

GROUND WATER QUALITY ANALYSIS ANNUR TOWN PANCHAYAT- COIMBATORE DISTRICT INDIA

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ABSTRACT

This article is to analyse the ground water quality in ANNUR town panchayat area in Coimbatore district. This town panchayat has been selected especially because the annual rainfall is very poor comparing average rainfall of Tamil Nadu state. The annual average rainfall of Tamil Nadu is 958.5mm, and that Annur is getting only 58.3% of annual rainfall of Tamil Nadu (LONG TERM (1959-2008) MEAN SEASONAL AND ANNUAL RAINFALL DETAILS). Hence by nature it is an affected area, resulting in short fall of rainfall and hence short fall in water for irrigation and drinking.

Keywords: Ground Water Quality Analysis.

I. INTRODUCTION

The Annur town panchayat is provided with drinking water supply facility from the river Bhavani near Mettupalayam also local bore well utilized to supplement the system. In the absence of river water supply, the bore well water is used for drinking. Hence it was proposed to analyse the ground water to check it up whether it is potable for drinking purpose.

II. GENERAL REPORT

SL.No.	DETAILS	REPORT	REMARKS
1	Country	INDIA	-
2	State	TAMIL NADU	-
3	District	COIMBATORE	-
4	Town Panchayat Name	ANNUR	-
5	Elevation	+338m	-
6	Co-ordinates	11.23 ^o N 77.10 ^o W	-
7	Town Panchayat Area	18.29 km ²	-
8	Total wards	15	-
9	Total Population	18052	According to 2001 census
10	Total Bore wells	32	-
11	Total Open wells	14	-
12	Daily replacement of water supply	7,00,000 LPD	-
13	Permission of Water Connection	6,000 Numbers	-

14	Permission Given	3,754 Numbers	-
15	Total villages under control	15	KAVANDUMPALAYAM,SELLANUR, ALLIKULAM,KUTTAIPUTHUR, SAANAMPALAYAM,SAALAIPALAYAM, NAGAMAPUTHUR, KUNNUTHURAMPALAYAM, KAALIAPURAM,SOKKAMPALAYAM, KAAKAAPALAYAM, AALAMPALAYAM, KUMARAPALAYAM.

III. WATER QUALITY ANALYSIS

3.1. IMPURITIES IN WATER

They may be classified as below

- 1.1.1. Physical impurities
- 1.1.2. Chemical impurities
- 1.1.3. Bacteriological impurities.
- 3.1.1. Physical impurities

They are due to the presence of inorganic substances like clay, pebbles, sand, silt, algae, fungi, bacteria etc., in water in finely divided conditions. Lighter substances float, heavier substances settle and of equal specific gravity mix with water.

3.1.2. Chemical impurities

They may be either organic or inorganic. They may be present in either suspended or dissolved form. The suspended organic chemical impurities are due to the presence of vegetables or animals in water.

3.1.3. Bacteriological impurities

The bacteriological impurities are caused in water by the presence of bacteria. The bacterias may be harmful or harmless. Harmless bacterias are called non-pathogenes. Pathogenes are dangerous and are manily responsible for water borne diseases. Hence, such impurities are to be carefully identified and removed to avoid outbreak of epidemics.

3.2. TESTS ON WATER

The analysis of water is carried out in order to establish its quality. The analysis of raw water is required to render the water fit and safe for use by suitable treatment and to design corresponding treatment works and the water supply scheme as a whole. Further, the analysis is also necessary to ascertain the fitness of water after its treatment. For analysis, samples are to be collected frequently over a long period of time. The samples are subjected to the following tests to determine the physical, chemical and bacteriological impurities present in them.

- 3.2.1. Physical test
- 3.2.2. Chemical test
- 3.3.3. Bacteriological test.

3.2.1. Physical test

Appearance, Colour, Odour, Turbidity NT Units, and Total dissolved solids and electrical conductivity Micro mho/cm.

3.2.2. Chemical test

pH, pH Alkalinity as CaCo₃, Total Alkalinity as CaCo₃, Total Hardness as CaCo₃, Calcium as Ca, Magnesium as Mg, Sodium as Na, Potassium as k, Iron as Fe, Manganese, Free Ammonia as NH₃, Nitrite as NO₂, Nitrate as NO₃, Cholride as Cl, Fluoride as F, Sulphate as SO₄ and Phosphates as PO₄.

3.2.3. Bacteriological test

Faecal coliforms per 100ml. To ensure safety to public health, economy and utility in industries and other uses, it, therefore, becomes imperative upon the planners and designers of the public water supply schemes, to thoroughly check, analyse, and treating the ground water to safe and the permissible limits, before supplying to the public. This is more true and must be strictly adhered to, when water is supplied for municipal uses, such as drinking, bathing, etc.,

IV. RESULTS AND DISCUSSION

4.1.RESULTS OF PHYSICAL AND CHEMICAL EXAMINATION

SL.NO	PHYSICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-1	SAMPLE-2	SAMPLE-3	SAMPLE-4
1	appearance	clear	clear	Clear	clear	clear
2	Colour(pt.o-scale)	10ppm	colourless	Colourless	colourless	colourless
3	odour	none	none	None	none	none
4	Turbidity NT units	10ppm	3	2	2	1
5	Total Dissolved solids	2000ppm	1079	1051	1813	1631
SL.NO	CHEMICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-1	SAMPLE-2-2	SAMPLE-3	SAMPLE-4
6	pH	6.5 to 8.5	7.26	7.27	7.29	7.12
7	pH Alkalinity as CaCO ₃	NIL	0	0	0	0
8	Total Alkalinity as CaCO ₃	600ppm	276	264	490	460
9	Total Hardness as CaCO ₃ ,	600ppm	352	340	590	580
10	Calcium as Ca,	200ppm	117	114	200	196
11	Magnesium as Mg,	100ppm	14	13	22	22
12	Sodium as Na,	200ppm	162	158	276	236
13	Potassium as k	1-2ppm (WHO)	16	15	27	23
14	Iron as Fe,	1.0ppm	0	0	0	0
15	Manganese,	0.3ppm	0	0	0	0
16	Free Ammonia as NH ₃	0.5ppm	0	0	0	0

17	Nitrite as NO ₂ ,	NIL	0	0	0	0
18	Nitrate as NO ₃ ,	100ppm	26	26	43	40
19	Chloride as Cl,	1000ppm	236	228	440	410
20	Fluoride as F	1.5ppm	0.8	0.8	1.0	1.0
21	Sulphate as SO ₄	400ppm	82	79	99	71
22	Phosphates as PO ₄ .	0.1ppm	0	0	0	0

SL.NO	PHYSICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-5	SAMPLE-6	SAMPLE-7	SAMPLE-8
1	appearance	clear	clear	clear	clear	clear
2	Colour(pt.o-scale)	10ppm	colourless	colourless	colourless	colourless
3	odour	none	none	none	none	none
4	Turbidity NT units	10ppm	2	2	1	1
5	Total Dissolved solids	2000ppm	1110	853	848	1252
SL.NO	CHEMICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-5	SAMPLE-6	SAMPLE-7	SAMPLE-8
6	pH	6.5 to 8.5	7.43	7.38	7.43	7.21
7	pH Alkalinity as CaCO ₃	NIL	0	0	0	0
8	Total Alkalinity as CaCO ₃	600ppm	292	236	232	316
9	Total Hardness as CaCO ₃ ,	600ppm	368	312	308	392
10	Calcium as Ca,	200ppm	122	104	102	131
11	Magnesium as Mg,	100ppm	15	12	12	15
12	Sodium as Na,	200ppm	166	108	106	196
13	Potassium as k	1-2ppm (WHO)	16	10	10	19
14	Iron as Fe,	0.3ppm	0	0	0	0
15	Manganese,	0.3ppm	0	0	0	0

16	Free Ammonia as NH ₃	0.5ppm	0	0	0	0
17	Nitrite as NO ₂ ,	NIL	0	0	0	0
18	Nitrate as NO ₃ ,	100ppm	29	24	24	33
19	Chloride as Cl,	1000ppm	248	196	192	272
20	Fluoride as F	1.5ppm	0.8	0.6	0.6	0.8
21	Sulphate as SO ₄	400ppm	85	68	70	98
22	Phosphates as PO ₄ .	0.1ppm	0	0	0	0

SL.NO	PHYSICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-9	SAMPLE-10	SAMPLE-11	SAMPLE-12
1	appearance	clear	clear	clear	clear	clear
2	Colour(pt.o-scale)	10ppm	colourless	colourless	colourless	colourless
3	odour	none	none	none	none	none
4	Turbidity NT units	10ppm	3	2	2	3
5	Total Dissolved solids	2000ppm	1925	1869	839	2226
SL.NO	CHEMICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-9	SAMPLE-10	SAMPLE-11	SAMPLE-12
6	pH	6.5 to 8.5	7.34	7.37	7.80	7.44
7	pH Alkalinity as CaCO ₃	NIL	0	0	0	0
8	Total Alkalinity as CaCO ₃	600ppm	510	480	220	580
9	Total Hardness as CaCO ₃ ,	600ppm	660	590	296	810
10	Calcium as Ca,	200ppm	224	196	99	272
11	Magnesium as Mg,	100ppm	24	24	12	31
12	Sodium as Na,	200ppm	264	272	112	296
13	Potassium as k	1-2ppm (WHO)	26	27	11	29

14	Iron as Fe,	0.3ppm	0	0	0	0
15	Manganese,	0.3ppm	0	0	0	0
16	Free Ammonia as NH ₃	0.5ppm	0	0	0	0
17	Nitrite as NO ₂ ,	NIL	0	0	0	0
18	Nitrate as NO ₃ ,	100ppm	51	43	24	61
19	Chloride as Cl,	1000ppm	460	410	184	510
20	Fluoride as F	1.5ppm	1.0	1.0	0.6	1.2
21	Sulphate as SO ₄	400ppm	130	121	66	158
22	Phosphates as PO ₄ .	0.1ppm	0	0	0	0

SL.NO	PHYSICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-13	SAMPLE-14	SAMPLE-15	SAMPLE-16	SAMPLE-17
1	appearance	clear	clear	clear	clear	clear	clear
2	Colour(pt.o-scale)	10ppm	colourless	colourless	colourless	colourless	colourless
3	odour	none	none	none	none	none	none
4	Turbidity NT units	10ppm	2	3	2	2	1
5	Total Dissolved solids	2000ppm	696	1414	1278	1477	1024
SL.NO	CHEMICAL EXAMINATION	PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE	SAMPLE-13	SAMPLE-14	SAMPLE-15	SAMPLE-16	SAMPLE-17
6	pH	6.5 to 8.5	7.71	7.68	7.57	7.59	7.62
7	pH Alkalinity as CaCO ₃	NIL	0	0	0	0	0
8	Total Alkalinity as CaCO ₃	600ppm	196	380	350	410	272
9	Total Hardness as CaCO ₃ ,	600ppm	272	490	470	520	328
10	Calcium as Ca,	200ppm	90	164	156	176	110
11	Magnesium as Mg,	100ppm	12	19	19	19	12
12	Sodium as Na,	200ppm	92	190	168	192	152

13	Potassium as k	1-2ppm (WHO)	9	19	16	19	9
14	Iron as Fe,	0.3ppm	0	0	0	0	0
15	Manganese,	0.3ppm	0	0	0	0	0
16	Free Ammonia as NH ₃	0.5ppm	0	0	0	0	0
17	Nitrite as NO ₂ ,	NIL	0	0	0	0	0
18	Nitrate as NO ₃ ,	100ppm	20	32	30	38	30
19	Chloride as Cl,	1000ppm	156	350	310	370	216
20	Fluoride as F	1.5ppm	0.6	0.8	0.8	0.6	.6
21	Sulphate as SO ₄	400ppm	55	73	71	78	67
22	Phosphates as PO ₄ .	0.1ppm	0	0	0	0	0

4.2. UNDESIRABLE EFFECT OUTSIDE THE DISRABLE LIMIT OF PHYSICAL AND CHEMICAL EAMINATION:

SAMPLE NO.	LOCATION	PHYSICAL EXAMINATION EXCEEDS THE PERMISSIBLE LIMIT	UNDESIRABLE EFFECT OUTSIDE THE DESIRABLE LIMIT OF PHYSICAL EXAMINATION	CHEMICAL EXAMINATION EXCEEDS THE PERMISSIBLE LIMIT	UNDESIRABLE EFFECT OUTSIDE THE DESIRABLE LIMIT OF CHEMICAL EXAMINATION
1	GOVT.HSS SCHOOL ANNUR SOURCE :OPEN WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
2	TAPAT SOKKAMPALAYAM NEAR BUS STOP SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION ADDISON'S DISEASE, INTERNAL BLEEDING
3	TAP AT KUTTAIPUTHUR NEAR ANNUR-SATHY		-	CALCIUM	ENCRUSTAION IN WATER SUPPLY STRUCTURE AND ADVERSE EFFECTS ON DOMESTIC USE

	MAIN ROAD SOURCE: BORE WELL	-		POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
				SODIUM	IT CAUSES HYPHERTENSION AND HIGH BLOOD PRESSURE
4	TAP AT ASTALAKSHMI CINEMA THEATRE WARD NO.12 SOURCE: BORE WELL	-	-	SODIUM	IT CAUSES HYPHERTENSION AND HIGH BLOOD PRESSURE
				POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
5	TAP AT KAALIAPURAM NEAR SOMANUR AND SOKKAMPALYAM ROAD JUNCTION SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY FAILURE DEHYDRATION ADDISON'S DISEASE INTERNAL BLEEDING
6	TAP NEAR TEMPLE KAVUNDAMPALAYAM SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY FAILURE DEHYDRATION ADDISON'S DISEASE INTERNAL BLEEDING
7	TAP NEAR OVER HEAD TANK, KUMARAPALAYAM SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
					KIDNEY

8	TAP NEAR NANJUNDAN HOUSE WARD NO.11 SOURCE: BORE WELL	-	-	POTASSIUM	PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
9	TAP NEAR THASAPPA-LINGA KALYANA MANDAPAM SOURCE: BORE WELL	-	-	TOTAL HARDNESS	ENCRUSTAION IN WATER SUPPLY STRUCTURE AND ADVERSE EFFECTS ON DOMESTIC USE
				POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
				CALCIUM	ENCRUSTAION IN WATER SUPPLY STRUCTURE AND ADVERSE EFFECTS ON DOMESTIC USE
				SODIUM	IT CAUSES HYPHERTENSION AND HIGH BLOOD PRESSURE
10	TAP NEAR BUS STOP KUNNATHURAMPALAYAM SOURCE: BORE WELL	-	-	SODIUM	IT CAUSES HYPHERTENSION AND HIGH BLOOD PRESSURE
				POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
11	TAP NEAR TEA STALL AVINASHI ROAD				KIDNEY

	NAGAMAPUTHUR SOURCE: BORE WELL	-	-	POTASSIUM	PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
12	TAP NEAR ANNUR ROAD SAANAMPALAYAM SOURCE:BORE WELL	TOTAL DISSOLVED SOLIDS	PALATABILITY DECREASES AND MAY CAUSE GASTRO INTENTIONAL IRRITATION	TOTAL HARDNESS	ENCRUSTAION IN WATER SUPPLY STRUCTURE AND ADVERSE EFFECTS ON DOMESTIC USE
				POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
				CALCIUM	ENCRUSTAION IN WATER SUPPLY STRUCTURE AND ADVERSE EFFECTS ON DOMESTIC USE
				SODIUM	IT CAUSES HYPHERTENSION AND HIGH BLOOD PRESSURE
13	TAP NEAR ANNUR ROAD, SAALAIPALAYAM SOURCE:BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION ADDISON'S DISEASE, INTERNAL BLEEDING
14	TAP NEAR VS STORES METTUPALAYAM ROAD ANNUR WARD NO.13 SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE,

					INTERNAL BLEEDING
15	WARD NO.13 ANNUR SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
16	TAP NEAR ST MARRYS SCHOOL, ALLIKARAMPALAYAM SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION, ADDISON'S DISEASE, INTERNAL BLEEDING
17	TAP NEAR SAMINATHAN HOUSE ANNUR WAR NO.9 SOURCE: BORE WELL	-	-	POTASSIUM	KIDNEY PROBLEM, DEHYDRATION ADDISON'S DISEASE, INTERNAL BLEEDING

4.3. RESULTS OF BACTERIOLOGICAL EXAMINATION:

SL.NO	LOCATION	TEST	DESIRABLE	MAXIMUM LIMIT	RESULT
1	Annur Ward no.11	Faecal coliforms per 100ml	Nil/100ml	Nil/100ml	0
2	Annur Ward no.12	Faecal coliforms per 100ml	Nil/100ml	Nil/100ml	0
3	Annur-Kumarapalayam1	Faecal coliforms per 100ml	Nil/100ml	Nil/100ml	0
4	Annur-Kumarapalayam2	Faecal coliforms per 100ml	Nil/100ml	Nil/100ml	0
5	Annur-Mettupalayam road	Faecal coliforms per 100ml	Nil/100ml	Nil/100ml	0

V. CONCLUSION

The water samples were collected and tested from one number of open well and sixteen numbers of deep bore wells. All ground water samples were not found non potable and to create awareness among people not to use the water for drinking, without treatment of boiling and filtration or reverse osmosis process.

*This article "Ground water quality analysis" was conducted in the year 2014.

VI. REFERENCES

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