

## An assessment of the quality of water from Tiruchendur temple, Tamil Nadu

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### SUMMARY

Tiruchendur is very popular sea shore temple. Being the second Aarupadai veedu of Lord Muruga, millions of pilgrims from all over India visit Tiruchendur every year. Thousands of people take the pilgrims tours every day. They require good accommodation, hospitality and drinking water. The quality of water is one of essential criteria for the tourism so the present work aimed to analyse the drinking water quality and to analyse the quality of water used for domestic purposes. Physico-chemical studies of water were made from Dec. 2006 to March 2007 at an intermittent period of four months. The study also included the collection and study of garbage materials in the beach area.

### Key words :

Physico-chemical,  
Characters,  
Water quality,  
Garbage,  
Pollutants

Tourism today is one of the worlds fastest growing industries. Most of the countries considered tourism as potential economic development activity. In all the advanced countries, domestic tourism occupies predominant place. In recent year, the number of domestic tourists has gone up very high. The origin of domestic tourism in India has to be traced in pilgrimage. Pilgrimage may be reported as the oldest branch of home tourism. Tamil Nadu is a unique and fascinating state. Pilgrim tourism is one of the major segments of tourism in Tamil Nadu. They visit places of worships according to the faith. Tiruchendur is 56km from Tirunelveli and can be reached by trains and by buses.

Tiruchendur is very popular sea shore temple. Being the second Aarupadai veedu of Lord Muruga, Tiruchendur finds an important place on the world map. Millions of pilgrims from all over India visit Tiruchendur every year. A large number of pilgrims visit Tiruchendur on various religious occasions such as Soora Samharam, Thiru Karthigai, Thai Poosam, Pongal and Maasi Thiruvizha. Due to mass gathering of pilgrims on such occasion problem of garbage and sewage disposal becomes deplorable. There is a holy well Nazhi Kinaru, which is a not a drinking water reservoir. But it has a great religious value for pilgrims. The well is believed to be millions time potent than the Ganges rivers, because by bathing in the Ganges, they sets only "Mukti" but by bathing Nazhi Kinaru, one achieves affections and love

of Lord Murugan. Thus, bathing makes its water highly polluted. Similarly, during the festival day thousands of pilgrims take bath simultaneously in sea water. Being an important domestic tourist centre, it is necessary to examine water quality. So, it was realized to analyse the well, sea and drinking water to assess the state of pollution and to suggest some remedial measures.

### MATERIALS AND METHODS

#### *The study area:*

Thiruchendur or Thiruchendur Alaivai is a holy place near Tirunelveli, in Tamil Nadu. It is situated on the coast of Manner. It is 40 Kms from Tuticorin. Geographically it is located between 9°00 to 7°30'N latitude and 78 to 30'E longitude. The physiographic feature of the coast is raised beaches with sand bars parallel to the present coastline.

#### *Location of sampling points:*

Three sampling points were selected to study the water quality of Thiruchendur. Samples were collected from the holy water tank in Saravana Theertham (Nazhi Kinaru), water available at the temple for drinking purpose and the surface sea water from seashore.

#### *Sampling:*

Sampling was carried at seasonally from monsoon to summer months of December 2006 to March 2007. The water quality was

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compared on a festival day and ordinary day of every month. The water was collected twice in a month. Each time the sample was collected in duplicate from three sites. The sample was used for physico-chemical analysis. The sample was collected in properly washed labeled polypropylene bottle. The samples were kept in the refrigerator until tested. The physiochemical analysis carried to find out pH, Electrical conductivity, Bicarbonate, Sulphate, Calcium, Magnesium, Potassium, TDS, Alkalinity, Chloride, Free CO<sub>2</sub> and DO (APHA, 1989).

The garbage materials were collected from beach area on festival and ordinary days. These waste materials identified and counted.

## RESULTS AND DISCUSSION

Every month the temple flooded with pilgrims for any one of the festival. Water quality assessment was carried out for the sea water, drinking water, and well water (Nazhi Kinaru) separately. The dates and characteristic of the sampling days are given Table 1.

Sr. No.	Month	Date	Character
1.	December	19.12.2006	Ordinary day
		30.12.06	Full moon day
2.	January	19.01.07	Ordinary day
		15.01.07	Pongal
3.	February	02.02.07	Thai Poosam
		04.02.07	Ordinary day
4.	March	01.03.07	Zasti
		15.03.07	Ordinary day

The results of the physico-chemical characters of the well, sea and drinking water samples are represented in Table 2. The maximum pH (8.5) was observed in the month of March 2007 and minimum pH value (6.1) was observed in the month of December 2006. The maximum values of total alkalinity were recorded in the festival days. Water body with alkalinity value higher than 100mg/l is nutritionally rich (Philipose, 1959). Alkalinity may be due to the minerals which dissolved in water from soil (Surve *et al.*, 2005). High alkalinity values are indicative of the eutrophic nature of water body (Kaur *et al.*, 1996). Calcium ions are very important element influencing the flora of ecosystem which plays potential role in metabolism and growth. It has an effect on pH and carbonate content of the ecosystem. The range of calcium content varied from 0.35 to 1.9 (meq/l) in drinking water. The maximum content of chloride 37.6 (meq/l) was recorded in the well water. High concentration is due to large quantity of organic matter in it (Thresh *et al.*, 1944), which was

further supported by Adoni (1985). The drinking water was collected from the drinking water tape (Best and Co., filtered drinking water supply unit) in the temple area. It was evident from the results that the drinking water in the festival days contain high amount of physico-chemical parameters compared with ordinary days (Table 2). For example, the sodium contented in the ordinary days ranged from 0.3 – 1.13 (meq/l) and festival days it ranged from 1.13 – 5.91 (meq/l).

The study revealed that the Nazhi Kinaru was badly polluted due to intense human activities. Mass bathing and continuous addition of detergent materials were enriching the well with organic pollutants that may result in severe eutrophication. According to the International Standards for quality of water resources provided by the WHO, the water of Nazhi Kinaru was not suitable for human consumption. In festival days, the condition of water became very critical due to fewer amounts of water compared with number of pilgrims. In the seasons of festivals the sea becomes slightly polluted due to disposal of large amount of garbage.

The garbage materials were collected from the beach area. Waste collected varied from 6-8 bags on ordinary days and 12 – 14 bags on (weighing approximately 230 – 250 kg) festival days, which was sorted and counted. Out of the waste collected and analysed, the major contribution were plastic carry bags (15%), disposable plates and plastic tea cups (20%). The remaining contribution was from food wrappers (10%), mineral water bottles (7%), Ice cream stick and cups (10%), cigarette covers, match sticks, and tobacco packing (8%) and un-segregated waste (10%). A few liquor bottles were also found. Other waste material was biodegradable banana, algal thallus, palm leaves, a few flowers and fruits. These types of waste clearly show the inadequacy of proper garbage removal system, in and around the beach area.

Besides these statistical figures following reasons were also observed which are contributory to the problem.

- Religious thinking and mind of pilgrims who give out many religious things into sea.
- There is not even single public dustbin in the sea shore to throw out garbage. So, the waste, disposed of by people ultimately reaches the sea water
- There are many uncontrolled cattle and pigs also making temple area ugly.
- Absence of enough number and poor maintenance of bathrooms toilets at the temple area is also noteworthy.
- Carelessness of local administrations, Pollution Control Board and Municipality.

**Table 2 : Seasonal fluctuation in physico-chemical parameters of drinking water of Tiruchendur temple during the period of December 2006 to March 2007**

Parameters	Sample	December		January		February		March	
		Ordinary day	Festival day	Ordinary day	Festival day	Ordinary day	Festival day	Ordinary day	Festival day
pH	Drinking water	6.8	6.1	7.2	7.9	7.9	8.5	8.5	7.6
	Well water	6.8	7.5	7.4	7.9	7.9	7.9	7.6	7.5
	Sea water	7.4	8.0	8.2	8.0	7.9	8.2	8.1	8.0
Electrical conductivity (meq/lit)	Drinking water	0.14	0.16	0.13	0.35	0.28	0.59	0.47	1.53
	Well water	5.46	4.5	4.2	4.37	4.37	4.26	4.88	4.64
	Sea water	46.0	46.0	50.2	54.0	53.20	46.5	49.8	46.0
Bicarbonate (meq/Lit)	Drinking water	1.05	0.5	0.6	0.7	1.0	1.2	3.1	5.0
	Well water	14.0	7.6	7.3	8.5	7.7	7.7	8.9	7.0
	Sea water	16.0	16.0	14.0	5.0	7.0	9.0	45.0	16.0
Suphate (meq/Lit)	Drinking water	-	-	-	-	-	-	-	-
	Well water	2.9576	8.4568	6.5891	5.53	8.4563	6.3999	7.7708	8.4568
	Sea water	400.00	400.00	475.0	505.0	498.0	450.0	265.0	400.00
Calcium (meq/Lit)	Drinking water	0.4	0.35	0.6	0.9	0.9	0.5	1.9	6.0
	Well water	14.0	4.0	4.0	3.3	3.7	4.0	5.2	9.1
	Sea water	39.5219	39.5219	11.530	30.4075	27.6149	7.6295	17.579	23.0
Magnesium (meq/Lit)	Drinking water	0.05	0.05	-	0.5	0.80	1.3	1.65	3.6
	Well water	5.5	12.4	10.9	11.3	12.8	12.2	13.8	16.7
	Sea water	25.0	25.0	18	21	20.5	24	460	23.0
Sodium (meq/Lit)	Drinking water	0.32	1.1304	0.7391	2.0869	1.1304	4.0869	1.1304	5.9128
	Well water	33.478	30.52	26.086	27.826	26.086	25.217	22.608	19.565
	Sea water	85.0	85.0	92	74	95	96.0	51.0	85.0
Potassium (mg /l)	Drinking water	0.0256	0.0256	0.0256	0.0512	0.0256	0.0769	0.0256	0.0769
	Well water	1.4871	1.564	1.282	1.3076	1.2820	1.2564	1.1280	1.2564
	Sea water	343.60	343.60	382.60	434.78	402.15	336.95	394.82	343.60
Total dissolved solids (mg /l)	Drinking water	8	4	8	8	12	8	12	8
	Well water	2.5	3.5	3.9	3.2	3.5	3.9	3.7	3.5
	Sea water	7.692	7.692	10.0	10.2564	10.2564	9.6153	8.974	7.692
Alkalinity (mg /l)	Drinking water	4.4	4.5	1.9	2.3	2.8	2.4	3.8	2.8
	Well water	20	20	20	28	24	26	22	24
	Sea water	33.5	52.8	37	35.9	42.8	35.8	33.8	36.2
Chloride (mg /l)	Drinking water	16	8	16	12	18	12	8	12
	Well water	37.6	32.5	28.25	29.7	27.6	28.6	32.0	31.0
	Sea water	24	12	20	12	16	18	22	16
Free CO <sub>2</sub> (mg /l)	Drinking water	0.375	1.125	0.75	4.7	1.8	4.7	1.1	10.3
	Well water	8	8	12	8	16	8	12	8
	Sea water	8	8	4	8	16	12	14	6
Dissolved oxygen (mg /l)	Drinking water	10.128	9.1951	9.7560	10.5382	9.1350	10.5100	9.1951	9.128
	Well water	14.1772	12.1951	12.9620	14.1891	12.1951	13.8191	14.9620	13.1951
	Sea water	8.9230	8.0996	7.7101	13.7749	9.0715	12.7749	9.0996	8.7101

– From the analysed parameters, it is concluded that the drinking water quality during the festival days are not in the range of WHO recommendations indicating the non-suitability of water for drinking purpose.

– The municipality can take initiatives in the regard by providing garbage disposal point which are accessible

easily and can be sponsored and maintained by private agencies. The packing and supply materials used by local vendors should be checked to avoid plastic.

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