

CHEMICAL ANALYSIS OF GROUND WATER OF MODASA TALUKA VILLAGES OF SABARKANTHA DISTRICT, GUJARAT, INDIA.



Chemistry

KEYWORDS: Drinking water, DO, BOD, COD, permissible, Modasa.

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ABSTRACT

Basic study was done to analyze the quality of Drinking water of some villages of Modasa Taluka for domestic and various purposes. Sample was taken from various villages located in Modasa Taluka and examined some physico-chemical parameters like DO, Hardness, Chloride, Alkalinity, COD and BOD. The examination was done according to ICMR standard illustrated the quality for drinking water. The study was required to assess the permissible limits for best uses of drinking and some other purposes also. Most of data has found in permissible range and some of has found in out of range.

1. Introduction:

Water is essential to sustain life, and a satisfactory supply must be made available to people. All efforts are essentials to made and achieve a drinking-water quality as high preferable as practicable. Prevention of water supplies from any contamination is the first way of defense. Source protection is almost invariably the best method of ensuring safe drinking-water and is to be preferred to treating a contaminated water supply to render it suitable for consumption. Once a potentially hazardous situation has been found, however, the risk to health, the availability of alternative sources, and the availability of suitable remedial measures must be considered so that a decision can be made about the acceptability of the supply.

More than 700 million people live in rural area in India spread over 15 different ecological zones. It's a big challenge to provide fresh water to this large population. Today our country is required awareness about socio economic development, poverty, education and providing pure drinking water. Around 37.7 million people are affected by water born diseases. Children are also more affected by water born diseases compare to elders.

Ground water is one of the sources which play an important role in human life especially in those areas in which have no sources like river, canal. They are totally depending on ground water. Now a day's ground water have found polluted due to uses of unbelievable level of harmful chemicals like fertilizers, pesticides in agriculture activities in rural area.

Some of mindless behaviors of human being have made the water around us polluted, we often make them unfit for human consumption and agriculture use and create severe health problems. The objective of this work is to assess the quality of drinking water in villages of Modasa Taluka.

2. Study Area:

The samples were collected from different villages located near to Modasa taluka surrounding 15 Kms as per standard method in winter, pre monsoon and post monsoon. We have analyzed 15 samples from different villages. These all sample location are located between 23°28' N to 73°21' E.

3. Method of Analysis:

Groundwater samples from the Modasa taluka, Sabarkantha district of North Gujarat were collected in cleaned plastic bottles during winter, pre monsoon, and post monsoon season. The dug wells and bore wells were in depth from 40 to 1000ft. The water samples were carried out for physico-chemical analysis in college laboratory. The chemical analysis was carried out in winter, pre monsoon, and post monsoon for Hardness, Total Alkalinity, chloride, dissolve oxygen, chemical oxygen demand and biological oxygen demand according to standard methods for 15 different villages.

All the reagents used are of AR grade and used without further purifications. Physico-chemical characterization of river, ground,

and surface water such as total alkalinity, chloride, Calcium, C.O.D, dissolved oxygen (DO) were carried out by following methods.

Different physico-chemical parameters like DO and COD were determined following standard methods. DO was determined using Winkler's method on the site itself. Calcium was estimated using EDTA titrimetry, chlorides by argentometry, COD was done by reflux titrimetry.

4. Results and Discussion:

Table 1: Physico-chemical analysis of ground water quality of Modasa taluka of Sabarkantha district (Gujarat) - (winter)

No.	Village	Ca ⁺² mg/L	Cl ⁻¹ mg/L	Alkalinity mg/L	DO mg/L	COD mg/L	BOD mg/L
1	Alampur	58	78	314	0.98	11	7
2	Bajkot	40	41	358	0.56	9	6
3	Bherunda	38	101	289	0.88	12	9
4	Bordi	48	145	343	1.24	8	5
5	Davli	36	156	356	0.87	13	9
6	Dolpur	49	102	379	0.45	17	4
7	Dugarwada	62	131	401	1.24	13	10
8	Gadha	78	147	388	1.98	15	7
9	Gajan	33	78	356	0.39	9	5
10	Isrol	47	125	341	0.64	8	3
11	Jitpur	61	179	347	1.58	10	4
12	Jivanpur	71	161	322	0.79	14	11
13	Khalikpur	41	68	298	0.91	12	6
14	Kolikhad	67	99	277	0.93	16	9
15	Pahadpur	53	58	318	1.49	11	7

Table 2: Physico-chemical analysis of ground water quality of Modasa taluka of Sabarkantha district (Gujarat) - (Pre-monsoon)

No.	Village	Ca ⁺² mg/L	Cl ⁻¹ mg/L	Alkalinity mg/L	DO mg/L	COD mg/L	BOD mg/L
1	Alampur	48	94	290	1.05	10	6
2	Bajkot	36	78	312	0.78	6	8
3	Bherunda	42	148	291	0.93	10	6
4	Bordi	40	113	324	1.33	5	7
5	Davli	45	164	321	0.92	9	4
6	Dolpur	38	98	349	0.56	11	9
7	Dugarwada	51	125	389	1.35	8	8
8	Gadha	64	154	371	1.88	9	5
9	Gajan	49	143	342	0.45	7	9
10	Isrol	39	132	352	0.69	5	7
11	Jitpur	58	198	363	0.99	6	6
12	Jivanpur	44	188	299	1.22	8	10
13	Khalikpur	68	89	278	0.65	7	8
14	Kolikhad	52	118	259	0.55	10	6
15	Pahadpur	47	73	301	0.89	6	8

Table 3: Physico-chemical analysis of ground water quality of Modasa taluka of Sabarkantha district (Gujarat) - (Post-monsoon)

No.	Village	Ca ⁺² mg/L	Cl ¹ mg/L	Alkalinity mg/L	DO mg/L	COD mg/L	BOD mg/L
1	Alampur	64	102	302	1.11	12	8
2	Bajkot	48	84	323	0.95	10	9
3	Bherunda	41	154	299	0.78	13	8
4	Bordi	54	86	331	1.05	9	6
5	Davli	48	148	347	1.02	12	7
6	Dolpur	69	102	352	0.58	13	8
7	Dugarwada	72	131	399	0.97	9	11
8	Gadha	75	147	389	0.96	12	8
9	Gajan	49	89	397	0.68	10	8
10	Isrol	52	79	388	0.84	9	6
11	Jitpur	58	115	355	1.49	9	5
12	Jivanpur	78	144	306	0.95	12	9
13	Khalikpur	54	84	282	1.01	8	10
14	Kolikhad	78	122	277	0.66	11	8
15	Pahadpur	61	92	299	1.34	9	6

(1) Calcium content

Winter Season shows highest value at Gadha and lowest value at Gajan.

Premonsoon Season shows highest value at Khalikpur and lowest at Bajkot.

Post monsoon Season shows highest value at Jivanpur and lowest at Bherunda.

(2) Chloride content

Winter Season shows highest value at Jitpur and lowest value at Bajkot.

Premonsoon Season shows highest value at Davli and lowest at Pahadpur.

Post monsoon Season shows highest value at Jivanpur and lowest at Isrol.

(3) Total Alkalinity

Winter Season shows highest value at Dugarwada and lowest value at Bherunda.

Premonsoon Season shows highest value at Gadha and lowest at Kolikhad.

Postmonsoon Season shows highest value at Isrol and lowest at Bordi.

(4) Dissolved Oxygen

Winter Season shows highest value at Gadha and lowest value at Dolpur.

Premonsoon Season shows highest value at Dugarwada and lowest at Gajan.

Postmonsoon Season shows highest value at Jitpur and lowest at Kolikhad.

(5) COD

Winter Season shows highest value at Dolpur and lowest value at Isrol.

Premonsoon Season shows highest value at Bherunda and lowest at Bordi.

Postmonsoon Season shows highest value at Davli and lowest at Khalikpur.

(6) BOD

Winter Season shows highest value at Jivanpur and lowest value at Isrol.

Pre monsoon Season shows highest value at Dolpur and lowest at Gadha.

Post monsoon Season shows highest value at Bherunda lowest at Davli.

5. Conclusion:

After all these analysis the conclusion is some parameter such as, Dissolved oxygen, BOD, COD, Total alkalinity, Calcium content and chloride content are changed accordingly the change in season to season so season play an important role in the quality of water. Most of the data are near to good range so the ground water is odourless and clean and it is useful for drinking and other domestic purposes.

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