

ASSESSMENT OF TUBEWELL WATER QUALITY IN DIFFERENT VILLAGE IN DIFFERENT BLOCK IN JAIPUR (RAJASTHAN) INDIA ON YEAR 2016-2017

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Abstract: Water quality becomes one in all the vital quality factors for the standard life in sensible cities. Recently, water quality has been degraded because of numerous sorts of pollution caused by disposal of human wastes, industrial wastes, automobile wastes. The increasing pollution affects water quality and therefore the quality of people's life. Hence, water quality analysis, monitoring, and prediction become a vital and hot analysis subject. This study the standard of water equipped as a Deep Tubewell, Shallow Tubewell and Openwell in several village in Jaipur district, through faucet, which incorporates tests for temperature, pH value, total solids, total suspended solids, hardness, acidity, alkalinity, chloride, chlorine, jarrest, BOD and DO.

A water quality customary could be a rule or law comprised of the uses to be made from a water body or section and therefore the water quality criteria necessary to safeguard that uses. The aim of this paper is to usually summary the water quality observance in several place in Rajasthan country and describe the performed. The scope of the paper includes factors thought of in testing, temporary descriptions of analytical strategies, the evolution of analytical technique.

Index Terms - Water quality evaluation, Deep Tubewell, Shallow Tubewell and Openwell, data-driven water quality evaluation, and water quality prediction.

I. INTRODUCTION

Water is one in all the foremost essential natural resources for the existence and survival of the complete life on this planet. We have a tendency to use water for drinking, cooking, personal hygiene, agricultural practices, and recreational functions nearly on a daily basis. Additionally, plants and animals conjointly rely upon water for his or her basic survival. In short, all living organisms want great quantity and smart quality of water to continue their life. per the globe Health Organization [1], AN calculable one.1 billion folks lacked access to wash drinkable and a couple of.6 billion lacked access to basic sanitation in 2005. Hence, 2005-2015 was declared because the International Decade for Action: "Water for Life". The increasing population, its cars AND industries are polluting all the water-bodies at an ugly rate. The effluents additional by these pollution sources have an effect on the hydrogen ion concentration worth of water.

This gives rise to several water-related issues like water-borne diseases in organisms and deaths of aquatic animals like fish, crab, and so on. These pollutions eventually disrupt the food-chain and harm scheme in end of the day. Hence, pollution is one in all the foremost ugly considerations for U.S. these days. Addressing this concern, folks have spent ample analysis efforts in water quality analysis and watching. within the past decades, several researchers have spent ample time on finding out and developing completely different models and ways in water quality analysis and analysis. though the surface of our planet is almost seventy one water, solely third-dimensional of it's contemporary. of those third-dimensional regarding seventy fifth is betrothed in glaciers and polar icebergs, pure gold in groundwater and 1 Chronicles is on the market within the type of H₂O in rivers, lakes and ponds appropriate for human consumption (Dugan, 1972). because of increasing manufacture on one hand and exploding population on the opposite, the stress of installation are increasing enormously.



Figure 1: Water Cycle in Environment

The general quality of water in lakes, rivers and coastal areas is sporadically assessed by scientific and environmental establishments. This classification is predicated on laboratory analysis of water quality samples collected from stations at choose

locations and information on water samples area unit hold on in laptop systems. From these recorded parameters of water, researchers are ready to take vital choices to safeguard the setting normally and their own consumption.

II. WATER QUALITY EVALUTION

Water quality analysis is a vital thanks to monitor and management pollution. The characteristics of a water system have an effect on its quality for a particular use. Water quality analysis shows however well the standard of water will meet the necessities of the user. it's outlined in terms of bound physical, chemical and biological characteristics. the target of water quality analysis is to visualize the standard of water to grasp if a given sample of water is appropriate enough for a given purpose. These characteristics square measure historically collected manually from totally different water resources (i.e. lakes, rivers, and oceans), and assessed manually. as an example, out of 2 given water samples of equally smart quality, users would possibly provide preference to at least one sample over the opposite due to style. So, water style becomes a top quality analysis parameter to judge water quality and its acceptableness.

R. Rosly, et al. in [4] has seen that data processing techniques will be wont to improve water quality prophetic accuracy. There square measure numerous factors which will have an effect on the standard of water that embody pollution, action, salinization, particle toxicity etc. several water resources lack basic protection. Therefore, these resources square measure liable to pollution from manufactory farms and industrial plants. Hence, water quality analysis becomes necessary and vital to confirm the standard of the water surroundings.

Consistent with D. Yang, et al. [5], the standard ways for water quality analysis will be classified into 2 classes:

- a) Single issue based mostly ways
- b) Comprehensive index based mostly ways

in a very single issue based mostly methodology, the foremost impaired water quality parameter is taken into account to judge water quality. It cannot replicate the excellent quality of water supported all factors. in a very comprehensive index methodology, every parameter is taken into account to possess associate degree equal contribution towards decisive quality of water despite the fact that this is often not invariably true in sensible things. The researchers in [5] have made a two-level index system, whose excellent indexes carries with it physical indexes, organic matter, significant metal, nutrients, oils, material, and new ototoxic pollutants.

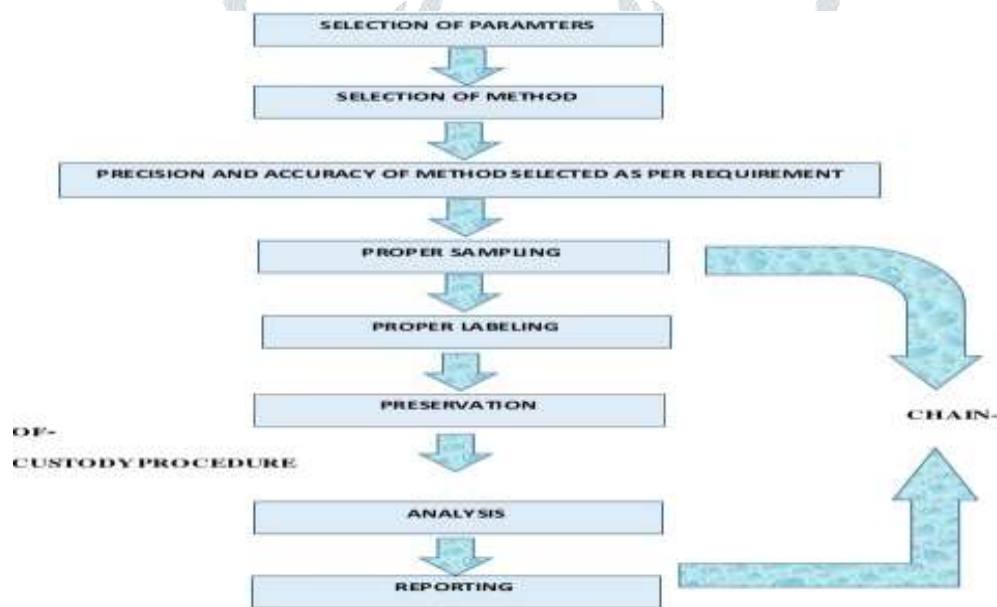


Figure 2:-Flow Chat of Water Quality Testing

III. WATER PARAMETERS

- A. Temperature:-**It is vital to record temperature aboard the opposite parameters as this may be helpful in behavioral analysis of the parameters being measured. regarding temperature-relation theories, pH And physical phenomenon have an undesirable impact with massive temperature changes. additionally to the present, extreme temperatures for pacific island climates is of apprehensible concern.
- B. pH:-**The pH of resolution an answer} is that the live of the acidity or pH of that solution. The pH scale may be a ordered series whose vary is from 0-14 with a neutral purpose being seven. Values on top of seven indicate a basic or alkalescent answer and values below seven would indicate an acidic answer. the bulk of aquatic life prefers a pH level of half-dozen.5 – 9.0. Something outside of this optimum vary is taken into account fatal to the marine scheme. Extreme pH values conjointly increase solubility of components and compounds creating them venomous and so a lot of probably to be absorbed by marine life. Moreover, temperature has AN inverse relationship with pH that's, as temperature will increase pH levels decrease and the other way around.
- C. Oxidation- Reduction Potential:-**Oxidation-Reduction Potential is that the live of a solutions oxidizing power. In straightforward terms it are often delineated because the potential of a solutions ability to sanitize itself. Higher ORP values would indicate a lot of oxidizers gift. Likewise lower ORP equals a lot of reducers' gift.

It is understood that a typical sensible price for aquatic life ought to be within the neighborhood of one hundred mV to two hundred mV. Something outside these limits may be a case to be investigated. constant are often aforementioned regarding water whose ORP levels square measure terribly high, sometimes within the high 600 mV attributable to the utilization of disinfectants like halogen. Something outside this vary ought to be investigated.

- D. Hardness**—Originally taken to be the capability of a water to destroy the lather of soap, hardness determined erst by volumetric analysis with soap answer. Nowadays, the analysis contains the determination of metallic element and metallic element that square measure the most constituents of hardness. though atomic number 56, metallic element and iron can even contribute to hardness, their concentrations square measure ordinarily therefore low during this context that they'll be neglected. Thus, total hardness is taken to comprise the metallic element and metallic element concentrations expressed as mg/l CaCO₃. The widespread abundance of those metals in rock formations leads usually to terribly respectable hardness levels in surface and ground waters.
- E. Alkalinity**—Alkalinity in natural waters can also be due to carbonates and hydroxides. generally analysis is administered totally differentiate to tell apart} between the pH components and this can be done by exploitation different indicators within the volumetric analysis procedure and by creating acceptable calculations. the symptoms most ordinarily utilized square measure acid-base indicator (color amendment around pH8.3) and acid-base indicator (color amendment around pH4.5), leading to the extra terms acid-base indicator pH and acid-base indicator pH; the latter is substitutable with total alkalinity.
- F. Chloride**—Chloride exists altogether natural waters, the concentrations varied terribly wide and reaching a most in ocean water (up to thirty five,000 mg/l Cl). In recent waters the sources embrace soil and rock formations, spray and waste discharges. Waste material contains massive amounts of chloride, as do some industrial effluents.
- G. Nitrite**—The significance of chemical group (at the low levels usually found in surface waters) is especially as AN indicator of doable waste material pollution instead of as a hazard itself though, as mentioned above beneath "Nitrate" (q.v.), it's chemical group instead of nitrate that is that the direct toxic. There is, consequently, a stricter limit for chemical group in drinking waters. Additionally, nitrites will produce to the presence of nitrosamines by reaction with organic compounds and there could also be malignant neoplastic disease effects..

IV. EXPERIMENTAL METHODS

A. Water Sampling Procedure And Analysis

The water samples were analyzed for numerous parameters within the laboratory of Environmental in several Blocks of Jaipur District in Rajasthan State. numerous physical and chemical parameters like Temperature, pH, Turbidity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Hardness, organic chemistry atomic number 8 Demand (BOD), Dissolved atomic number 8 (DO), Residual atomic number 17, Chloride, pH scale are monitored for the faucet water of various locations.

Plastic bottles of one.5 cubic decimeter unit} capacity with stopper were used for aggregation samples. every bottle was washed with two aqua forties and so rinsed thrice with water. The bottles were then preserved in a very clean place. The bottles were stuffed exploit no air area, and so the bottle was sealed to stop any discharge. every instrumentation was clearly marked with the name and date of sampling.

B. Sampling Points

Test in State PHED Lab Jaipur and samples collected from different village in Jaipur district the sampling point as marked describe below follows:

- A. village Achrol, block Amber Jaipur Rajasthan
- B. village Akedadoongar , block Amber Jaipur Rajasthan,
- C. village Baskhoh, block Bassi Jaipur Rajasthan
- D. village Bassi, block Bassi Jaipur Rajasthan
- E. village Kanota, block Bassi Jaipur Rajasthan
- F. village Salagrampura, block Chaksu Jaipur Rajasthan
- G. village Akoda, block Dudu Jaipur Rajasthan,
- H. village Dudu, block Dudu Jaipur Rajasthan
- I. village Govindgarh, block Govindgarh Jaipur Rajasthan
- J. village Khapariya, block Jalsu Jaipur Rajasthan
- K. village Radhakishanpura, block Jalsu Jaipur Rajasthan
- L. village Pachar, block Jhotwara Jaipur Rajasthan,
- M. village Beenjahera block Kotputli Jaipur Rajasthan
- N. village Keshwanagujar, block Kotputli Jaipur Rajasthan
- O. village Chauru, block Phagi Jaipur Rajasthan
- P. village Thala, block PhagiJaipur Rajasthan
- Q. village Badhalr, block Sambhar Jaipur Rajasthan,
- R. village Khatwari Khurd block Sambhar Jaipur Rajasthan
- S. village Dantli, block SanganerJaipur Rajasthan
- T. village Jeerota ,block Sanganer Jaipur Rajasthan

- U. village Lobrawas, block Shahpura Jaipur Rajasthan
- V. village Surajpura, block Viratnaga Jaipur Rajasthan

And so on different villages in block amber district Jaipur in Rajasthan

C. Water Quality Sampling Parameters

- I. Temperature of the tap water from different Village in different block district Jaipur in Rajasthan
- II. pH value of the tap water different Village in different block district Jaipur in Rajasthan
- III. Alkalinity of the water samples from different Village different block district Jaipur in Rajasthan
- IV. Total hardness of the water samples from hall different Village in different block district Jaipur in Rajasthan
- V. Presence of residual chlorine in the water samples from different Village in different block district Jaipur in Rajasthan

The results of the analyzed parameters of tap water of the different locations of different Village different block district Jaipur in Rajasthan with the related standards for drinking water prescribed by IS:10500 and USPHS. The drinking water standard is given in the table Figure number 3.

Table 1:-Indian Standard 10500 Parameter of water Quality

INDIAN STANDARD SPECIFICATIONS FOR DRINKING WATER IS. 10500			
S.NO.	Parameter	Requirement desirable Limit	Remarks
1.	Colour	5	May be extended up to 50 if toxic substances are suspected
2.	Turbidity	10	May be relaxed up to 25 in the absence of alternate
3.	pH	6.5 to 8.5	May be relaxed up to 9.2 in the absence
4.	Total Hardness	300	May be extended up to 600
5.	Calcium as Ca	75	May be extended up to 200
6.	Magnesium as Mg	30	May be extended up to 100
7.	Copper as Cu	0.05	May be relaxed up to 1.5
8.	Iron	0.3	May be extended up to 1
9.	Manganese	0.1	May be extended up to 0.5
10.	Chlorides	250	May be extended up to 1000
11.	Sulphates	150	May be extended up to 400
12.	Nitrates	45	No relaxation
13.	Fluoride	0.6 to 1.2	If the limit is below 0.6 water should be rejected, Max. Limit is extended to 1.5
14.	Phenols	0.001	May be relaxed up to 0.002
15.	Mercury	0.001	No relaxation

V. RESULT AND DISCUSSION

The various physico-chemical parameters examined showed right smart variations in numerous samples. The observations square measure represented in table-2. The findings and their comparison with UN agency and BIS health based mostly drinking tips square measure bestowed in table-1. The information unconcealed a substantial variation within the water samples with regard to their chemical composition.

pH is affected not solely by the reaction of greenhouse emission however conjointly by organic and inorganic matter gift in water. Any alteration in water pH is in the midst of the amendment in different chemistry parameters¹⁵. pH varies from seven.4 to 8.2. This shows that everyone samples square measure existed among the minimum and most tolerable limit of UN agency and BIS. The water samples were found to be slightly basic in nature in year 2016-2017.

Table 2:- Sampling Points of different location in Jaipur Rajasthan

1	StateName	Dist Name	Block	VillageName	TypeOfSource	Lab	testld
2	Rajasthan	Jaipur	Amber	Achrol	Deep Tubewell	State PHED Lab Jaipur	L0020083313
3	Rajasthan	Jaipur	Amber	Akedadoonga	Shallow Tubewell	State PHED Lab Jaipur	L0020083885
4	Rajasthan	Jaipur	Bassi	Baskhoh	Deep Tubewell	State PHED Lab Jaipur	L0018524639
5	Rajasthan	Jaipur	Bassi	Bassi	Openwell	State PHED Lab Jaipur	L0018524669
6	Rajasthan	Jaipur	Bassi	Kanota	Shallow Tubewell	State PHED Lab Jaipur	L0019954204
7	Rajasthan	Jaipur	Chaksu	Salagrampura	Shallow Tubewell	State PHED Lab Jaipur	L0020084222
8	Rajasthan	Jaipur	Dudu	Akoda	Deep Tubewell	State PHED Lab Jaipur	L0020139311
9	Rajasthan	Jaipur	Dudu	Dudu	Shallow Tubewell	State PHED Lab Jaipur	L0019406411
10	Rajasthan	Jaipur	Govindgarh	Govindgarh	Deep Tubewell	State PHED Lab Jaipur	L0019406486
11	Rajasthan	Jaipur	Jalsu	Khapariya	Deep Tubewell	State PHED Lab Jaipur	L0019440257
12	Rajasthan	Jaipur	Jalsu	Radhakishanp	Shallow Tubewell	State PHED Lab Jaipur	L0018809282
13	Rajasthan	Jaipur	Jhotwara	Pachar	Deep Tubewell	State PHED Lab Jaipur	L0018609537
14	Rajasthan	Jaipur	Kotputli	Keshwanaguj	Deep Tubewell	State PHED Lab Jaipur	L0018579413
15	Rajasthan	Jaipur	Kotputli	Beenjahera	Shallow Tubewell	State PHED Lab Jaipur	L0018579959
16	Rajasthan	Jaipur	Phagi	Chauru	Deep Tubewell	State PHED Lab Jaipur	L0016987205
17	Rajasthan	Jaipur	Phagi	Thala	Shallow Tubewell	State PHED Lab Jaipur	L0019469220
18	Rajasthan	Jaipur	Sambhar	Badhal	Deep Tubewell	State PHED Lab Jaipur	L0018609278
19	Rajasthan	Jaipur	Sambhar	Khatwari Khur	Openwell	State PHED Lab Jaipur	L0020138513
20	Rajasthan	Jaipur	Sanganer	Dantli	Deep Tubewell	State PHED Lab Jaipur	L0019957493
21	Rajasthan	Jaipur	Sanganer	Jeerota	Shallow Tubewell	State PHED Lab Jaipur	L0020067528
22	Rajasthan	Jaipur	Shahpura	Lobrawas	Deep Tubewell	State PHED Lab Jaipur	L0019657329
23	Rajasthan	Jaipur	Viratnaga	Surajpura	Shallow Tubewell	State PHED Lab Jaipur	L0018620170

Chloride varies from 30-1980 mg/lit. All the water samples area unit beneath the permissible limits as of United Nations agency. Chloride isn't harmful to human at low concentration however may alter the style of water at concentration on top of 250mg/lit. Hardness is incredibly vital in decreasing the cyanogen result of toxic component. Hardness is measured in terms of total hardness and Ca hardness. Total hardness varies type 110-1420 mg/ lit principally exceeds the utmost permissible limits of United Nations agency. Hardness though has no health effects it will wee unsuitable for domestic and industrial use.

Nitrate varies from 6-235 mg/lit. Though solely 2 samples check id L0020067528 and L0018620170 exceeds the permissible limit and shows high concentration. Nitrate indicates the pollution in well water because of agricultural activities, waste matter percolation below the surface. Presence of nitrate in water indicates the ultimate stage of mineralization. the main natural resources of halide is amphiboles, apatite, fluor and mineral. It's concentration in natural waters usually mustn't exceed 45mg/lit. The factors liable for well water contamination with halide area unit geologic factors like weathering of minerals, rock dissolution and decomposition. Containing halide over an extended amount of your time leading to the action it into ground water4. Associate phylogeny issue like process liberates higher concentration of halide into atmosphere.

Table 3:-Lab Results of different Sampling Points of different location in Jaipur Rajasthan

1	Parameter	pH(ph)	Chloride(mg/l)	Fluoride(mg/l)	Nitrate(mg/l)	TDS(mg/l)	Alkalinity(mg/l)	Hardness(mg/l)
2	Test id	6.5 to 8.5	250 to 1000	0.6 to 1.2	45	500	20 to 200	300 to 600
3	L0020083313	7.7	80	0.96	48	770	240	220
4	L0020083885	7.7	50	0.4	21	385	250	110
5	L0018524639	8.3	140	1.4	50	1371	570	200
6	L0018524669	7.5	320	0.65	16	1509	440	650
7	L0019954204	7.8	1060	0.5	13	600	320	500
8	L0020084222	7.8	900	1.8	8	1078	140	620
9	L0020139311	7.8	110	0.42	52	770	200	160
10	L0019406411	7.6	280	0.4	2	924	160	280
11	L0019406486	7.7	280	1.2	42	1925	640	230
12	L0019440257	7.8	40	1.1	14	770	400	160
13	L0018809282	7.8	240	1.24	42	770	350	100
14	L0018609537	8.2	30	0.3	22	560	280	140
15	L0018579413	7.4	1170	0.4	10	600	340	340
16	L0018579959	7.7	1760	0.1	27	780	440	1420
17	L0016987205	7.6	90	0.6	6	560	220	160
18	L0019469220	7.8	1160	3.6	23	3080	600	180
19	L0018609278	7.4	770	1.3	15	3157	200	520
20	L0020138513	8.1	290	3	38	1386	310	130
21	L0019957493	7.5	1980	0.83	10	6006	160	350
22	L0020067528	7.7	810	2.2	170	3773	950	440
23	L0019657329	7.7	60	0.4	20	539	260	220
24	L0018620170	7.7	470	0.2	235	1694	280	670

The concentration of halide within the studied water samples varies from zero.2 to 2.2 mg/li. High halide concentration causes dental pathology and a lot of skeletal pathology whereas the low concentration or absence of halide in drink ends up in cavity in youngsters significantly once the halide concentration is a smaller amount than zero.5 mg/lit30.

The free chemical element was found to be studied water samples varies from thirty to 1980 mg/li. Chloride happens naturally in well water, however is found in larger concentrations wherever water and run-off from road salts (salts wont to de-ice icy roads) will create their approach into water sources. As such, well homeowners close to snowy roads or road seasoning storage facilities area unit particularly in danger for prime levels of binary compound

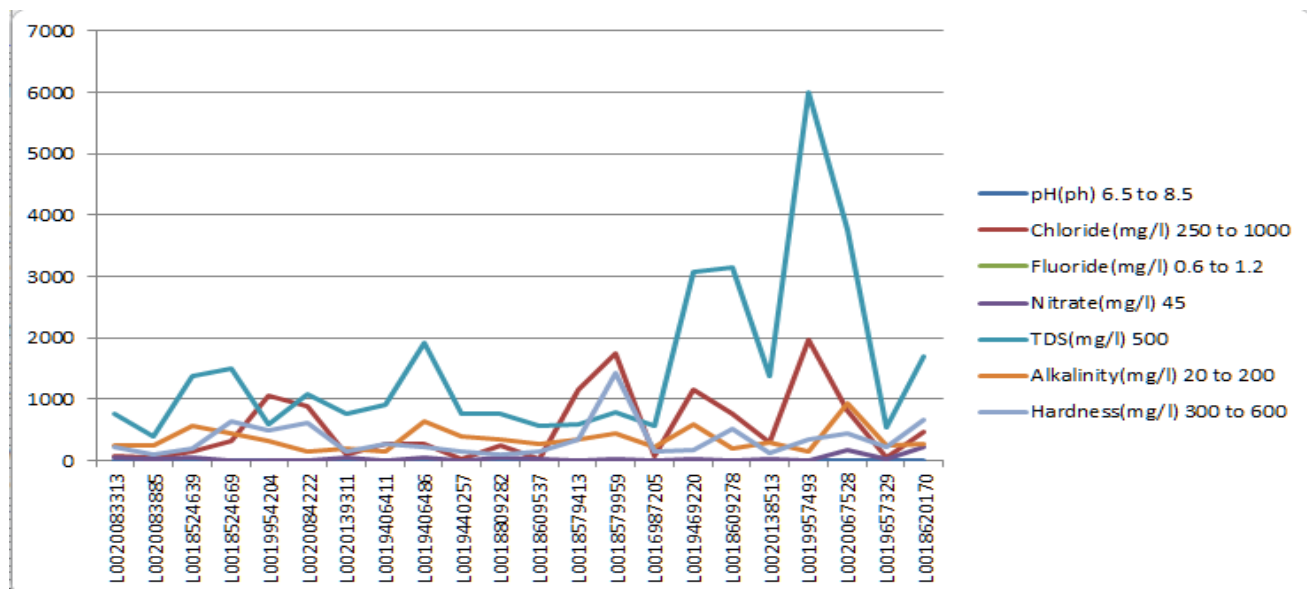


Figure 3:- Graph plot on the basis of Lab Results in Different Test id basis.

VI. CONCLUSION

The analysis of the physico-chemical parameters of spring water from 10 completely different locations in Jaipur block shows that the hydrogen ion concentration, turbidity, chloride and halide were among permissible limit. Extremely exceeded price of total hardness, nitrate and iron were according at some locations of study space. The determined variance for the parameters shows that the deviation within the total hardness (162.02), chloride (63.42) and nitrate (32.06) are of moderately high vary. From this it's finished that varied parameter concentration are varied extremely in several location of Different Village in Jaipur.

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