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PHYSICO-CHEMICAL ANALYSIS OF WATER TAKEN RANDOMLY FROM AKOLA REGION

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ABSTRACT

The present study has determined water quality assessment of some area in Akola region on the basis of physico-chemical analysis such as pH, Electrical Conductivity (EC), Turbidity (Turb),Total Dissolved Solids (TDS), Total Hardness (TH), Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Chloride (Cl^{-}), Sulphate $(SO_4)^{2-}$,Total Alkalinity (TA) etc., using a chemical method. This study attempted to bring in awareness to the public on the important subject of water analysis.

KEYWORDS: Physico-chemical analysis, pH, Total Dissolved Solid.

INTRODUCTION

The quality of the earth's water is vital to our existence. We need ample clean water to quench our thirst, irrigate our fields, and sustain all life forms in the environment. We must have clean water in our homes, communities, businesses, industries, and in nature. We need clean water today and we will need it tomorrow.[1]

The quality of water is not same in every region.[2] It is different because chemical constituent and the concentration of constituent in various region is different.[3] Decrease in water quality indicates that the polluted water is not potable for human being.[4] Increase in urbanization, industrialization, agriculture activity and various human activities has increase the pollution of surface water and ground water.

As the safe and potable drinking water is needed various treatment methods are adopted to raise the quality of drinking water. Water should be free from the various contaminants viz., organic and inorganic pollutants, pesticides etc. as well as its parameters like pH, Electrical

Conductivity, Total Dissolved Solid, Total Hardness, Calcium, Magnesium Hardness, Chlorides, Carbonates, Bicarbonates.[5] Therefore it is necessary to timely study the physical and chemical properties of water in the locality. In some area water is contaminated with total dissolve (TDS) and chloride which is harmful to the health.

MATERIAL AND METHOD

Water sample were collected from 20 different areas of Akola city. All these samples were collected in clean plastic bottles. The water samples were immediately brought into laboratory for the estimation of various physico-chemical parameters. pH were measured by using pH meter, TDS values were measured by using TDS meter. While other parameters such as Total Hardness (TH), Calcium, Magnesium were measured by EDTA titration method. Chlorides were determined by volumetrically by silver nitrate titrimetric methods using potassium chromate as indicator. Alkalinity was determined by using standard laboratory method. Sulphates are determined by qualitative analysis method.

RESULT AND DISCUSSION

The results of physical and chemical parameters are given in table. All samples were colourless and odourless. The pH values of water samples recorded in the range 6.3 - 7.8. The values of alkalinity as $CaCO_3$ for methyl orange was from 185mg/L - 455mg/L. In many regions the percentage of hardness was varied. The values of hardness of water samples are found from 229mg/L to 570mg/L. The calcium concentration in the water samples ranges from 120.mg/L to 382mg/L. The Magnesium concentration in the water samples ranges from 68mg/L to 288mg/L. The TDS concentration are between 215mg/L - 2990mg/L. The Chloride Concentration in the water sample ranges from 31mg/L to 176mg/L

Table 1: Drinking Water Quality Standards.[6]

Parameters	Method	Requirement	Permissible Limit
pH	pH meter	6.5 - 8.5	No relaxation
TDS (Mg/L)	TDS meter	500	2000
Alkalinity(Mg/L)	Titrimetric	200	600
Total Hardness(Mg/L)	Titrimetric	200	600
Total Calcium(Mg/L)	Titrimetric	75	200
Total Magnesium(Mg/L)	Titrimetric	30	-
Total Chloride(Mg/L)	Titrimetric	250	1000
Total Sulphates	-	-	-

Table -2 Observations of Various Parameter of Different Areas.

Sr.N	Location	pH	EC(µS/cm)	TDS (Mg/L)	TA (Mg/L)	TH (Mg/L)	Ca (Mg/L)	Mg (Mg/L)	Cl (Mg/L)	Sulphates
1	Guljarpura	7.2	615	641	235	376	216	160	86	Absent
2	Taj nagar	7.3	424	365	327	254	186	68	168	Present
3	Lakshminagar	7.3	339	230	420	322	202	120	172	Present
4	Chabnammanagar	6.8	481	615	320	530	382	148	78	Present
5	Habibnagar	7.2	349	225	398	342	192	152	75	Absent
6	Sai nagar	7.3	372	507	418	450	168	282	76.4	Present
7	Dnyeneshwarnagar	6.8	525	589	390	535	258	277	80	Present
8	Phadkenagar	6.9	436	269	420	344	148	196	75	Present
9	Renuka nagar	7.2	351	220	388	304	120	184	82	Absent
10	Ashray nagar	6.8	780	1430	433	548	326	222	176	Present
11	Godbole plot	7.8	583	896	364	396	220	176	65	Present
12	Bharti plot	6.9	487	1000	385	470	260	210	115	Present
13	Chintamainagar	7.2	309	215	185	229	158	71	56	Present
14	Gajanannagar	7.1	375	229	419	304	161	143	76	Absent
15	Wankhade nagar	6.3	896	2990	460	520	347	173	135	Present
16	Amankha plot	7.4	322	230	420	321	142	179	78	Absent
17	Jawaharnagar	7.4	436	380	450	415	225	190	76	Present
18	Alsi plot	7.4	521	420	415	460	280	180	96	Present
19	Gaurakshan road	7.3	309	230	455	570	348	222	85	Present
20	Ratanlal plot	7.2	301	273	377	383	191	192	31	Absent

GRAPHICAL REPRESENTATION OF VARIOUS TESTS

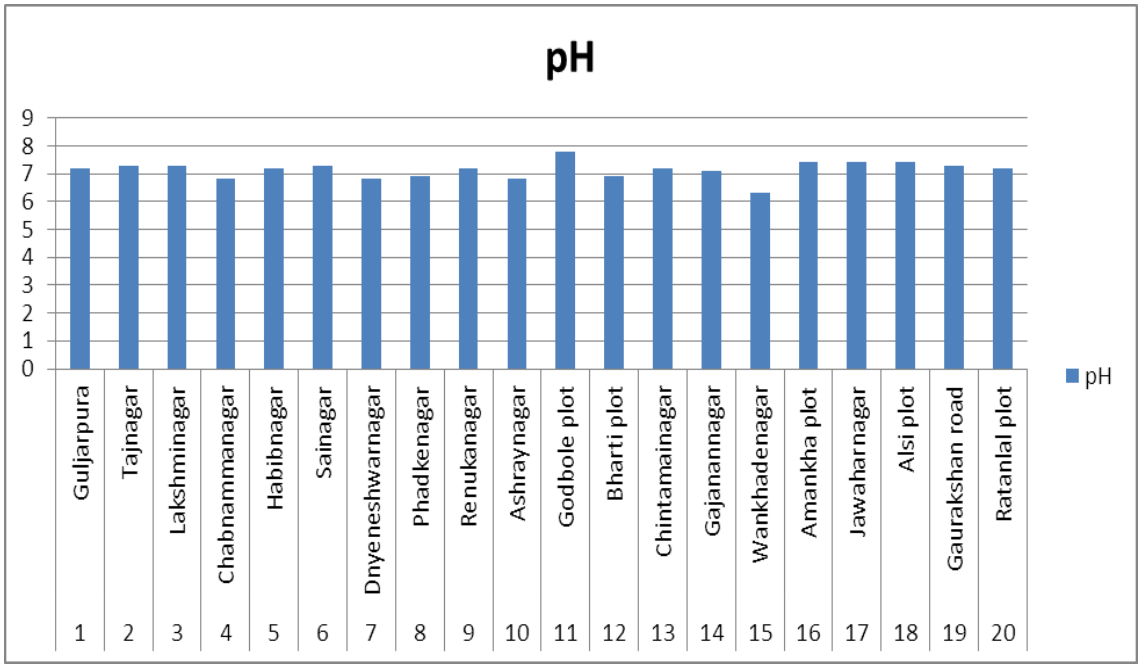

Figure 1: Sample wise pH values.

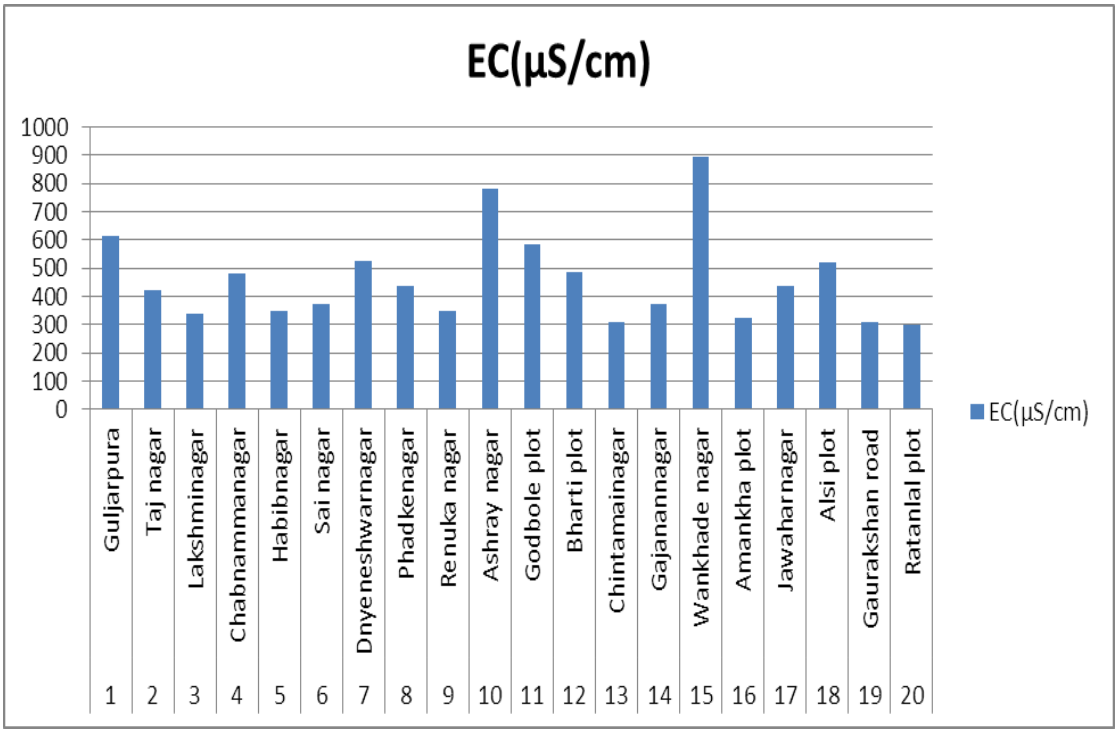

Figure 2: Sample wise EC values.

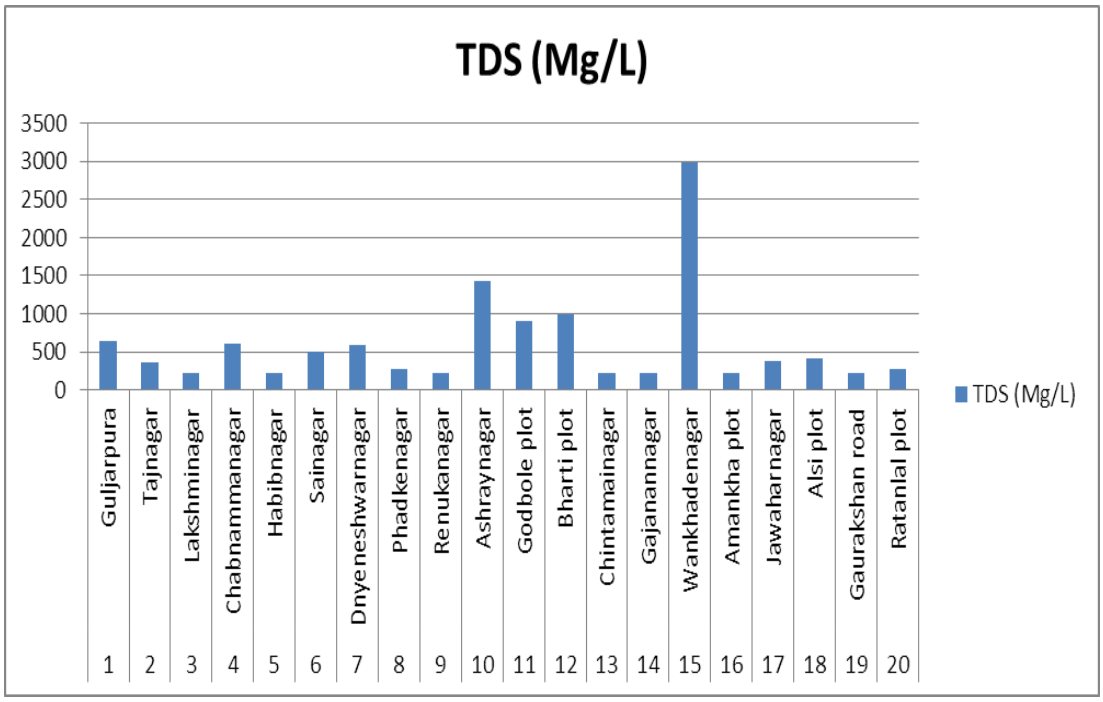

Figure 3: Sample wise TDS values.

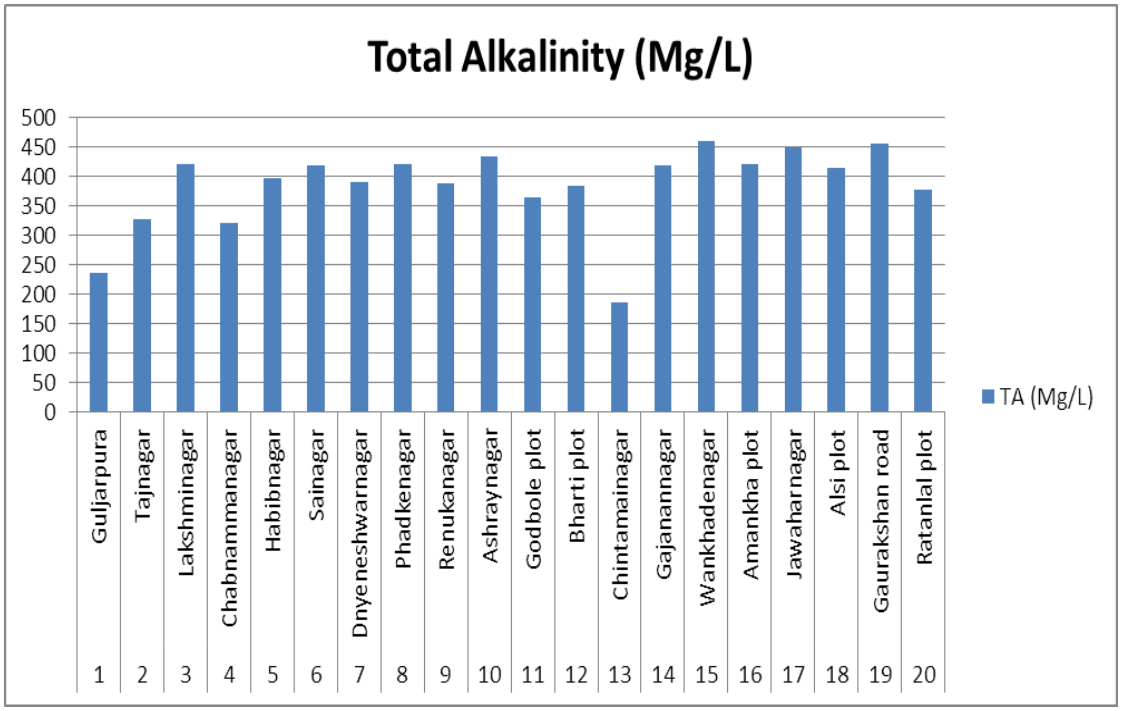

Figure 4: Sample wise Total Alkalinity value.

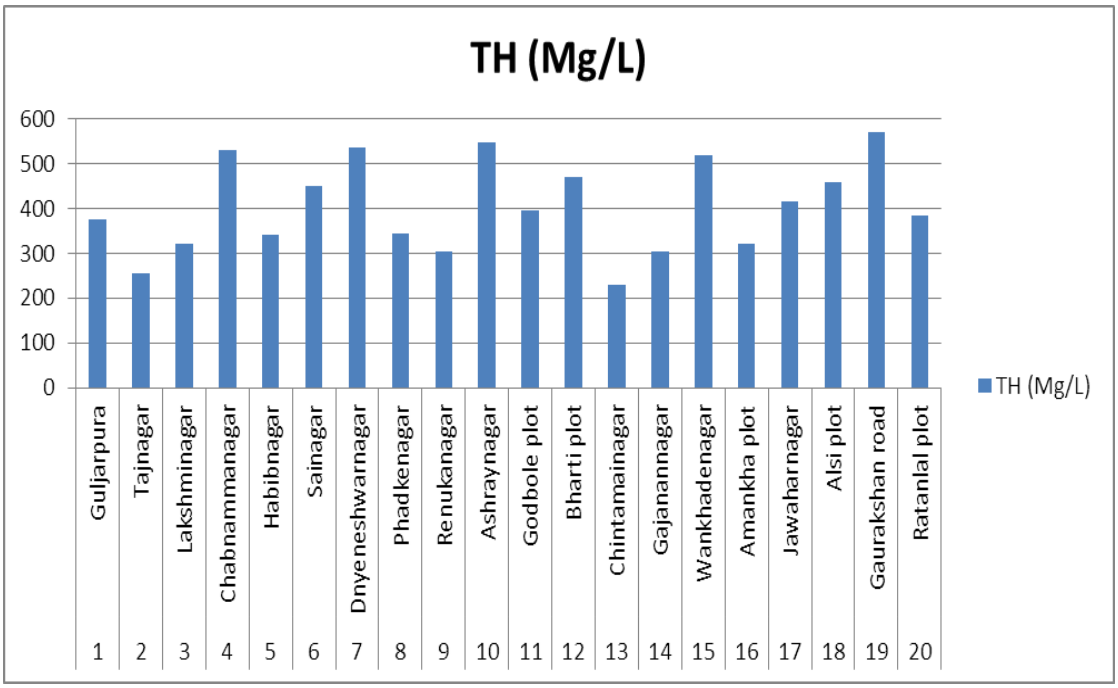

Figure 5: Sample wise Total Hardness values.

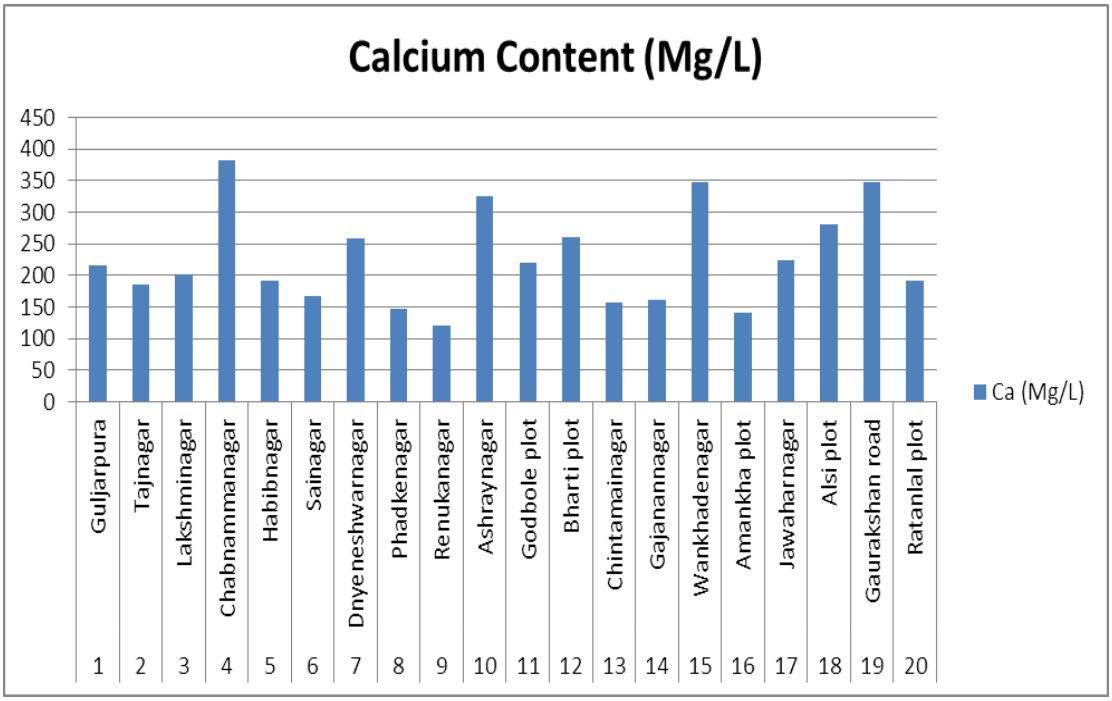

Figure 6: Sample wise Calcium Hardness.

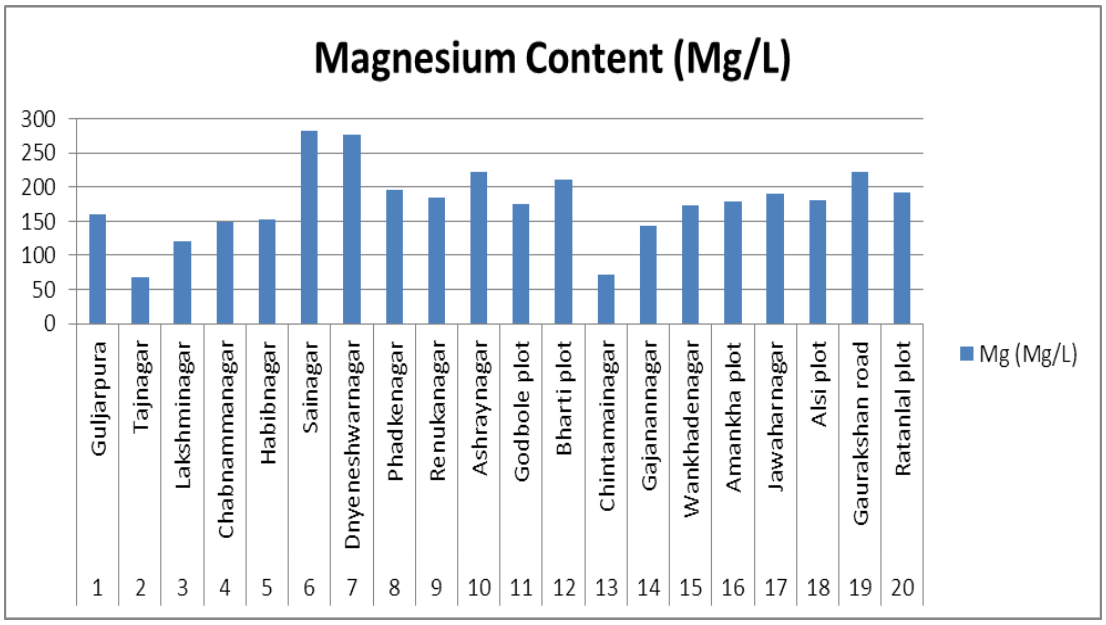

Figure 7: Sample wise Magnesium Content.

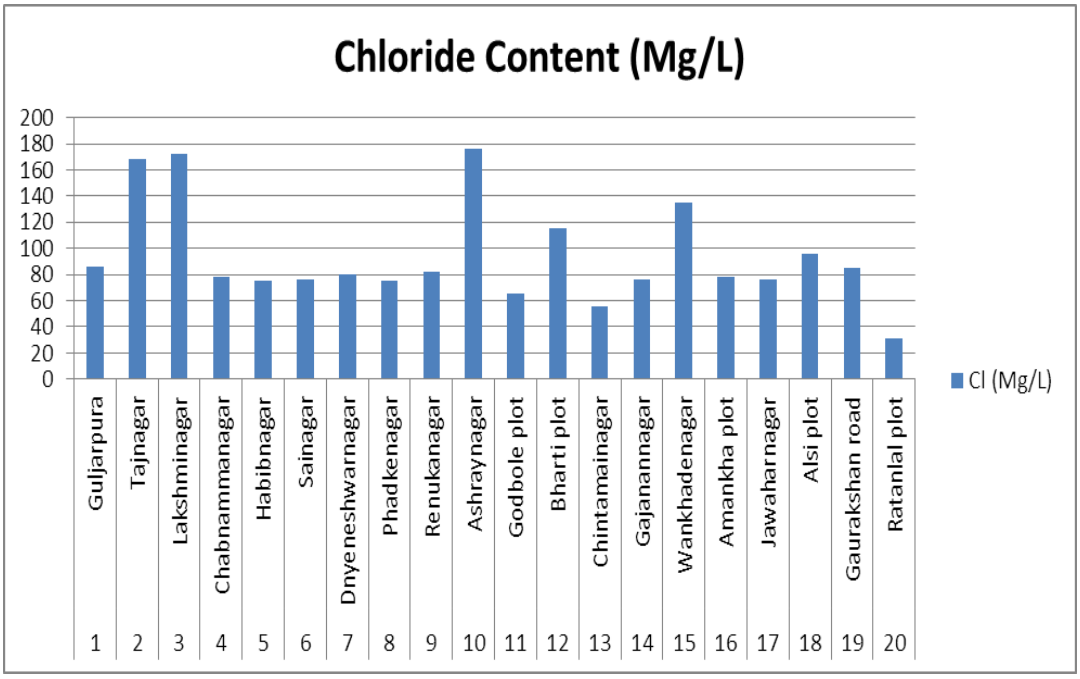

Figure 8: Sample wise Chloride Content.

CONCLUSION

This study shows that result of Physico-chemical analysis of water indicate considerable variation. Most of the water sample values are found in its permeable limit. The water quality in the most of the location area found to be suitable for drinking purpose. Out of 20 water sample sulphates are present in 14 samples. TDS value of Wankhade Nagar water sample is found to higher than permissible limit which is not potable for drinking purpose due to its high percentage of TDS, which may be cause gastro-intestinal trouble.

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