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Der Chemica Sinica, 2014, 5(5):91-97



**Pelagia Research
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ISSN: 0976-8505
CODEN (USA) CSHIA5

Evaluation of water quality of sriperumpudur in Kancheepuram District in Tamilnadu

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ABSTRACT

The water quality of Sriperumpudur in Kancheepuram was studied to examine the suitability of ground water for domestic, agricultural and industrial purposes etc, The study area was situated between latitude of 12°58'00" and longitude of 79°47'30" of kanchipuram district. Six groundwater samples from tanks, Wells, Bore wells were randomly collected each during the post monsoon period of the month of January 2013 to May 2013. The samples were analyzed according to APHA (1995) and BIS (1991) standards. Physico-chemical parameters were analyzed and the results showed the samples were highly alkaline and that the water samples were not fit for drinking and domestic purposes in many places. The characteristic and availability of water has been greatly affected due to rapid industrialization, heavy road transportation, over - population, indiscriminate usage and disposal of water. It is concluded that the parameters shows drastic variations because of seasonal changes also. The variations in the parameters in the post monsoon were discussed.

Key words: Ground water, Sriperumpudur, Tanks, Wells, Post monsoon, Physico-chemical quality

INTRODUCTION

Water is said to be life since it controls most aspect of life. Freshwater made up of below 3% of the world's water resources but it is still regarded as the world's most important natural resources. Water is also essential for the healthy growth of environment. It acts as a universal solvent. It is most important that the water which people drink must be free of germs and chemicals and must be clear. The analysis of physical, chemical and biological properties is essential and the variation shows the quality of water. (1)

Groundwater is of major importance in providing the main water supply, and is intensively exploited for private, domestic and industrial use in many urban centers of the developing world. At the same time, the subsurface was come to serve, for much urban centers. It is a necessary input for many sectors of the global economy. Almost in all the developing countries availability and access of freshwater largely determines the state of economic growth and social development. The sources of water supply to the area are through hand-dug wells, boreholes and surface water. These sources of water supply especially from the hand-dug wells and surface water are polluted due to anthropogenic activities.

Sriperumpudhur is the important industrial place in kancheepuram, Sriperumbudur has seen rapid industrialization, attracting huge investments due to its proximity of upcoming Chennai Air port, infrastructure growth. There is no literature survey has been done on the quality of water in Sriperumpudhur taluk which is an upcoming industrial place of kancheepuram District in Tamilnadu

Kancheepuram district lakes receive partially treated and untreated sewage effluent, sewage polluted surface run-off and untreated effluent from nearby residence and industrial areas. The lakes are further polluted by indiscriminate throwing of household, clinical, pathological & commercial waste and discharge of spent fuel and human excreta. In fact, the lakes, tanks, ponds has become a dumping ground of all kinds of solid, liquid and waste of bank-side population.

MATERIALS AND METHODS

This study provides an assessment of the present status of water quality of different water samples in and around Sriperumpudhur based on APHA (1985), Trivedi R.K. and Goel.P.K. (1986). The analysis of water sample collected from five places during January, February, March April, May June 2013. It identifies locations along the Sriperumpudhur where surface and ground water of acceptable quality may be available for the usage throughout the year, including the dry season.

In this study we have collected water sample using cleaned polythene canes regularly for every month from 5 different places along Sriperumpudhur town. We have analyzed the sample for 7 different parameters in the laboratory immediately except BOD (pH, DO, BOD, SULPHATE, TURBIDITY, CHLORIDE, HARDESS) according to the prescribed standard method. (APHA and AWWA 1995, Trivedi & Goel 1986,) Each of these properties is useful in evaluating the chemical character of surface and ground water. (2)

RESULTS AND DISCUSSION

A complete analysis may determine the suitability of ground water for drinking, agriculture, irrigation and industrial purpose. The analysis of ground water sample includes the determination of concentration of the inorganic constituents present in addition to the measurement of P^H , Electrical conductance, total dissolved solids and other minor constituents.(3) In the present study, ground water from different area have been sampled and analyzed for post monsoon period.

LOCATION OF SAMPLES:

1. Pond water opposite to dharma Ayurvedic medical college,
2. Sriperumpudhur.
3. Lake water, Sriperumpudhur.
4. Pond water opposite to temple, Sriperumpudhur.
5. Tube well water, Sriperumpudhur.
6. Bore well water near to bus stand, Sriperumpudhur.



Fig.1. Sriperumpudhur Map

Table: 1 Physical and chemical parameters of Sriperumpudur, Kancheepuram District, Tamilnadu -2013

Parameters	Samples	January	February	March	April	May
Ph	S 1	7.72	8.34	8.60	8.98	9.05
	S 2	8.01	8.71	8.76	8.93	9.16
	S 3	8.34	8.56	8.78	9.23	9.40
	S 4	7.34	7.31	7.25	7.05	7.05
	S 5	7.65	7.82	8.50	8.52	8.54
Turbidity	S 1	0.4	0.8	0.8	1.1	1.2
	S 2	2.1	2.2	3.1	3.0	4.1
	S 3	5.4	5.2	5.3	6.2	6.3
	S 4	0.6	0.8	0.8	0.8	1.0
	S 5	1.0	0.8	0.9	1.1	1.1
Hardness	S 1	350	440	226.88	248	256.8
	S 2	120	167.5	86.01	100.04	106.01
	S 3	125	185	184.13	187	188.13
	S 4	710	435	415	415	425
	S 5	160	182.5	105.64	120	125.64
Chloride	S 1	143.6	173	175.8	176.5	177
	S 2	46.8	49.5	58	50.0	51
	S 3	163.7	175.6	178.13	188.0	188.1
	S 4	482.1	460.2	435	405	405.5
	S 5	66.6	68.5	70.6	71	71.6
Dissolved Oxygen	S 1	5.4	4.3	5.2	5.0	4.4
	S 2	5.6	5.9	5.9	5.6	5.2
	S 3	5.9	5.5	4.8	4.9	4.9
	S 4	4.4	5.7	6.2	6.4	6.2
	S 5	5.6	6.9	6.5	6.6	6.6
BOD	S 1	3.24	2.54	2.5	2.4	2.4
	S 2	2.7	3.54	2.95	2.8	2.5
	S 3	2.65	2.48	2.16	2.1	2.0
	S 4	2.64	3.41	3.2	3.2	3.0
	S 5	2.8	3.45	3.9	3.6	3.2
Sulphate	S 1	35	38	38	47	48
	S 2	11.2	11.4	11.2	11.2	11.2
	S 3	34.6	34.4	35.4	35.4	38.4
	S 4	82	85	90	96	97
	S 5	13.5	14	15	16	16

P^H OF WATER

The pH level of the drinking water is a measure of how acidic or basic it is – pH is related to the hydrogen ions in water and stands for “potential of hydrogen.”

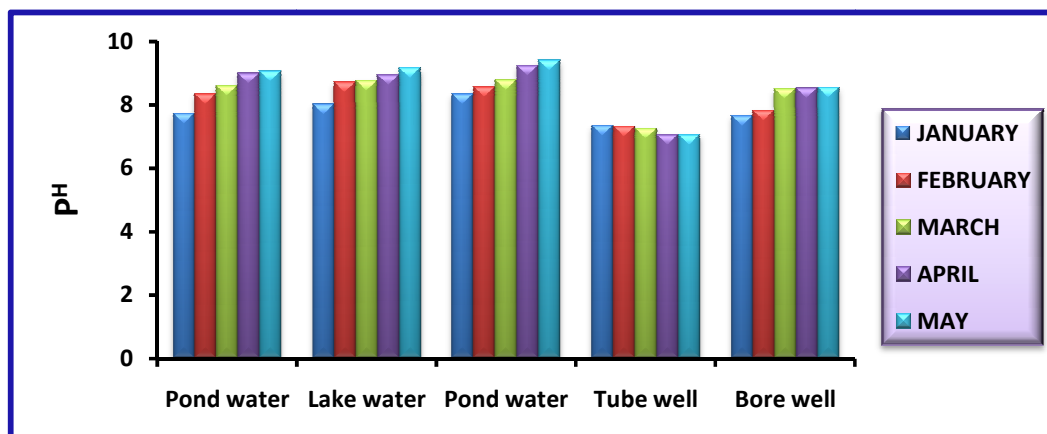


Fig.2. pH level of the drinking water in Sriperumpudur, Kancheepuram District

The pH value in the study area are in the range of $7.05 \pm .05$ to $9.40 \pm .05$ highly alkaline, it is above the BIS, WHO 1996 prescribed, limit (4). It shows that the study area is due the concentration of salts during the summer season except sample 4. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH

TURBIDITY

Turbidity in water is the range of 0.8 to 6.2. It is caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and plankton and other microscopic organisms. Turbidity is an expression of the optical property that causes light to be scattered and absorbed rather than transmitted with no change in direction or flux level through the sample. Correlation of turbidity with the weight or particle number concentration of suspended matter is difficult because the size, shape, and refractive index of the particles affect the light-scattering properties of the suspension. When present in significant concentrations, particles consisting of light-absorbing materials such as activated carbon cause a negative interference. In low concentrations these particles tend to have a positive influence because they contribute to turbidity. The presence of dissolved, colour-causing substances that absorb light may cause a negative interference. Some commercial instruments may have the capability of either correcting for slight colour interference or optically blanking out the colour effect.

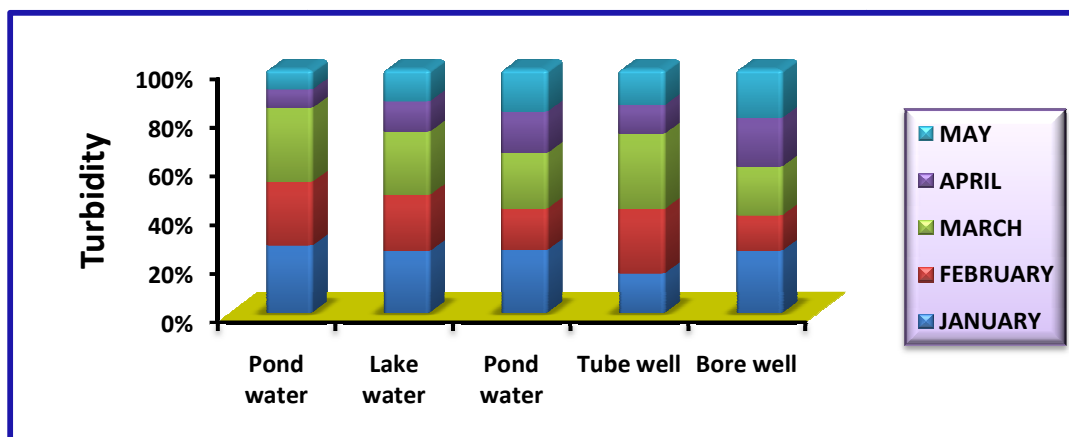


Fig.3. Turbidity of the drinking water in Sriperumpudur, Kancheepuram District

These S1 and S3 water samples was turbid, the temple pond is highly polluted due to the all sort of washing bathing cleaning, done in the pond. This contaminated pond would be a main source of communicable diseases and unsafe for domestic purposes.

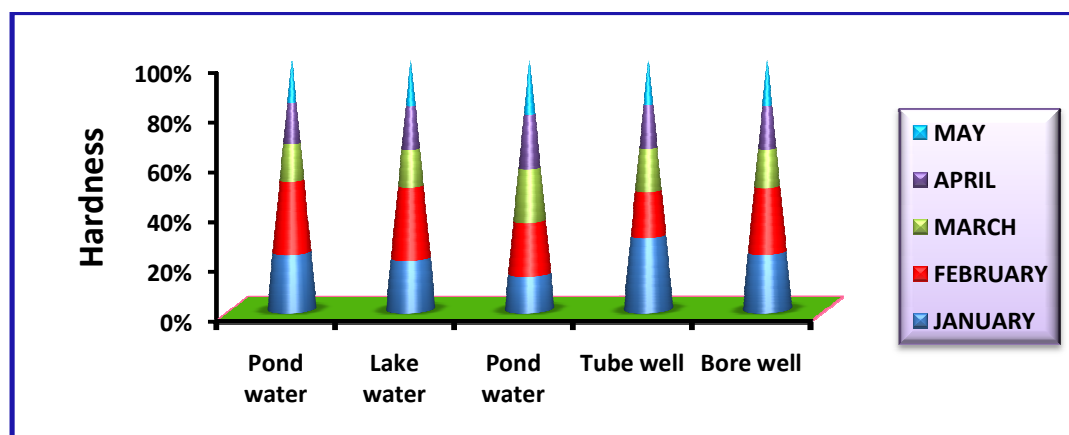


Fig.4. Hardness value of the drinking water in Sriperumpudur, Kancheepuram District

HARDNESS

Hardness value in the study area is ranged between 86.0 mg/l and 440mg/l. The permissible limit (WHO 1996) of domestic water should be 300mg/l. It exceeds the desirable permissible limit (5). The concentration of Ca and Mg is very high. During rainy season, it may be diluted. But the sample 1 and sample 4 are not fit for the domestic purposes. High value of hardness during summer can be due to decrease in water volume and increase of rate of evaporation of water. Similar results were obtained in the present S. A. Manjare, S. A. Vhanalakar 2010 (10)

CHLORIDE

Chloride content in the study area ranged between 46.8 and 482.1 mg/l .The recommended desirable limit of WHO1996 as 250 mg/l and the maximum desirable limit as 100mg/l for drinking purpose. The sample1 sample3 and sample4 are not fit for drinking as well as for the domestic and industrial purposes. In present study area maximum values of chloride reaches in summer. Similar results were reported by S. A. Manjare, S. A. Vhanalakar 2010 (10)

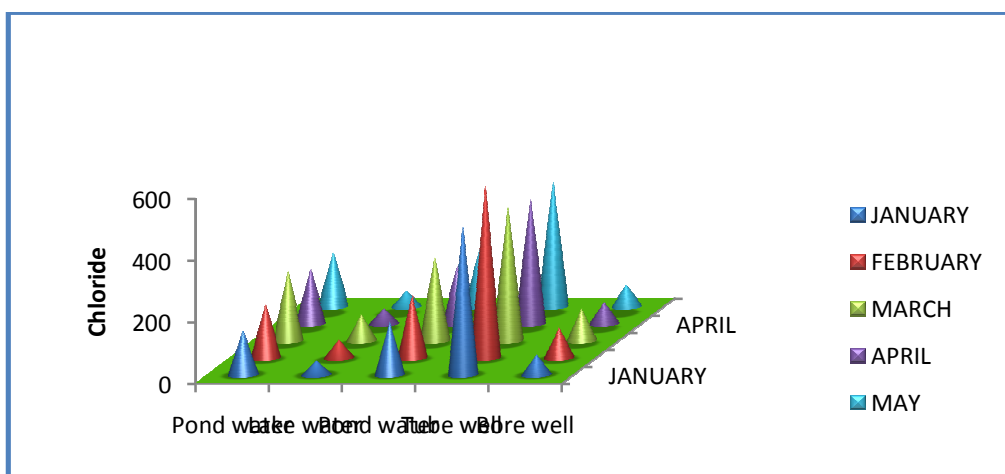


Fig.5. Chloride content of the drinking water in Sriperumpudur, Kancheepuram District

DISSOLVED OXYGEN

The dissolved oxygen is one of the properties in the water assessment. The optimum level of dissolved oxygen in waters is 4 – 6 ppm. The dissolved oxygen in sample 4 was higher than the permissible limit. This indicates there was no organic pollution occurred and does not affect the aquatic life (6).

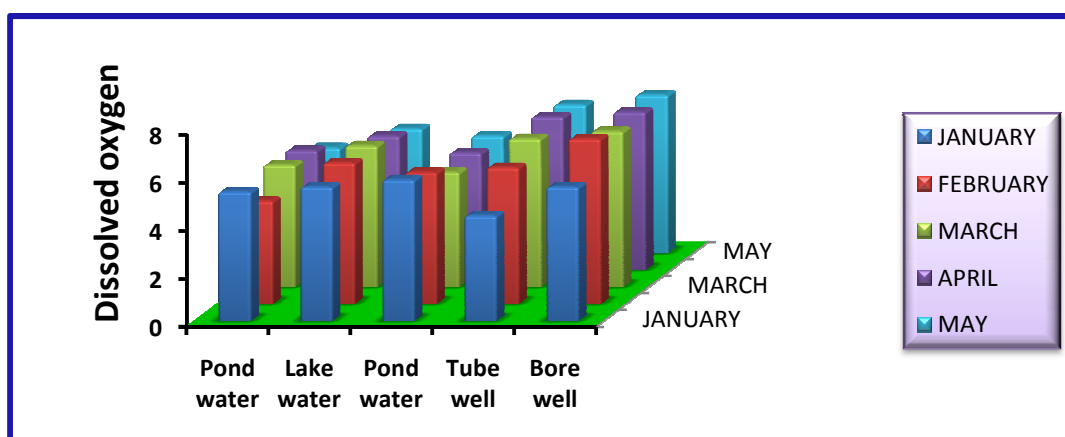


Fig.6. Dissolved oxygen of the drinking water in Sriperumpudur, Kancheepuram District

BIOCHEMICAL OXYGEN DEMAND (BOD)

The values of BOD observed are ranged from 2.0 to 3.6 mg/l .According to the ISI 1991prescribed limit of BOD in drinking water ranges from 1 to 3mg/l ,It exceeds in the sample 4 and 5 indicates the extent of pollution.(7).

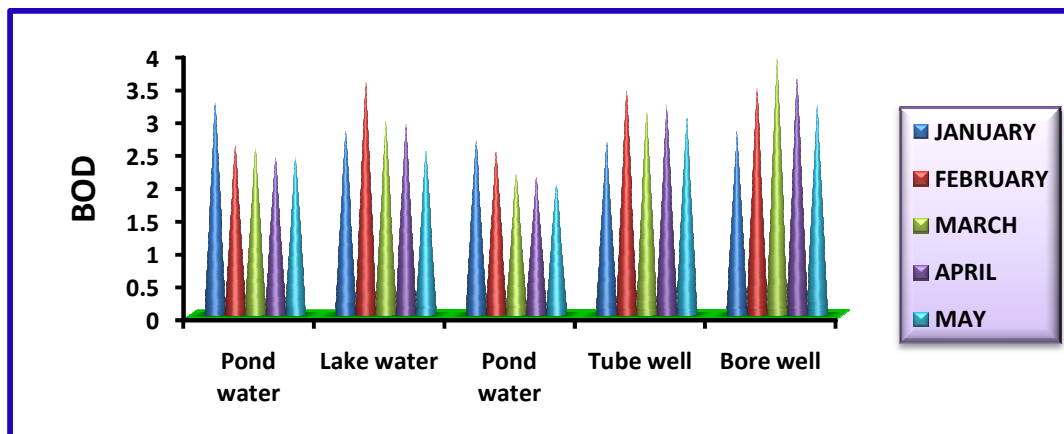


Fig.7. Biochemical Oxygen Demand (Bod) of the drinking water in Sriperumpudur, Kancheepuram District

DETERMINATION OF SULPHATE

The concentration of sulphate in the study area ranged from 11 to 97mg/l .The sulphate concentration of recommended limit is from 200-400 mg/l.

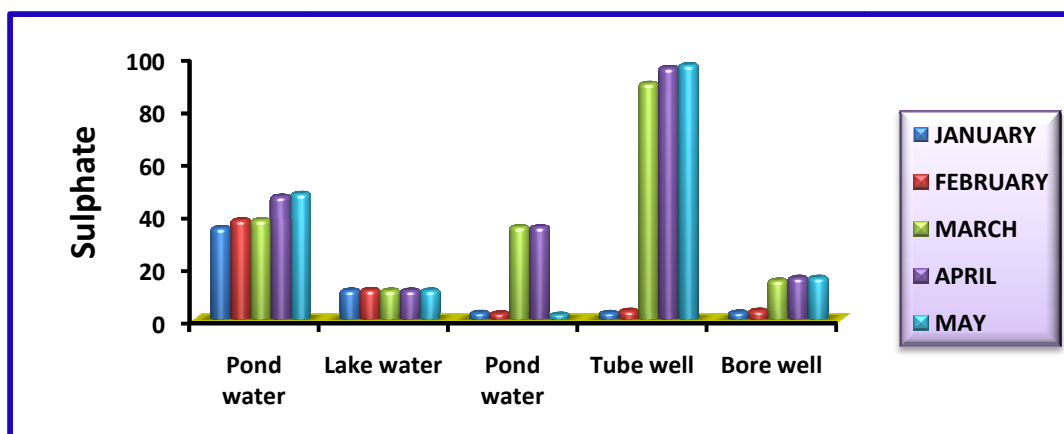


Fig.8. Concentration of sulphate in the drinking water in Sriperumpudur, Kancheepuram District

The concentrations of sulphate in all the sites are under the desirable limit. It is concluded that water are highly alkaline, pH above 8.5 were recorded and natural alkaline water may be due to the lime deposits at the source of water. Turbidity of water may be due to the clay or slit finely divided organic and inorganic matters not by Iron content, then on standing the turbidity decreases (8). Turbidity can be removed by Alum treatment. Ground water (Tube wells) has high Total Dissolved salts compared to the surface water. High TDS shows that the (Tube wells) have Ca Mg Na K SO⁴ Cl² which is beyond the safer limits. Tube wells have high concentration of chloride above the permissible limits. BOD tests indicate the organic pollutants are present due to sewage and industrial wastes (9). When organic level high, the Dissolved Oxygen level in water decreases and affects the aquatic life at site 4 than the other site. BOD were sufficient to support aquatic life.

CONCLUSION

In the present investigation it was found the maximum parameters were at the level of pollution except few parameters in few sites. The pond and Lake are highly polluted and unsafe for human use. The pollution of water

due to the natural and anthropogenic impacts such as industrial effluents, sewage discharge, heavy load of transportation, runoff from settlement and agricultural activities. Implementation of reverse osmosis which can optimise all the parameters, reuse of treated water can be used for gardening cleaning of vehicles, floor cleaning. Steps should be taken to educate the general public about the environmental pollution and create awareness of actual surroundings in which they live.

REFERENCES

- [1] B. Rajappa, S. Manjappa E. T. Puttaiah, D. P. Nagarajappa, *Advances in Applied Science Research*, **2011**, 2(5):143-150
- [2] H V. Vyas and V A. Sawant., (2008), *Nature environment and pollution technology*,7(2),pp 261-266
- [3] M. O. A.Oladipo, R.L. Njinga, A. Baba, and I. Mohammed, *Advances in Applied Science Research*, **2011**, 2(6):123-130
- [4] E.E.Kontis1, Gaganis Global NEST Journal Hydro chemical characteristics and groundwater quality in the island of Lesbos, Greece **2012** vol 14, No 4, pp 422-430.
- [5] G. Patil Shilpa., Chonde Sonal Goroba, Jadhav Aasawari Suhas, D.Prakash . Raut, **2011**, *Advance in applied Science research*, 2(4) (229-234)
- [6] N. Pramod. Kamble, B.Viswas. Gaikwad and R.Shashikant. Kuchekar, *Der Chemica Sinica*, **2011**, 2 (4):229-234
- [7] N.C.Mondal, .V.K.Saxena. and V.S.Singh. *current science* **2005** vol. 88, No.12 pp 1988-1994
- [8] N.Pramod . Kamble, Viswas , B. Gaikwad and Shashikant R. Kuchekar, *Der Chemica Sinica*, **2011**, 2 (4):229-234
- [9] Manjra, S.Analysis of water quality using physico-chemical parameters tandalge tank in Kolhapur district, Maharashtra. **2010**”Vol 1, Issue 2, **2010**, pp 115-119