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COMPARATIVE INVESTIGATION OF THE PHYSICO-CHEMICAL ANALYSIS

OF WATER QUALITY

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ABSTRACT

The tendency as a wellspring of relishing water country area is an aftereffect of the fairly favored quality over waterway test. Normal waters are being polluted by anthropogenic activity, which has a dynamic effect on the nature of water. Normal waters are being sullied. It is possible to characterise the quality of water in terms of the concentration and state (broken up or particulate) of some or all of the organic and inorganic material that is present in the water, in addition to certain characteristics of the water itself. This can be done in conjunction with other characteristics of the water. In-situ estimations and the analysis of water samples taken either locally or at the research centre are used to keep it under control. On-site measurements, the collection and analysis of water samples, the analysis and evaluation of the logical results, and the documentation of the findings are the primary components of the process of assessing the quality of the water.

Key Word: *water, analysis and evaluation.*

INTRODUCTION

Water is the soul of each living animal on Earth. It comprises 50 to 90 percent mass of a wide range of living organic entity. It assists with forming the outside of the planet through disintegration and different cycles and cover about 70% of the world's surface. Despite its plenitude the vast majority of earth's water is unusable as 97% of it is saline seawater. A large portion of the excess three percent is secured up ice. Just around three liters out of 100,000 liters are consumable water. Groundwater gives around 85% of the water utilized for human utilization. The hydrologic cycle portrays the consistent development of water above, on and beneath the Earth's surface. Water changes states between fluid, strong and gas during the cycle. Buildup, vanishing and freezing of water happen in the cycle because of the Earth's climatic conditions. The hydrologic cycle starts with water vanishing from the world's dirt, plant and water surfaces to shape water fume. The sun supplies the energy needed to dissipate water. By far most of dissipation happens from the seas. It is assessed that almost 98 cm of water every year vanishes from the outside of the seas. Water fume is brought into the air by temperature angles and can be moved more than many miles by enormous air masses. At the point when water fume cools, it consolidates to shape mists. As water consolidates inside mists, water drops expansion in size until they tumble to the world's surfaces as precipitation like precipitation, hail, slush or snow. Precipitation fluctuates in force from one spot to another. Around 70 to 90 percent of the water that tumble to the world's surface enters the dirt.

Ground Water Characteristics

The term "groundwater" refers to water that is located under the surface and can be found in crevices and voids within the soil, sand, and shakes. The term "immersed zone" refers to the geographical area where water completely fills these voids. The water table is the term used to refer to the highest point in this zone. The water table might be located only a metre below the surface of the earth, or it could be located many metres below the surface. There are several locations where one can locate ground water. The water table may be very deep or very shallow, and it may also rise or decrease depending on a large number of different factors. It is possible for the water table to rise as a result of heavy rainfall or melting snow, while it is possible for the water table to decrease as a result of an extended period of dry climate. The layers of soil, sand, and rock that make up springs are where water from the ground is stored before being released into the environment. The majority of the time, springs are made out of rock, sand, sandstone, or broken stone such as limestone.The fact that these materials contain large associated gaps makes it possible for liquids such as water to pass through them, making them porous. The water that is contained in springs either naturally rises to the surface through a spring or is discharged into nearby lakes and streams. This water can also be extracted through a hole that has been completely dug into the spring. While surface water travels via rivers or streams at speeds ranging from 3.5 to 12 kilometres per hour, ground water travels at speeds ranging from 3 to 90 centimetres per day (11 to 335 metres per year). Only if there is an enough pushing factor or head available to force water through the crevices between permeable spring materials can ground water move. The pressure-driven inclination and the degree to which pores are well linked to one another are the two primary factors that determine the rate of growth.

WATER QUALITY PROBLEMS IN INDIA

Water is the main normal asset of a state or a nation, yet of the whole mankind. The deficiency of water in the nation has begun influencing the existences of individuals and entire Ecosystem. A portion of the significant issues that need critical consideration are:

- The accessibility of savoring water numerous pieces of the country during the commonplace late spring months is diminishes due the inordinate utilization of Ground water in horticulture, homegrown and modern purposes.
- Roughly half of the people who live in rural areas and those who live in urban areas rely on risky water sources to satisfy their day-to-day requirements. The majority of them in addition, water shortages in metropolitan regions and towns have driven massive quantities of water to be gathered and transferred over substantial distances by large transporters and pipelines. This is happening all over the world.
- As the rate of population growth and industrialisation quickens, the quality of the ground water is being more impacted. Different chemical concentrations, including as nitrate, TDS, chloride, fluoride, iron, and hardness, each constitute a significant contributor to India's severe medical problems.
- The level of ground water is steadily declining as a direct result of the extensive extraction of ground water for the sake of farming, modernization, and domestic production.

Pollution In River Water

Streams stream towards another water body consistently. Along these lines, the toxins present in the waterway are weakened and disintegrated much rapidly when contrasted with stale waters. Be that as it may, and still, at the end of the day, various waterways and streams are definitely dirtied. This is so on the grounds that since antiquated occasions, agribusiness is being drilled close to stream banks and presently likewise the spots close by regular water sources are the best regions for ranchers as these spots are amazingly ripe due to the presence

of different supplement stores in that dirt. Since more established occasions and even presently, urban communities and enterprises are set by the waterway side since it is simple for them to dispose of the loss by unloading them into the stream.

ORGANIC TOXINS

This gathering incorporates oxygen-requesting squanders, sickness causing specialists, plant supplements, sewage, manufactured natural mixtures and oils. Decline of broke down oxygen DO) esteem in water is a file of contamination primarily because of natural matter, for example sewage (homegrown and creature), modern waste from food handling plants, paper factories and tanneries; squanders from butcher houses and meat pressing plants; spillover from rural terrains, and so forth Water is the transporter of pathogenic microorganisms and can make tremendous damage general wellbeing. The water borne sicknesses are typhoid and paratyphoid fevers, looseness of the bowels and cholera, polio and irresistible liaepatitis. The capable creatures happen in the defecation or pee of tainted individuals and are at long last released into a water body.

OBJECTIVES OF THE STUDY

1. To look at the nature of surface water and ground water.
2. To dissect the information measurably based on the outcomes acquired.

RESEARCH METHODOLOGY

The research was conducted based on the collection of crucial information, which included a review on the Physico limits in Kathalal locations followed by a detailed evaluation of the water quality in these areas. The samples were collected in plastic bottles with a capacity of 2.5 litres that had previously been sanitised. In accordance with APHA standards, the testing, protection, and investigation were carried out (1998). Before each and every estimation, the instruments were calibrated, and all of the synthetic chemicals that were used were of GR grade. In addition to fluoride, other parameters of water quality such as pH, total dissolved solids, chloride, bicarbonate, calcium, magnesium, absolute hardness, and calcium hardness were evaluated. Fluoride was not one of these parameters.

DATA ANALYSIS

The physical and synthetic boundaries, for example, Temperature, PH, TDS, DO, TH, Ca-Hardness, Mg-Hardness, TA, Chloride, Sulfate, Nitrate and Phosphate suggested esteem displayed in Table No.1

Table 1 recommended value of Quality Parameters

Sr.No.	Parameters	Minimum Value	Maximum Value	Health And Other Effects
1	Temperature	Subjective	Subjective	High temp. accelerate the biodegradation of organic materials
2	PH	6.5-8.5	---------	Low PH-corrosion High Ph-deposition
3	Ca^{+2} Hardness	75-150mg/l	200mg/l	Kidney stone/bladder
4	Mg^{+2} Hardness	50-75 mg/l	100 mg/l	Gastrointestinal irritation in presence ofSo_4^{-2}
5	TDS	500-1000 mg/l	2000 mg/l	Gastrointestinal irritation
6	Total Alkalinity	200 mg/l	600 mg/l	Large Alkalinity imparts bitter taste of water.
7	Chloride	250 mg/l	1000 mg/l	Taste, Corrosion, Laxative effect, Heart and Kidney diseases
8	Phosphate	---	5 mg/l	Gastrointestinal irritation
9	Sulphate	200 mg/l	400 mg/l	Gastrointestinal irritation when combined with Mg/Na.
10	Nitrate	20-45 mg/l	50 mg/l	Diarrhea/Blue baby syndrome.
11	DO	3mg/l	----	Low DO may Prove lethal for many of the organisms.

The aftereffects of substance investigation of well, tube well and waterways water tests, interrelationship between the properties of well ,tube well and streams water tests, have been introduced and talked about in this part. The subtleties of the underground well, tube well and streams water tests gathered from various towns of Kathalal taluka. viz., Kheda are given Bellow.

Chemical analysis of underground water samples of Kathalal City During March- 2012 To July-2014. That is given in table No. 2(A) & (B).

Table 2 Chemical analysis of underground water samples of Kathalal City During March-2012 To July-2014. That is given in table No. 5.2(A)

	Tem.°C	PH	Ca^{+2}	Mg^{+2}	TDS	Total
Sample			Hardness	Hardness	In ppm	Alkalinity
No.			mg/L	mg/L		mg/L
1	27.5	7.36	145	85	435	557
2	29.1	7.47	125	56	446	345
3	30.2	7.6	126	59	380	254

4	27.4	7.39	123	67	332	552
5	27.5	8.1	147	66	305	478
6	27.8	7.12	254	78	1220	369
7	26.9	7.42	265	59	375	358
8	27.5	7.3	120	102	330	365
9	30.1	7.56	127	158	260	345
10	28.1	7.39	104	65	690	302
11	28.2	7.67	205	98	1022	301
12	29.1	6.63	200	90	595	358
13	27.7	7.45	148	67	220	678
14	28.7	6.4	156	69	525	544
15	26.8	7.46	178	65	470	358
16	27	7.64	189	79	990	447
17	28.4	5.9	185	76	125	458
18	30.4	7.62	182	72	765	401
19	28.1	7.27	135	70	540	402
20	27.5	6.34	229	86	235	465
21	27.6	7.44	269	95	235	498
22	27.4	7.5	285	93	260	521
23	28.3	7.33	247	73	1390	321
24	27.6	7.39	257	71	425	845
25	27.5	7.52	256	70	405	562
26	27.5	6.35	288	80	265	632
27	27.6	7.47	294	90	365	447
28	28.1	7.38	209	94	275	325
29	28.5	7.23	203	82	270	547
30	27.7	7.64	211	76	385	625

Table 3 Chemical analysis of underground water samples of Kathalal City During March-2012 To July-2014. That is given in table No. 5.2 (B).

Sample No.	Chloride mg/L	PO_4^{-3} mg/L	SO_4^{-2} mg/L	NO_3^{-1} mg/L	D.O mg/l	COD mg/l	$_F$-1
1	402	1.4	0.1	3.1	4.22	12	0.43
2	145	1.2	0.2	5.1	4.58	15	0.27
3	156	0.8	0.0	6.4	5.47	19	1.9
4	178	1.1	0.2	3.2	5.25	16	1.8
5	258	0.7	0.0	1.0	4.89	25	3.2
6	245	0.9	0.1	6.0	5.5	46	5.3
7	456	1.4	0.2	10.2	5.47	45	2.5
8	589	2.4	0.0	3.9	5.56	33	4.0
9	321	2.1	0.4	7.5	5.23	77	3.4
10	125	1.9	0.5	6.4	4.58	58	1.3
11	126	2.5	0.0	8.1	4.55	69	5.2
12	147	2.0	0.2	5.9	5.14	102	4.9
13	159	1.0	0.0	4.5	5.89	120	3.2
14	123	2.4	0.1	6.1	6.01	14	0.68
15	223	1.8	0.0	8.1	5.14	16	2.2
16	225	1.8	0.3	5.4	4.48	09	1.8
17	287	2.4	0.4	5.4	4.25	76	4.8
18	354	0.8	0.4	3.8	4.21	12	4.8
19	369	1.4	1.9	4.6	4.20	45	1.0
20	358	2.1	0.2	5.4	4.47	65	3.4
21	321	1.7	0.1	2.9	5.2	85	0.66

22	324	2.6	0.3	1.7	5.7	95	0.72
23	325	1.9	2.8	5.4	4.48	32	1.5
24	321	1.3	0.5	2.4	5.21	12	0.93
25	665	0.7	0.0	2.2	5.4	41	0.79
26	425	1.7	0.2	4.5	5.4	55	0.92
27	337	1.1	0.3	1.8	4.89	14	1.0
28	214	2.4	1.0	3.3	5.41	12	0.93
29	258	1.0	1.5	4.6	4.58	65	1.7
30	201	2.4	1.4	1.2	4.23	45	2.6

Village:- JamniTime Period:-January-2012-February-2012

The trial results have been portrayed in the accompanying sub-heads with detail of towns of Kathalal Taluka.Compound qualities of bore well, tube well and waterways water tests and their interrelationships.

RESULT AND DISCUSSION

Kathalal taluk is a taluk situated in kheda locale, Gujarat, India. the base camp of the taluk isthe town of kathalal . the taluk was among a few in bhaner region that with the section ofthe state's reorganization act of 1956 were moved from bhaner region, jamnagar state to therecently made amreli area of Gujarat state (the last later renamed as gujratstate). Water systemhas been assuming a significant part even from the old time since it speeds up the financialexercises of kathalal taluk as well as the entire world. in kathalal taluk, individualsare agriculturists. Their agribusiness generally relied on water system channels, trench took careof tanks and rainfed tanks. The water system in kathalal primarily comprises of thekothayar water system framework.

Since the towns are in Kathlal Taluk, they are additionally curtailed as VAE, VMM, VPE, VPR and VPL separately. While the water test was taken from bore wells, the code of the water tests are reabbreviated as SVAE, SVMM, SVPE, SVPR and SVPL individually. Simultaneously, code of the water tests drawn from drill openings are abbreviated as BVAE, BVMM, BVPE, BVPR and BVPL.

The boundaries of shallow well water and drill opening water taken from various stations were thought about and classified in Tables. Measurable examination likewise was done to portray the examples and the qualities are introduced in Tables 4 A correlation of the different physical-synthetic qualities of the contemplated water test has been made with the WHO (1984) and BIS (1998) principles.

Table 4 Parameter values of Station code VAE -Shallowwell– Borehole–Summer Season- Kathlal taluk

S.No	Parameters	Samplecode	
		SSVAE	SBVAE

1	Temperature(C)	26	27
2	pH	7.8	7.7
3	Turbidity(NTU)	5.4	7.3
4	Alkalinity(mg/L)	152	190
5	HardnessCa(mg/L)	52	68
6	HardnessMg(mg/L)	1.6	1.6
7	Salinity(ppm)	64	70
8	Fluoride(ppm)	0.4	0.8
9	Chloride(ppm)	210	250
10	Totaldissolvedsolids(TDS)(ppm)	370	420
11	Dissolvedoxygen(DO)(ppm)	7	5.4
12	BiologicalOxygenDemand(BOD)(ppm)	5	4.6
13	Electricalconductivity(Mics/cm)	600	600
14	TotalNitrogen(mg/L)	4	4
15	Nitrate(mg/L)	0.4	0.8
16	Sulphate(mg/L)	4.4	5.2
17	Ammonia(mg/L)	0.4	0.4
18	Phosphate(mg/L)	0.7	0.8
19	TotalPhosphorous(mg/L)	0.5	0.6
20	Sodium(mg/L)	15.8	18.8
21	Potassium(mg/L)	11.4	12.9
22	Oxidation-ReductionPotential(mV)	560	620

CONCLUSION

Water assets internationally are continuously getting cmtaminated by the expansion of unfamiliar materials from the environmental elements. These incorporate natural matter of plant and creature beginning, land surface washings other than modern and sewage effluents. The expansion of these materials not just impacts

the miniature fauna of new water yet additionally favors the improvement of an assortment of new biota, delivering it ill suited for human utilization. Unpolluted safe drinking water is one of the essential imperatives for sound human existence .The wellbeing perils from dirtied waters are clear from the way that about 80% of irresistible infections all through the world are water related. The condition is more genuine in thickly populated regions with lacking sterilization and sewerage offices. Sadly the present circumstance is more normal in non-industrial nations and is additionally compounded in light of the fact that the offices to control the sickness out break are restricted.

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