l. (Dutta RK, *et al*, 2006; Rong Lin, *et al*, 2009).

Table 1: Physico-Chemical Parameters Analysis of Drinking Water Samples and Their Observed Results

S.No.	Area of Betul	Resources	Temp.°C	pH	TDS (mg/l)	Conductivity at 25°C (µS/cm)	Total Alkalinity (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Cl (mg/l)	F (mg/l)
			25	6.5-8.5	500-2000	500-800	200-600	300-600	75-200	250-1000	1.0-1.5
1	Barsali	Handpump	32	6.9	336	560	160	260	56	110	0.42
2	Bhadus	River	32	7	336	560	190	260	48	110	0.67
3	Boregaon	Handpump	32	6.8	306	570	160	280	64	40	0.38
4	Churani	Handpump	30	7.4	182	304	120	100	56	35	0.62
5	Daudwada	Handpump	32	6.9	294	440	160	290	56	90	0.45
6	Diyamahu	Handpump	30	7.6	242	404	140	190	48	55	0.24
7	Footatalab	Pond	27	7.5	196.8	328	200	210	180	60	0.032
8	Gohachi	Pond	32	7.5	414	690	160	290	72	60	0.71
9	Hardu	Handpump	30	7.6	723	120	220	600	44	190	0.29
10	Harnya	Handpump	30	7.4	313	522	210	220	36	40	0.65
11	Hasalpur	Handpump	32	7.5	396	660	210	290	56	120	0.42
12	Karbala ghat	Handpump	26	7.4	477	795	420	390	180	110	0.09
13	Kumhariya	Tubewell	32	7.6	396	660	170	290	68	90	0.56
14	Lakhapur	Handpump	32	7.5	276	460	120	280	64	40	0.73
15	Machna	River	25	7.6	146.4	244	220	500	140	110	0.07
16	Mahatgaon	Well	32	6.8	294	490	210	260	64	120	0.81
17	Sapna dem	Dam	25	7.5	143.4	239	480	234	200	23	0.06
18	Selgaon	Pond	32	7.7	294	490	110	280	68	60	0.48
19	Tirmahu	Handpump	30	7.4	296	494	100	190	120	65	0.36
20	V.V.M.	Tubewell	26	7.5	775.2	1292	200	600	190	335	0.076

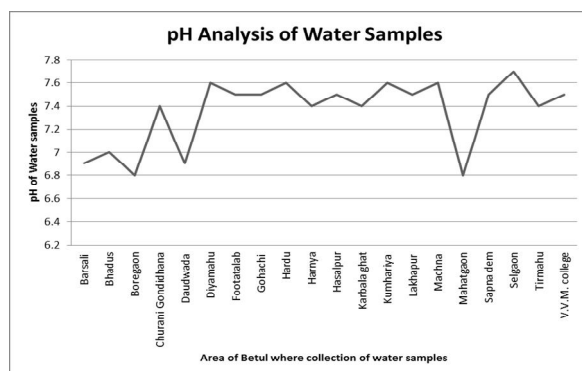


Fig. 1: pH (6.5-8.0) Analysis of Drinking water samples

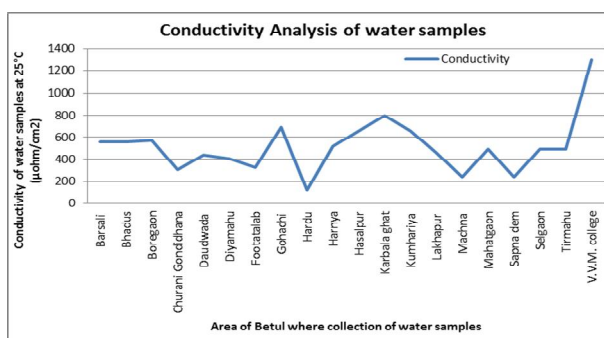


Fig. 2: Conductivity(500-800µS/cm) Analysis of Drinking water samples (25°C)

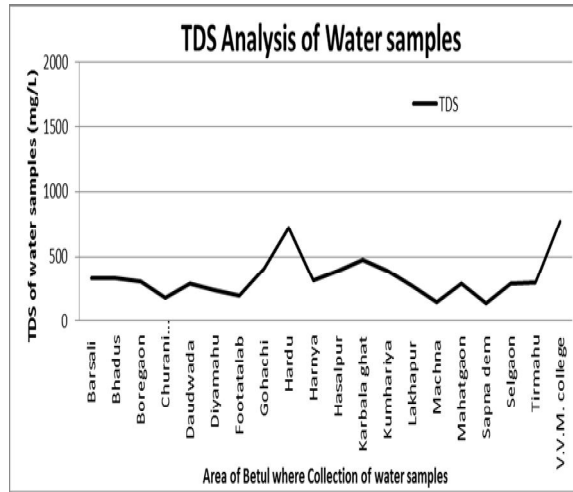


Fig. 3: TDS (500-2000 mg/L) Analysis of Drinking water samples

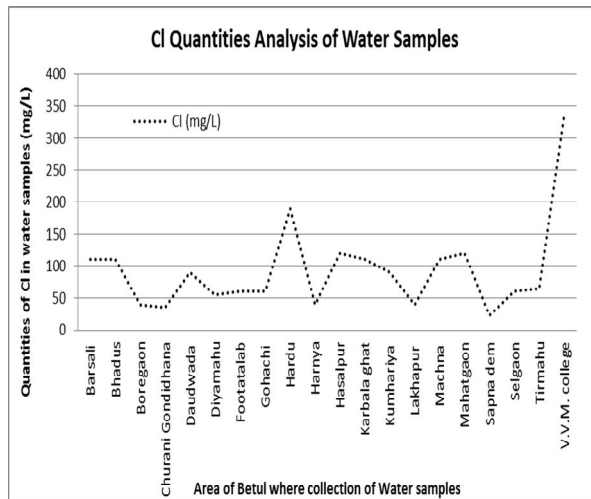


Fig. 4: Chlorides (250-1000mg/L) Analysis of Drinking water samples

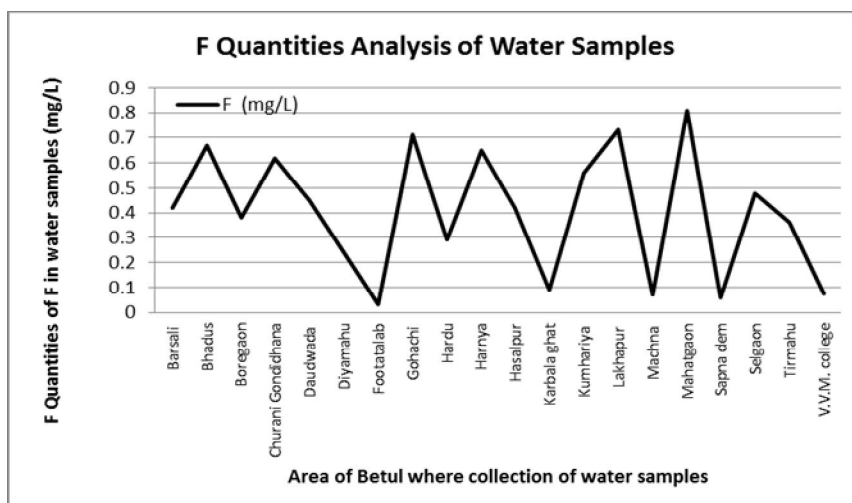


Fig. 5: Fluorides (1.0-1.5 mg/L) Analysis of Drinking water samples

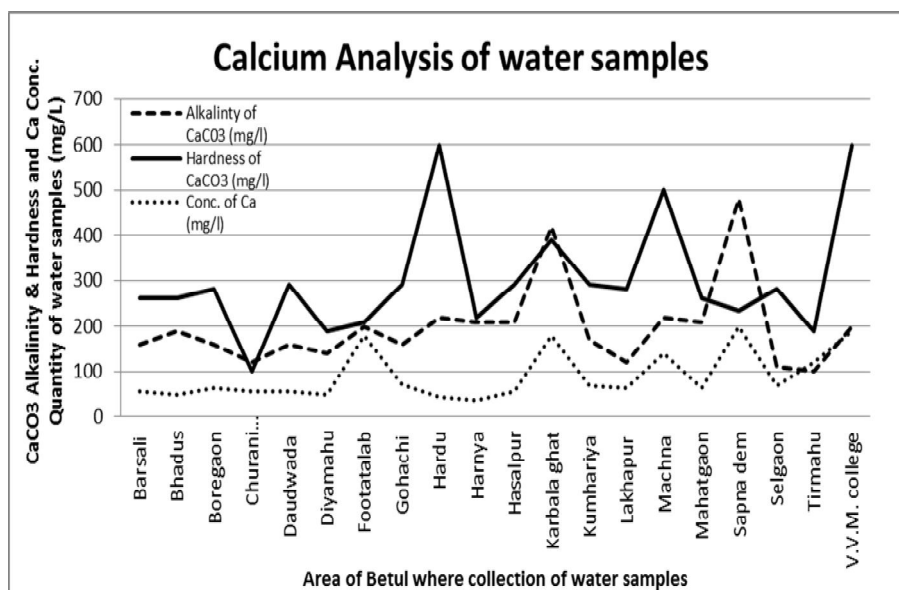


Fig. 6: Calcium Carbonate Alkalinity (200-600 mg/L), Hardness (300-600 mg/L) and Calcium conc.(75-200 mg/L) Analysis of Drinking water samples

## CONCLUSIONS

According to our obtained result focus to overall development, industrialization and urbanization are felt on the water resources the quantity of falling short and quality deterioration with time. This has resulted few untreated wastes are discharged in water that impact can be easily observed by water minerals properties changed.

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