

Pollution Status Assessment of Mahadeb Dighi, South Tripura

1.0 Introduction :

The physico-chemical characteristics of any aquatic ecosystem and the nature and distribution of its biota are directly related to and influenced by each other and controlled by a multiplicity of natural regulatory mechanisms. However, because of man's exploitation of the water resources, the normal dynamic balance in the aquatic ecosystem is continuously disturbed, and often results in each dramatic response as depletion of fauna and flora, fish kill, change in physico- chemical character etc. Artificial changes which lead to such ecological responses are referred to as pollution and pollutional stage may reach a stage when these valuable aquatic resources are no longer safe for human use.

Lakes are considered to be one of the most productive and biologically rich inland surface water ecosystem. They are either natural or man-made. Several important urban conglomerations have various natural and man-made lakes, reservoirs, which objectively fulfill various demands of mankind. The growing urbanization, scarcity of potable water and ever increasing anthropogenic influences have been constantly exerting pressure on surface water bodies.

In recent times, the faulty developmental policies and mismanagement of surrounding areas of a lake have resulted into unprecedented nutrient enrichment of water bodies causing cultural eutrophication, which is manifested by raised trophic status, increased rate of sedimentation, loss of water storage capacity, lowered retention period and deteriorated water quality.

The availability and quality of fresh water resources have always remained an important consideration in taking decision about any development project, and planners usually confine themselves to the

problems of meeting requirement of water and its disposal after use. Until recently the water bodies were thought to be the cheapest convenient refuse disposal systems. This tendency has resulted in indiscriminate and excessive loading of waste matter into the aquatic system beyond their capacity of self purification.

2.0 Background :

Nature has been bountiful and the environs of Udaipur are generously provided with many lakes and streams. Udaipur is hence known as “City of Lakes” as well. Mahadev Dighi is one of the largest lakes at Udaipur, South Tripura. Previously Mahadev Dighi was popularly known as the ‘Bijoy Sagar’. The lake was dug during the intermediary period between Dhanya Manikya and Govinda Manikya’s reign. The lake is 750 ft. in length and 450 ft. in breadth.

Dense human settlements are present in the catchment area of the Dighi. Few pakka latrines are present at the western and southern side of Mahadev Dighi the outlets of which directly or indirectly drawn into the Dighi. The Dighi is contaminated with domestic sewage and waste water through one drain located on the north-eastern side. One outlet is also present at the corner of south- eastern side, by which the water level of the Dighi is balanced. Even now the urban population depends heavily on this Dighi for their daily needs which include bathing, washing, fishery etc. But solid waste generated by the surrounding households area also dumped directly or indirectly into the Mahadev Dighi.

3.0 Objectives :

The water bodies are important surface water resources which facilitate harvesting and storage of rain water from their catchment areas and replenishment of the ground water. Due to increasing urbanization along the catchment area within past few years, the quality of the water of these water bodies are deteriorating fast creating social, economical and technological problems.

The present study has been undertaken with a view to assessing the pollution load of **Mahadev Dighi** of Udaipur, South Tripura.

4.0 Methodology :

In order to assess the water quality of Mahadev Dighi, a scientific team of Tripura State Pollution Control Board went to Udaipur and collected water samples from twelve points covering the whole area of Mahadev Dighi during July, 2004, and analysed the different parameters that determine water quality in the Laboratory of the Board.

The Physico-Chemical quality of surface water was analysed using the standard methods given in APHA (American Public Health Association).

5. 0 Study Areas :

Previously the water of the Mahadev Dighi was used as drinking water. With the progressive quality deterioration, water uses may successively shift from drinking to bathing, washing, water for livestock, agriculture and industrial uses and so on.

As a result of different human activities through out the Dighi, it is difficult to select the sampling locations of the Dighi. For physico-chemical analysis of the present study, the twelve sampling locations were selected covering the entire Dighi as given in Table-1.

Table-1

Sl. No.	Name of the location	Reason for selection
1.	North Side of Mahadev Dighi	Bathing ghat
2.	Middle of north Side of Mahadev Dighi	Bathing ghat & heap of solid waste
3.	North Side of Mahadev Dighi	Bathing ghat & entrance of one drain
4.	East Side of Mahadev Dighi	Bathing ghat & outlet of pakka latrine
5.	Middle of east Side of Mahadev Dighi	Eutrophied
6.	East Side of Mahadev Dighi	Bathing ghat
7.	South Side of Mahadev Dighi	Heap of solid waste & outlet of pakka latrine
8.	Middle of south Side of Mahadev Dighi	Eutrophied
9.	South Side of Mahadev Dighi	Bathing ghat
10.	West Side of Mahadev Dighi	Bathing ghat
11.	Middle of west Side of Mahadev Dighi	Bathing ghat & adjacent to park
12.	West Side of Mahadev Dighi	Bathing ghat & Immersion of idols

6. 0 Observations :

Visual : Waste water and domestic sewage from houses situated on the East, South, and Northern bank of Mahadev Dighi are discharged into Mahadev Dighi. The Dighi is also contaminated with domestic sewage and waste water through one drain located on the north-eastern side. In addition solid wastes generated by the surrounding households are also dumped directly or indirectly into the Mahadev Dighi.

Temperature : Water temperature showed variation at different sites. Minimum temperature recorded was 28°C whereas maximum temperature was 30.5 °C.

pH : The pH value of water samples of the Mahadev Dighi were within the standard limits. Observed pH values ranged from 6.84 to 8.64 at different sites. (Tables 2,3,4 & 5)

Conductivity : There was wide variation of conductivity at different sites of Mahadev Dighi. The maximum Conductivity value was recorded as 174 μ mho/cm & the minimum value was found to be 134 μ mho/cm.(Tables 2,3,4 & 5)

Turbidity : Turbidity showed a wide amplitude of variation at all the study points. The minimum value observed was 4 NTU and maximum was 31 NTU as shown in table 2,3,4 & 5.

Colour : The colours of water samples of Mahadev Dighi were within the standard limits. The observed values ranged from 0.6 1/m to 3.3 1/m at different sites.

Total Suspended Solid : The value of Total Suspended Solid ranged from 6 mg/l to 40 mg/l at different sites. (Tables 2,3,4 & 5)

Total Dissolved Solid : The total dissolved solid also showed wide variations at different sites of the Dighi. The maximum & minimum values of total dissolved solid were found to be 208 mg/l & 142 mg/l.

Total Alkalinity : The values of Total alkalinity indicate that there is fluctuations among all the sixteen sites, ranging from 39.68 mg/l to 61.50 mg/l. (Tables 2,3,4 & 5)

Phenolphthalein Alkalinity : The observed phenolphthalein alkalinity of all the twelve sites were nil.

Dissolved Oxygen : From tables 2,3,4 & 5 a significant observation comes out in respect of Dissolved Oxygen (DO) of the water samples of Mahadev Dighi. **It was found that the DO values of five sites were below the standard limit (BIS: 6 mg/l). The DO value of the five sites were ranged from 4.96 mg/l to 5.85 mg/l.** The DO value of the rest sites were above the standard limit. The variation of DO value of all the sites are graphically represented in fig-1 at page 13.

Bio-chemical Oxygen Demand : From the tables 2,3,4 & 5 it may be seen that the Bio-chemical Oxygen Demand (BOD) values of six sites of Mahadev Dighi were higher than the standard limit (BIS: 3 mg/l) and ranges from 3.56 mg/l to 7.37 mg/l and the BOD value of rest six sites were within the standard limit. The variation of BOD value of all the sites are graphically represented in fig- 2 at page- 14.

Chemical Oxygen Demand : There was variation of Chemical Oxygen Demand (COD) value among the water samples of all the sites of Mahadev Dighi. The maximum COD value was recorded as 41 mg/l & the minimum value was found 5 mg/l.

Nitrates : The observed values of Nitrate of the water samples of nine sites of Mahadev Dighi are nil. The Nitrate content of the water samples of the rest sites were much lower than the standard limit and ranges from 0.01 mg/l to 0.15 mg/l. The standard limit of Nitrate prescribed by BIS is 20 mg/l.

Nitrites : The observed value of Nitrites of the water samples of all the sites of Mahadev Dighi ranged from 0.00 mg/l to 0.03 mg/l.

Ammonical Nitrogen : The values of ammonical nitrogen were recorded at all the sites from where water samples were drawn. The observed values of Ammonical Nitrogen of the water samples of five sites of Mahadev Dighi are nil. But the values of ammonical nitrogen of seven sites ranged from 0.004 mg/l to 0.13 mg/l whereas the standard limit is 1.2 mg/l.

Sulphate : The observed sulphate content of the water samples of all the sites ranged from 9.18 mg/l to 19.59 mg/l. The sulphate content of the water samples of all the sites were lower than the standard limit. The standard limit of sulphate prescribed by BIS is 400 mg/l.

Total Hardness : From the tables 2,3,4 & 5, it may be seen that the Total Hardness of the water samples of Mahadev Dighi were within the standard limit (300 mg/l). The maximum value of Hardness was found 93.14 mg/l and minimum value was found 49.02 mg/l.

Calcium : From the tables 2,3,4 & 5, it may be seen that the value of Calcium of the water samples of Mahadev Dighi were within the standard limit (BIS: 75 mg/l). The maximum value of Calcium was found to be 15.72 mg/l and minimum value 7.86 mg/l.

Magnesium : From the tables 2,3,4 & 5, it may be seen that the value of magnesium of the water samples of Mahadev Dighi were within the standard limit (BIS: 24.28 mg/l). The maximum value of magnesium was found to be 15.48 mg/l and minimum value 2.38 mg/l.

Phosphate : There was variation of Phosphate content among the water samples of all the sites of Mahadev Dighi. The value of the phosphate content ranged from 0.00 mg/l to 0.29 mg/l.

Chlorides : The Chloride contents of the water samples of all the sites were lower than the standard limit. The standard limit of Chloride prescribed by BIS is 250 mg/l.

Arsenic : **Arsenic was absent** in the water samples of all the sites of Mahadev Dighi.

Note :

- **If DO is above standard value (6 mg/l) the water quality is good.**
- **If BOD is more than 3 mg/l the water quality is bad.**
- **If COD is high then the water quality is bad.**
- **If Ammonical Nitrogen is more than 1.2 mg/l the water quality is also bad.**

**Physico - Chemical Results of Surface
Water Samples of Mahadev Dighi,
Udaipur,
South Tripura**

Date of Collection : 13.07.2004

Table : 2

S1 No	Parameters	S1	S2	S3	Standar d (BIS)
1	Temperatures (°C)	29.0	29.0	29.5	-
2	Total Suspended Solid (mg/l)	18	40	6	-
3	Total Dissolved Solid (mg/l)	180	208	176	500
4	Volatile Solid (mg/l)				-
5	Fixed Dissolved Solid (mg/l)	112	108	100	-
6	pH	7.47	6.84	7.46	6.5-8.5
7	Colour (1/m)	0.9	3.3	1.2	10
8	Turbidity (NTU)	12	31	14	-
9	Conductivity (μ mho/cm)	155	174	151	-
10	Total Alkalinity(mg/l)	47.61	49.60	43.64	-
11	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12	DO (mg/l)	6.29	5.13	5.75	6
13	BOD (mg/l)	3.85	1.65	2.65	3
14	COD (mg/l)	15	9	21	-
15	Sulphate (mg/l)	11.23	11.23	19.59	400
16	Hardness (mg/l)	83.33	88.24	88.24	300
17	Calcium (mg/l)	9.82	9.82	11.79	80.10
18	Magnesium (mg/l)	14.29	15.48	14.29	24.28
19	Nitrate (mg/l)	0.15	Nil	Nil	20
20	Nitrite (mg/l)	0.01	0.03	0.01	-
21	Ammonia (NH ₃ -N) (mg/l)	0.130	Nil	0.028	1.2
22	Phosphate (mg/l)	0.29	0.19	0.14	-
23	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24	Chloride (mg/l)	19.23	24.04	26.44	250

Locations :

- S1 : North Side of Mahadev Dighi, Udaipur, South Tripura.
 S2 : Middle of north Side of Mahadev Dighi, Udaipur, South Tripura.
 S3 : North Side of Mahadev Dighi, Udaipur, South Tripura.

**Physico - Chemical Results of Surface
 Water Samples of Mahadev Dighi,
 Udaipur,
 South Tripura**

Date of Collection : 13.07.2004

Table : 3

Sl No	Parameters	S4	S5	S6	Standards (BIS)
1.	Temperatures (°C)	30.5	29.5	30.0	-
2.	Total Suspended Solid (mg/l)	18	14	28	-
3.	Total Dissolved Solid (mg/l)	164	128	150	500
4.	Volatile Solid (mg/l)				-
5.	Fixed Dissolved Solid (mg/l)	74	78	84	-
6.	pH	7.0	8.53	7.19	6.5-8.5
7.	Colour (1/m)	1.5	0.6	0.7	10
8.	Turbidity (NTU)	16	13	4	-
9.	Conductivity (μ mho/cm)	158	149	150	-
10.	Total Alkalinity(mg/l)	47.61	55.55	41.67	-
11.	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12.	DO (mg/l)	5.85	6.10	7.86	6
13.	BOD (mg/l)	2.55	1.09	3.56	3
14.	COD (mg/l)	25	12	18	-
15.	Sulphate (mg/l)	14.08	15.92	14.49	400
16.	Hardness (mg/l)	93.14	88.24	68.63	300
17.	Calcium (mg/l)	13.75	13.75	9.82	80.10
18.	Magnesium (mg/l)	14.29	13.11	10.72	24.28
19.	Nitrate (mg/l)	Nil	Nil	Nil	20
20.	Nitrite (mg/l)	0.02	Nil	Nil	-
21.	Ammonia (NH ₃ -N) (mg/l)	0.004	Nil	Nil	1.2

22.	Phosphate (mg/l)	0.06	0.03	0.03	-
23.	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24.	Chloride (mg/l)	19.23	19.23	19.23	250

Locations :

S4 : East Side of Mahadev Dighi, Udaipur, South Tripura.

S5 : Middle of east Side of Mahadev Dighi, Udaipur, South Tripura.

S6 : East Side of Mahadev Dighi, Udaipur, South Tripura.

**Physico - Chemical Results of Surface
Water Samples of Mahadev Dighi,
Udaipur,
South Tripura**

Date of Collection : 13.07.2004

Table : 4

S1 No	Parameters	S7	S8	S9	Standards (BIS)
1.	Temperatures (⁰ C)	29.0	29.5	30.5	-
2.	Total Suspended Solid (mg/l)	22	14	24	-
3.	Total Dissolved Solid (mg/l)	148	156	150	500
4.	Volatile Solid (mg/l)				-
5.	Fixed Dissolved Solid (mg/l)	108	90	80	-
6.	pH	7.70	7.43	8.19	6.5-8.5
7.	Colour (1/m)	1.6	0.8	2.2	10
8.	Turbidity (NTU)	6	13	8	-
9.	Conductivity (μ mho/cm)	149	150	154	-
10.	Total Alkalinity(mg/l)	61.50	39.68	49.60	-
11.	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12.	DO (mg/l)	7.17	6.19	4.96	6
13.	BOD (mg/l)	4.18	1.67	2.07	3
14.	COD (mg/l)	41	5	9	-
15.	Sulphate (mg/l)	10.41	11.43	16.33	400

16.	Hardness (mg/l)	88.24	68.63	58.82	300
17.	Calcium (mg/l)	9.82	9.82	11.79	80.10
18.	Magnesium (mg/l)	15.48	10.72	7.15	24.28
19.	Nitrate (mg/l)	0.07	Nil	Nil	20
20.	Nitrite (mg/l)	Nil	Nil	Nil	-
21.	Ammonia (NH ₃ -N) (mg/l)	0.059	0.072	0.069	1.2
22.	Phosphate (mg/l)	0	0.19	0.02	-
23.	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24.	Chloride (mg/l)	24.04	21.63	19.23	250

Locations :

S7 : South Side of Mahadev Dighi, Udaipur, South Tripura.

S8 : Middle of south Side of Mahadev Dighi, Udaipur, South Tripura.

S9 : South Side of Mahadev Dighi, Udaipur, South Tripura.

**Physico - Chemical Results of Surface
Water Samples of Mahadev Dighi,
Udaipur,
South Tripura**

Date of Collection : 13.07.2004

Table : 5

S1 No	Parameters	S10	S11	S12	Standard (BIS)
1.	Temperatures (°C)	28.5	29.0	28.0	-
2.	Total Suspended Solid (mg/l)	16	21	19	-
3.	Total Dissolved Solid (mg/l)	142	178	166	500
4.	Volatile Solid (mg/l)				-
5.	Fixed Dissolved Solid (mg/l)	126	119	112	-
6.	pH	7.54	8.64	7.67	6.5-8.5
7.	Colour (1/m)	1.2	0.7	2.9	10
8.	Turbidity (NTU)	7	11	19	-
9.	Conductivity (μ mho/cm)	157	134	171	-
10.	Total Alkalinity(mg/l)	45.63	41.66	49.60	-
11.	Phenolphthalein Alkalinity	Nil	Nil	Nil	-

	(mg/l)				
12.	DO (mg/l)	7.86	9.10	5.11	6
13.	BOD (mg/l)	7.37	3.9	3.64	3
14.	COD (mg/l)	31	19	14	-
15.	Sulphate (mg/l)	13.06	9.18	10.41	400
16.	Hardness (mg/l)	49.02	53.92	53.92	300
17.	Calcium (mg/l)	15.72	7.86	15.72	80.10
18.	Magnesium (mg/l)	2.38	8.34	3.57	24.28
19.	Nitrate (mg/l)	Nil	Nil	0.06	20
20.	Nitrite (mg/l)	Nil	Nil	0.01	-
21.	Ammonia (NH ₃ -N) (mg/l)	0.119	Nil	Nil	1.2
22.	Phosphate (mg/l)	0.10	0.03	0.09	-
23.	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24.	Chloride (mg/l)	21.63	19.23	24.04	250

Locations :

S10 : West Side of Mahadev Dighi, Udaipur, South Tripura.

S11 : Middle of west Side of Mahadev Dighi, Udaipur, South Tripura.

S12 : West Side of Mahadev Dighi, Udaipur, South Tripura.

7.0 Conclusion :

The above findings indicate that Mahadev Dighi is polluted by continuous inflow of a large amount of solid waste dumped from the surrounding residential area and untreated domestic sewage discharged into Mahadev Dighi by one drain. The domestic sewages were heavily loaded with organic matter, ammonia, pathogens etc. and are producing severe environmental stress as a result the Mahadev Dighi was mostly Eutrophied.

From the observed value of Bio-Chemical Oxygen Demand, it may safely be concluded that the bacteriological load in Mahadev Dighi is high due to Eutrophication and dumping of waste materials. From the observation it is also seen that the Chemical Oxygen Demand (COD) was slightly higher. This is also a bad indication.

It may hence be concluded that the water of Mahadev Dighi is not suitable for drinking, bathing and other purposes.

8.0 Recommendations :

- **Eutrophied area of Mahadev Dighi should be clean immediately.**
- **The one drain having domestic sewage and waste water inflows should be diverted immediately through another way.**
- **The outlet of the pakka latrines which is directly or indirectly drawn into the Mahadev Dighi should be stopped immediately.**
- **Dumping of solid waste including polythene into the Mahadev Dighi should be stopped immediately.**
- **Continuous monitoring should be required.**

**Physico - Chemical Results of Surface Water Samples of
Mahadeb Dighi, Udaipur, South Tripura**

Date of Collection : 13.07.2004

Table : 1

Sl. No	Parameters	S1	S2	S3	Standard (BIS)
1	Temperatures (^o C)	29.0	29.0	29.5	-
2	Total Suspended Solid (mg/l)	18	40	6	-
3	Total Dissolved Solid (mg/l)	180	208	176	500
4	Volatile Solid (mg/l)				-
5	Fixed Dissolved Solid (mg/l)	112	108	100	-
6	pH	7.47	6.84	7.46	6.5-8.5
7	Colour (1/m)	0.9	3.3	1.2	10
8	Turbidity (NTU)	12	31	14	-
9	Conductivity (μ mho/cm)	155	174	151	-
10	Total Alkalinity(mg/l)	47.61	49.60	43.64	-
11	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12	DO (mg/l)	6.29	5.13	5.75	6
13	BOD (mg/l)				3
14	COD (mg/l)	Nil	9	Nil	-
15	Sulphate (mg/l)				400
16	Hardness (mg/l)	83.33	88.24	88.24	300
17	Calcium (mg/l)	9.82	9.82	11.79	80.10
18	Magnesium (mg/l)	14.29	15.48	14.29	24.28
19	Nitrate (mg/l)	0.15	Nil	Nil	20

20	Nitrite (mg/l)	0.01	0.03	0.01	-
21	Ammonia (NH ₃ -N) (mg/l)	0.130	Nil	0.028	1.2
22	Phosphate (mg/l)				-
23	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24	Chloride (mg/l)	19.23	24.04	26.44	250

Locations :

S1 : North Side of Mahadeb Dighi, Udaipur, South Tripura.

S2 : North Side of Mahadeb Dighi, Udaipur, South Tripura.

S3 : North Side of Mahadeb Dighi, Udaipur, South Tripura.

Physico - Chemical Results of Surface Water Samples of Mahadeb Dighi, Udaipur, South Tripura

Date of Collection : 13.07.2004

Table : 2

Sl. No	Parameters	S4	S5	S6	Standard (BIS)
1	Temperatures (°C)	30.5	29.5	30.0	-
2	Total Suspended Solid (mg/l)	18	14	28	-
3	Total Dissolved Solid (mg/l)	164	128	150	500
4	Volatile Solid (mg/l)				-
5	Fixed Dissolved Solid (mg/l)	74	78	84	-
6	pH	7.0	8.53	7.19	6.5-8.5

7	Colour (1/m)	1.5	0.6	0.7	10
8	Turbidity (NTU)	16	13	4	-
9	Conductivity (μ mho/cm)	158	149	150	-
10	Total Alkalinity(mg/l)	47.61	55.55	41.67	-
11	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12	DO (mg/l)	5.85	6.10	7.86	6
13	BOD (mg/l)		1.09	3.56	3
14	COD (mg/l)	Nil	41	Nil	-
15	Sulphate (mg/l)				400
16	Hardness (mg/l)	93.14	88.24	68.63	300
17	Calcium (mg/l)	13.75	13.75	9.82	80.10
18	Magnesium (mg/l)	14.29	13.11	10.72	24.28
19	Nitrate (mg/l)	Nil	Nil	Nil	20
20	Nitrite (mg/l)	0.02	Nil	Nil	-
21	Ammonia (NH ₃ -N) (mg/l)	0.004	Nil	Nil	1.2
22	Phosphate (mg/l)				-
23	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24	Chloride (mg/l)	19.23	19.23	19.23	250

Locations :

S4 : East Side of Mahadeb Dighi, Udaipur, South Tripura.

S5 : East Side of Mahadeb Dighi, Udaipur, South Tripura.

S6 : East Side of Mahadeb Dighi, Udaipur, South Tripura.

**Physico - Chemical Results of Surface Water Samples of Mahadeb Dighi,
Udaipur, South Tripura**

Date of Collection : 13.07.2004

Table : 3

Sl. No	Parameters	S7	S8	S9	Standard (BIS)
1	Temperatures (⁰ C)	29.0	29.5	30.5	-
2	Total Suspended Solid (mg/l)	22	14	24	-
3	Total Dissolved Solid (mg/l)	148	156	150	500
4	Volatile Solid (mg/l)				-
5	Fixed Dissolved Solid (mg/l)	108	90	80	-
6	pH	7.70	7.43	8.19	6.5-8.5
7	Colour (1/m)	1.6	0.8	2.2	10
8	Turbidity (NTU)	6	13	8	-
9	Conductivity (μ mho/cm)	149	150	154	-
10	Total Alkalinity(mg/l)	61.50	39.68	49.60	-
11	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12	DO (mg/l)	7.17	6.19	4.96	6
13	BOD (mg/l)	4.18	1.67	2.07	3
14	COD (mg/l)	Nil	Nil	Nil	-
15	Sulphate (mg/l)				400
16	Hardness (mg/l)	88.24	68.63	58.82	300
17	Calcium (mg/l)	9.82	9.82	11.79	80.10
18	Magnesium (mg/l)	15.48	10.72	7.15	24.28

19	Nitrate (mg/l)	0.07	Nil	Nil	20
20	Nitrite (mg/l)	Nil	Nil	Nil	-
21	Ammonia (NH ₃ -N) (mg/l)	0.059	0.072	0.069	1.2
22	Phosphate (mg/l)				-
23	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24	Chloride (mg/l)	24.04	21.63	19.23	250

Locations :

S7 : South Side of Mahadeb Dighi, Udaipur, South Tripura.

S8 : South Side of Mahadeb Dighi, Udaipur, South Tripura.

S9 : South Side of Mahadeb Dighi, Udaipur, South Tripura.

**Physico - Chemical Results of Surface Water Samples of Mahadeb Dighi,
Udaipur, South Tripura**

Date of Collection : 13.07.2004

Table : 4

Sl. No	Parameters	S10	S11	S12	Standard (BIS)
1	Temperatures (°C)	28.5	29.0	28.0	-
2	Total Suspended Solid (mg/l)	16	21	19	-
3	Total Dissolved Solid (mg/l)	142	178	166	500
4	Volatile Solid (mg/l)				-
5	Fixed Dissolved Solid (mg/l)	126	119	112	-

6	pH	7.54	8.64	7.67	6.5-8.5
7	Colour (1/m)	1.2	0.7	2.9	10
8	Turbidity (NTU)	7	11	19	-
9	Conductivity (μ mho/cm)	157	134	171	-
10	Total Alkalinity(mg/l)	45.63	41.66	49.60	-
11	Phenolphthalein Alkalinity (mg/l)	Nil	Nil	Nil	-
12	DO (mg/l)	7.86	9.10	5.11	z6
13	BOD (mg/l)	7.37	3.9	3.64	3
14	COD (mg/l)	Nil	Nil	Nil	-
15	Sulphate (mg/l)				400
16	Hardness (mg/l)	49.02	53.92	53.92	300
17	Calcium (mg/l)	15.72	7.86	15.72	80.10
18	Magnesium (mg/l)	2.38	8.34	3.57	24.28
19	Nitrate (mg/l)	Nil	Nil	0.06	20
20	Nitrite (mg/l)	Nil	Nil	0.01	-
21	Ammonia (NH ₃ -N) (mg/l)	0.119	Nil	Nil	1.2
22	Phosphate (mg/l)				-
23	Arsenic (mg/l)	Nil	Nil	Nil	0.05
24	Chloride (mg/l)	21.63	19.23	24.04	250

Locations :

S10 : West Side of Mahadeb Dighi, Udaipur, South Tripura.

S11 : West Side of Mahadeb Dighi, Udaipur, South Tripura.

S12 : West Side of Mahadeb Dighi, Udaipur, South Tripura.