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Analysis Of Ground Water Quality (Phiscally, Chemically And Biologically) Using Analytic Techniques In Peesangan Area Of Ajmer District Rajasthan, India

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Abstract

Water Is A Universal Solvent. Standard Quality Of Ground Water Is Very Important Parameter For All Kind Purpose. This Research Article Is Mainly Focus On The Analysis Of Physio-Chemical And Hydro-Chemical Parameters In Peesangan Area Of Ajmer District In Rajasthan From Various Ground Water Sources In My Research Area, For Determining Its Quality For Drinking And Irrigation Purpose. For This Purpose, I Have Selected 10 Water Samples From Different Ground Water Sources In My Selected Research Area And Their Physio And Hydro-Chemical Analysis As Temperature, Ph, Tds, Total Alkalinity, Total Hardness, Ec, Alkali Earth Metals As, Ca^{+2}, Mg^{+2}, Chloride Ion, Fluoride Ion And Nitrate Ion Has Been Carried Out Using Analytical Techniques. [1] All Results Were Compared With The Who Guidelines For Drinking And Irrigation Purpose. After The Evaluation Of Result Of Ground Water Samples, I Conclude That The Ground Water Of This Area Is Not Suitable For Drinking Purpose.

Keywords: Hydro-Chemical Analysis, Irrigation, Alkalinity And Hardness Etc.

1.Introduction

Water That Exist Or Located Beneath The Earth Surface In Underground Or Filling The Porous Spaces In Soil, Sediment Or Rocks, Which Is Originate From Rain Water Or Melting Of Snow Is Know As **Ground Water**[2].

Ground Water Is A Main Source Of Fresh Water On Earth Which Is Suitable For All Kind Of Purpose. Now A Days Ground Water Is Not Only Using For Drinking Purpose But Also In Irrigation, Industry Etc.

In India Main Source Of Fresh Drinking Water Is Ground Water And Above 90% Population Depend On It, So Assessment Of Ground Water Quality Is Very Important.

Quality Of Ground Water In Particular Area Is Depend On Various Factors Like Geology Of This Area, Flow Of Rain Water, Human Activities In Particular Area, Mineral Contamination Or Weathering, Evaporation Rate Etc. Thus Quality Of Ground Water Found Different Due To Changes In Geological Altitude.

To Analysis And Monitoring Of Ground Water Quality Is Most Important Because It's Promote The Sustainable Development And Provide Importance Clue For Water Management And Implementation Of Water Quality Program Rapidly. [3]

Rajasthan In India Is Know As A Dessert Area And Highly Suffered With Water Crises. Geographically, Rajasthan On Of The Most Suffered Area In India Not Only Quantitatively But Qualitatively Also.

Ajmer District In Rajasthan Is Also Know As Fluoride Contaminated Area, So It's Essential To Know The Level Of Contamination And Analyzed Various Parameter Of Ground Water Which Is Describe By Physically, Chemically And Biologically. [4]

2.Study Area

Fig No.1 Google Map Of Peesangan Tahsil Ajmer District

My Research Area Is Pessangan, Which Is Belong To Ajmer District. It Is 31 Km Away From Ajmer Headquarter District. The Latitude Is 26.38° 37' 195'' And Longitude Is 74.41° 05 '291''.

Pessangan Tehsil Is Bounded In North Side With Riyan Badi, South Side With Beawar, East Side With Ajmer And West Side Is Masooda. It Is In The 438 M Elevation.

3**.Objects**

Ajmer District And Most Of Villages Near About Ajmer Are Found In Various Research Article, Highly Contaminated With Fluoride And Alkaline In Nature Thus I Decided To Assess The Ground Water Quality In Peesangan, Tahsil Ajmer, Using Different Parameters With Standard Analytic Techniques And Compared With Standard Parameter Prescribed By Who.

4.Material And Method

4.1 Water Samples Collection

For The Analysis Of Ground Water Analysis,10 Sample Were Collected From Peesangan Tehsil Ajmer District From Various Ground Water Points As From Tube Well, Handpump, Bore-Wells In Clean Two-Liter Black Color Plastic Bottle With Precautions**.** These Ground Water Sample Were Taken In Chemistry Laboratory For Analysis**.**

4.2 Physical, Chemical And Biological Analysis Of Ground Water Samples

After The Analysis Of 10 Ground Water Samples, The Data's Are Summarized In Table No 1 And Results Are Described In Result And Conclusions. As Shown In Below [5]

Table No. 1

Various Parameter Determined In Ground Water Of Peesangan Tahsil, Ajmer

S.N	Arae	Ph	Ec µs /Cm	Th Mg/L	Alk. Mg/L	Cl^- Mg/L	F^- Mg/L	No^-_3 Mg/L	Ca^{+2} Mg/L	Mg^{+2} Mg/L	Tds Mg/L
1	Akhpura	7.0	2077	235	715	685	3.1	17	98	125	2960
2	Bassi	7.2	970	95	295	111	2.0	26	41	78	1410
3	Hathipura	7.7	780	176	544	135	1.2	23	75	118	1100
4	Jhar	7.8	620	165	620	170	2.1	40	70	92	900
5	Mohanpura	7.6	1390	185	800	269	1.1	30	80	98	1980

6	**Manesar Khedi**	**7.8**	**1170**	**290**	**700**	**179**	**1.2**	**44**	**120**	**170**	**1650**
7	**Rajwas**	**7.8**	**1247**	**250**	**680**	**255**	**1.0**	**60**	**115**	**160**	**1750**
8	**Ratanpura**	**7.8**	**1500**	**350**	**890**	**379**	**1.2**	**10**	**175**	**186**	**2150**
9	**Sambhariya**	**7.4**	**1060**	**80**	**710**	**45**	**1.2**	**25**	**178**	**185**	**2200**
10.	**Tunga**	**7.9**	**1478**	**900**	**290**	**410**	**0.5**	**360**	**500**	**450**	**2058**

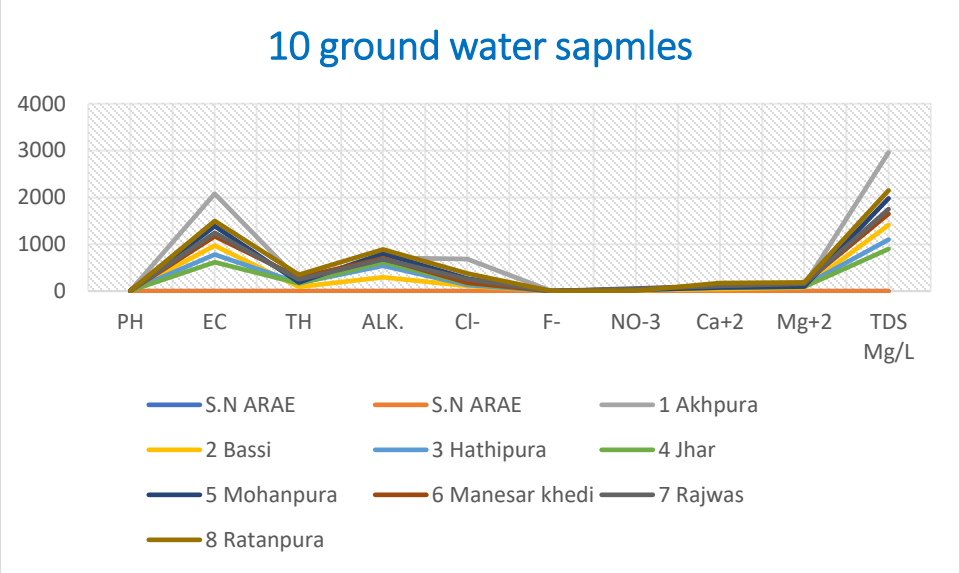

Fig No.2 10 Ground Water Sample With Their Parameter

Table No.2 Standard Parameter By Who

Ww	Parameter	Permissible Limit
1	Ph	6.9-9.2
2	Ec	300µmhos/Cm

3	Tds	500-1500mg/L
4	Ca^{+2}	75-200mg/L
5	Mg^{+2}	30-150mg/L
6	Th	100-500mg/L
7	Alk	200mg/L
8	Cl^{-}	200-600mg/L
9	F^{-}	1-1.5ppm
10.	No_3^{-}	40-50mg/L

5.Result And Discussion

5.1.Ph

The Value Of Ph For 10 Ground Water Samples Were Analyzed By Using Digital Ph Meter. The Ph Value In 10 Water Sample Were Found Minimum Is 7 And Maximum Is 7.9 As Shown In Above Table No 1 And In Fig No 2. Thus Ph Of Ground Water Samples In Peesangan Area Ajmer Is Found Under The Guidelines Or Prescribed Limit By Who.[6]

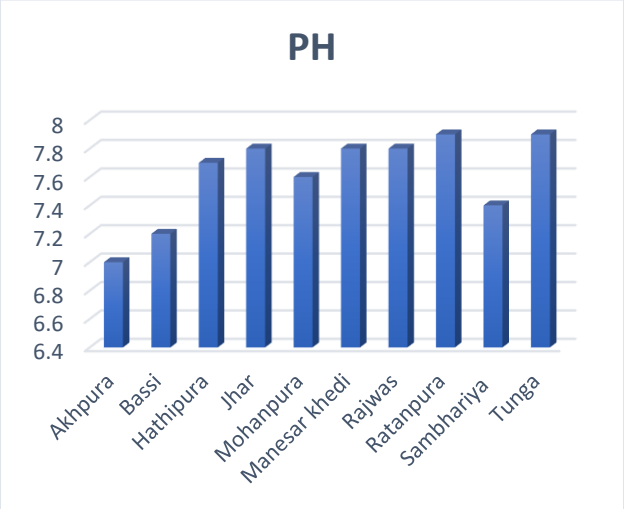

Fig No. 2 Ph Value Of Ground Water Sample

5.2.Ec (Electrical Conductivity)

The Electrical Conductivity In Water Sample Is Found Due To The Possibility Of Minerals Or Salts. In Peesangan Area Ajmer, Ec Value Found In 10 Ample Sample Is Minimum Is 620 And Maximum Is 2077. It Is More Than Permissible Limit Prescribed By Who. Its Value Is Determined By Digital Conductivity Meter.

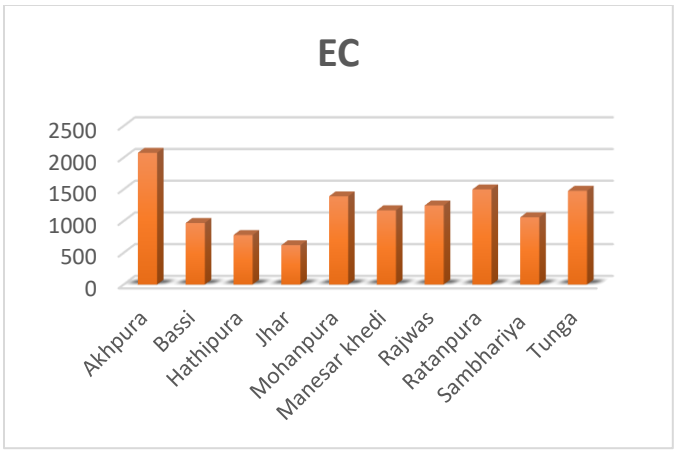

Fig. No.3 Ec Value Of Ground Water Samples

5.3. Total Hardness (Th)

Harness In Ground Water Due To The Presence Of Calcium And Magnesium Salt. Hardness Is Determined In 10 Water Sample By Titrimetric Method With Edta.

In My Research Area, In Peesangan, Ajmer District, Total Harness Were Found In 10 Ground Water Sample Of Different Villages Are Found Minimum Is 80 In Sambhriya Village And Maximum Is 900 In Tunga Village. Thus It Is Also Beyond The Limit Prescribed By Who.

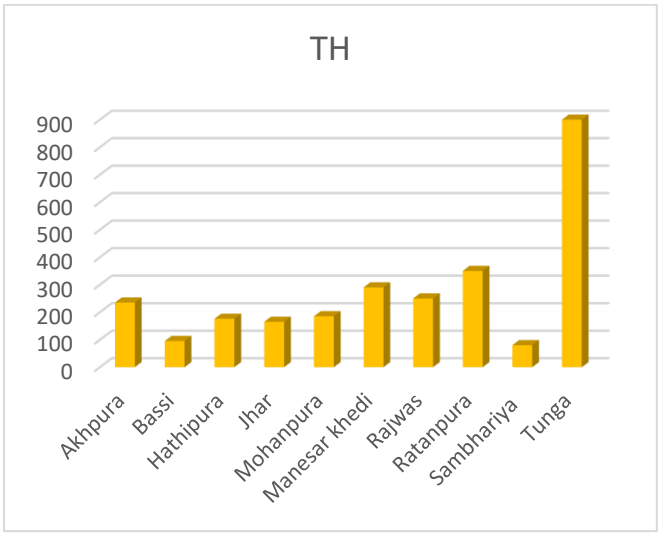

Fig.No.4 Total Harness Of Ground Water Samples

5.4. Alkalinity

The Reason Of Alkalinity In Ground Water Is Due To The Presence Of Carbonates, Bicarbonates And Hydroxide. The Values Of Alkalinity In 10 Water Samples Which Is Collected From My Research Area Peesangan, Ajmer Were Determined By Titrimetric Method And Results Are Listed In Above Table And Plotted In Fig No 5

The Minimum Value Is 290 In Tunga Village And Maximum Value Is 890 In Ratanpura. Among 10 Villages Only In 3 Villages As Bassi, Hathipura And Tunga, Value Of Alkalinity Were Found Under Permissible Limit Of Who.

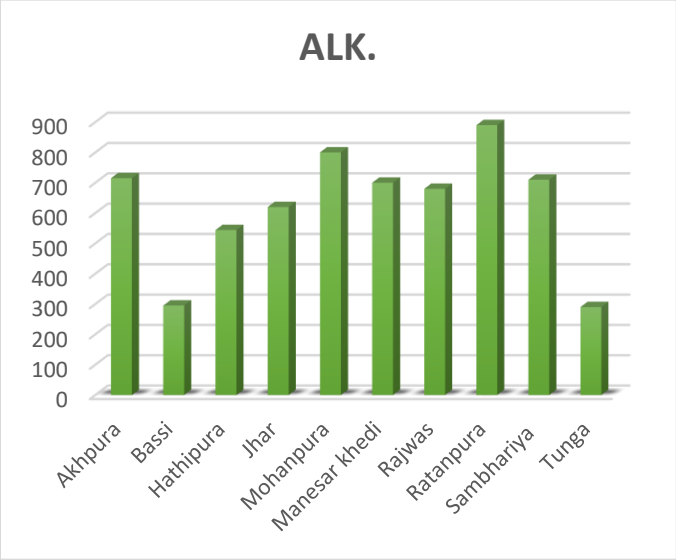

Fig.No.5 Total Alkalinity Of Ground Water Samples

5.5. Chloride

Naturally Ground Water Contain The Chloride But The Highest Concentration In Ground Water Is Occurred Due To The Disposal Of Human Waste, Domestic Waste, Agriculture Activities Like Uses Of Pesticides Etc. Excessive Chloride Is Harmful For Living Organism. Value Of Chloride Ions Were Determined Titrimetric Method With Silver Nitrate. In Research Work I Found The Minimum Value Is 45 In Sambhriya Village And Maximum Is 685 In Akapura.

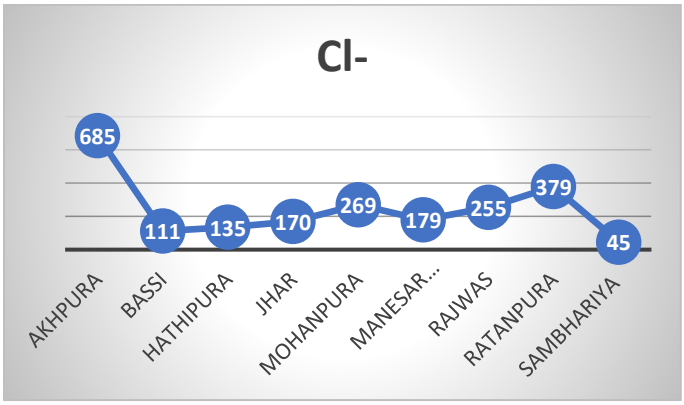

Fig.No.6 Chloride Ion In Ground Water Samples

5.6. Fluoride

As Prescribed Quantity (1 To 1.5 Mg/L) Of Fluoride Is Required For Skeletal Development But Beyond The Limit Its Causes Fluorosis. In My Research Area Among The 10 Water -Sample The Minimum Value Is Found In Tunga Is 0.5 And Maximum Is 3.1 In Akhpura. In Akhpura, Bassi And Jhar Value Of Fluoride Were Found Beyond The Limit.

Ion Selective Method Were Used For Determination Of Fluoride In Water Samples.

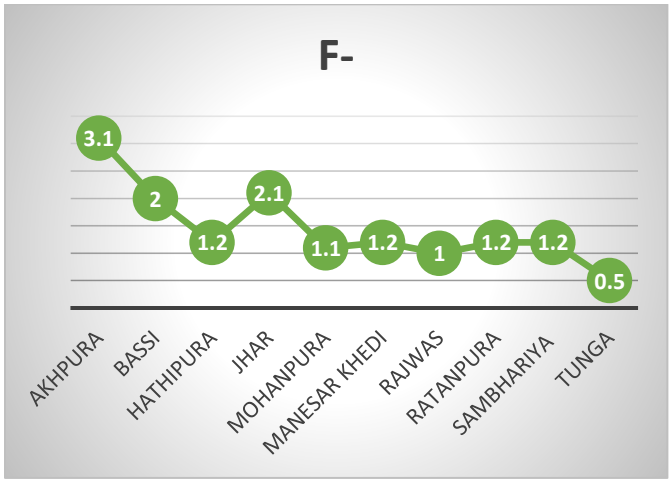

Fig.No.7 Fluoride Ion In Ground Water Samples

5.7. Nitrate Ions

As Shown In Table No 1 The Value Of Nitrate Among 10 Ground Water Samples In Peesangan, Ajmer Were Found Minimum Is 10 In Ratanpura And Maximum Is 360 In Tunga Village. It Is Beyond The Permissible Limit Prescribed By Who.

For Determination Of Nitrates Ion, Spectroscopic Method Were Applied.

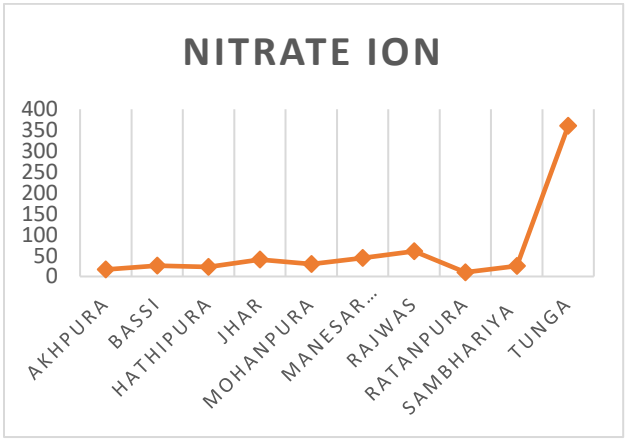

Fig.No.8 Nitrate Ions In Ground Water Samples

5.8. Calcium Ions

Calcium Ion Is Essential Element For Health But Excess Limit Is Harmful. Calcium Ions Is Found In Ground Water Is Dur Top The Presence Of Calcium Salts.

Here Titrimetric Method Were Used And The Value Of Calcium Ion Is Found In Research Area In 10 Different Ground Water Sample Is Between The Range 41 To 500 Mg/L. Miniumum Value Is Found In Bassi Village While Maximum Value Was Found In Tunga Village Of Peesangan Tahsil, Ajmer.

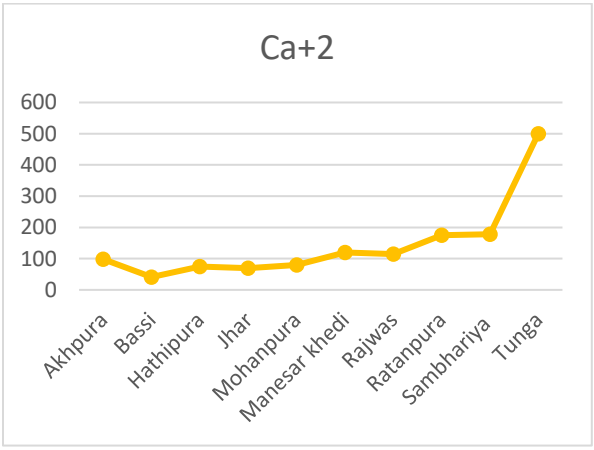

Fig.No.9 Calcium Ion In Ground Water Sample

5.9. Magnesium Ions

Like-Wise Calcium Magnesium Also An Essential Element Or Nutrient In Permissible Limit But High Range Is Harmful For Health. In 10 Water Samples The Range Is Found From 78 To 400 Mg/L. Minimum Value Found In Bassi Village While Maximum Found In Tunga Village Pessangan Tahsil, Ajmer. Quantity Of Magnesium Ions Were Also Found Out By Using Titrimetric Method.

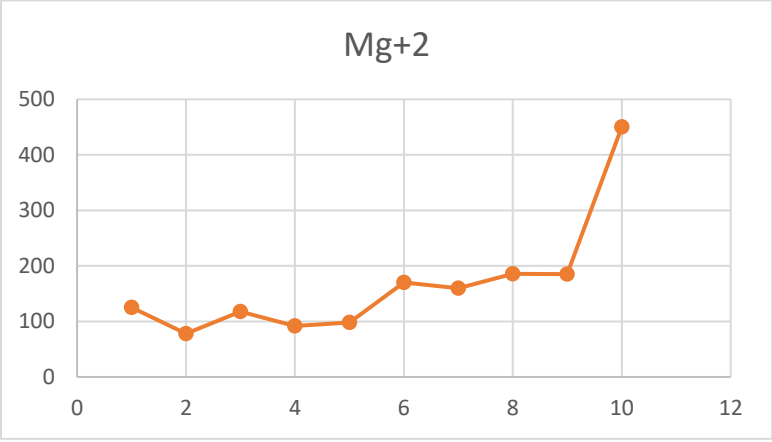

Fig. No. 10 Magnesium Ion In Ground Water Samples

5.10. Tds (Total Dessolved Solid)

Assessement Of Tds Value Of Ground Water In Any Area Is Very Important Parameter For Defining The Water Quality. Tds Is Total Dissolved Solid, Which Composed Carbonates, Bicarbonates, Nitrates, Phosphate, Minerals, Organic Matter Etc. For Drinking Purpose Value Of Tds Should Not Exceed Beyond 500 Mg/L Prescribed Who. In My Research Area 10 Ground Water Samples Which Collected From Different Villages Of Peesangan Tahsil, Ajmer, Range Of Tds Value Were Found 900 To 2960 Mg /L Which Are Beyond The Limit. The Value Of Tds Were Found By Using Digital Conductivity Meter.[7]

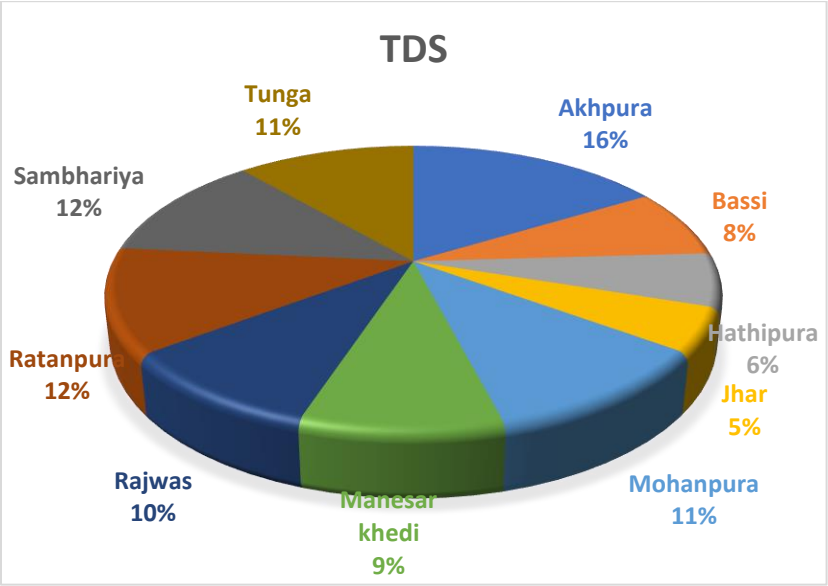

Fig.No.11 Tds Of Ground Water Samples

6. Conclusion

After The Result And Discussion, It's Conclude That, The Most Of Water Samples Are Show Beyond The Permissible Limits Of Drinking Water Prescribed By Who. So Ground Water In Peesangan Area Of Ajmer District Is Not Suitable For Drinking Purpose Mostly. Water Treatment Is Required Before Using Ground Water For Drinking In This Area. There Is An Urgent Need To Undertake Suitable Policy Measures For Sustainability Of Groundwater Quality.[8] Government Or Water Management System Should Make Plan For The Treatment Of Ground Water Otherwise It Will Be Reason Of Various Of Health Issues.

7. Acknowlegent

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8. **Refrences**

1. 1.Kumar R, Chauhan A, Rawat L (2017) Physico-Chemical Analysis Of Surface And Ground Water In Selected Sites Of Dehradun, Uttarakhand, India. J Environ Anal Toxicol 6: 420. Doi: 10.4172/2161-0525.1000420.
2. 2.Karen Ghazaryan, Hasmik Movsesyan Et All (2020) Comparative Hydro-Chemical Assessment Of Groundwater Quality From Different Aquifers For Irrigation Purpose Using Iwqi: A Case Study From Massi Province In Armenia, Ground Water For Sustainable Development, Vol 11.
3. 3.Khanna.Priynak, Rai.Nidhi (2016) Assessment Of Ground Water Quality Of Peesangan Block Of Ajmer District, Ijcrr, Vol 8, Issue 4.
4. Saxena Umesh And Saxena Swati (2015) Correlation Study Of Physiochemical Parameter And Quality Assessment Of Ground Water Of Bassi Tahsil Of District Jaipur Rajasthan, Int J Env Sci Tech Vol 1 Issue 1, 78-91.
5. 5.Central Ground Water Board, (2007), Ministry Of Water Resource Government Of India, Ground Water Scenario, Jaipur District Rajasthan Cgwb, Jaipur.
6. Who (2005) International Standard For Drinking Water, Who Genewa.
7. 7.Indian Standard Specifications For Drinking Water Supply, (1975) Special Report Series No 44, Icmr New Delhi.
8. 8.Sunil Mittal, Prafulla Kumar Sahoo Et All (2021), Hydro-Chemical Characteristics And Human Health Risk Assessement Of Ground Water In Shivalik Region Of Sutlej Basin, Punjab India, Arabian Journal Of Geosciences, Vol 14, Issue No.847.