



Research Article

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## Seasonal Variation in Physico-Chemical Parameter of Tapti River Drinking Water in Varangaon Dist. Jalgaon, Maharashtra

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### ABSTRACT

*In the physico-chemical analysis various quality parameters were measured such as temperature, pH, electrical conductivity, total dissolved solids, total hardness, Calcium ion magnesium ion and total alkalinity for drinking water .and compared with (IS:10500). Also compared monthly and seasonal variation in parameters of drinking water in Varangaon region.*

**Keywords:** Physico-chemical parameters, Tapti river, water quality.

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### INTRODUCTION

Varangaon is a most important Nagarpalika in Jalgaon district of Maharashtra state in India..It is located 5Km East of Thermal power station Deepnagar .The ordnance factory which manufactures gun powder and similar military products for the Indian Armed forces is located in Varangaon .Varangaon Nagarpalika having population near about 45,000. Cordinates 21<sup>0</sup>1'12"N latitude and 75<sup>0</sup>54'36"E longitude small river Bhogavati flows through the town, although it is mostly dry for eight month of the year. Bhogavati later joins the Tapti River. The Hatnur dam which is located 11 Km. north on the river Tapti. Provides water to the Varangaon.The River Bhogavati divides town into two parts, on north old village and on south near highway new town.

Tapti River originates in Betul district from a place called Multai.The Sanskrit name of Multai is Multapi and the term means the origin of Tapti Mata or the Tapti River. Tapti River above the sea is about 2000ft. The area is essentially a high land tract, divided naturally into three distinct portions differing their superficial aspects. The character of their soil and their geological formation is similar throughout the upper source of the river. The Northern part of the district forms an irregular plain of the sand stone formation. The area is well-wooded tract, in many places stretching out in charming glades like an English park. It is one of the major rivers of peninsular India with length of around 724km.Basin area 65.145km<sup>2</sup> and source is Satpuda range

### EXPERIMENTAL SECTION

**Study Area:-**The Varangaon region lies between 21<sup>0</sup>1'12"N latitude and 75<sup>0</sup>54'36"E longitude.

**Sample Collections:-**Samples were collected in plastics container (2- lit.)To avoid predictable changes in characteristics at 8am to 10am.in the month of Junr2015-May-2016.as per standard procedure (APHA-1998).

**Materials and Methods:**-The collected samples were analyzed for different physico-chemical parameters such as, Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Hardness (TH), Calcium ion, Magnesium ion and Total Alkalinity (TA) etc.as per the standard methods (APHA-1998) [1].And the result were compared with the Indian standard (IS: 10500) for drinking water. Some parameters were measured in laboratory by titration method [2, 3].

## RESULTS AND DISCUSSION

In the present study physico-chemical parameters of drinking water (Tapti River) in Varangaon were studied for a period of 12 month June-2015 to May-2016. As shown in table-1 and seasonal variation is shown in table-2.

Water temperature is an important factor for aquatic flora. The most suitable temperature for plant growth is 20°C to 35 °C[4].The average water temperature ranging from 25.2 °C to 30 °C during the study period. The maximum temp.35.5 °C was observed during month of May-2016 and minimum temp.28.5 °C was observed during month of November. The variation in temperature due to change in season [6].The temp. Started falling from rainy season to winter season and then started increasing towards summer season [7].

The pH value of water is important indication of water quality. pH determines the suitability of water for various purposes [8]. The average pH of river water was found ranged between 7.0 to 7.25 during the study period. The maximum pH was found 7.4 in month of March and minimum pH was observed 6.8 in month of July. The pH of drinking water in whole study period is observed in acceptable range 6.5-8.5[5].

Electrical conductivity is a measure of water's capacity to convey electric current. Conductivity of water varies directly with the temp [7].And is proportional to its dissolved minerals matter content. Electrical conductivity determination is very rapid, so the quantity of dissolved salts of water sample can be ascertained quickly. In the present study average EC varies between 201 to 250(µs/cm.). During the study period. The maximum EC 270 (µs/cm.), was observed in month of May and minimum 175(µs/cm.) was observed in month of August.

In the present study TDS average ranged from 175 mg/l. to 240 mg/l.in the study period. According to Indian standard and WHO.TDS value should be less than 500 mg/l. for drinking water [1] .All the samples in study period was observed between the ranges. Maximum TDS was observed 270 mg/l in month of May and minimum value of TDS 165 mg/l. was observed in month of September i.e. in rainy season.

**Table: 1-Monthly Variation in Physico-chemical Parameters of Tapti River drinking water in Varangaon during June 2015-May 2016**

Month/ Parameters	June	Jul	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
Temp.	25.1	25.3	25.0	25.4	25.1	23.5	24.5	24.5	24.5	27.8	27.8	35.5
pH	6.9	6.8	6.9	7.0	7.0	7.1	7.2	7.3	7.2	7.3	7.3	7.1
EC	198	178	175	180	201	205	220	210	230	245	260	270
TDS	170	172	169	165	175	181	190	195	210	225	235	270
TH	90	95	99	97	110	120	115	119	140	142	145	143
Ca <sup>++</sup>	25	29	29	32	30	31	35	29	35	39	40	45
Mg <sup>++</sup>	20	22	23	21	19	25	23	24	22	24	25	30
TA	120	121	122	119	130	128	125	124	131	133	135	137

**Table: 2-Seasonal Variation in Physico-chemical Parameters of Tapti River drinking water in Varangaon during 2015-2016**

Season/ parameter	Monsoon Season			Winter season			Summer season		
	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
Temp.	25.0	25.4	25.2	23.5	25.1	24.3	24.5	35.5	30
pH	6.8	7.0	6.9	7.0	7.3	7.15	7.1	7.4	7.25
EC	175	198	186.5	201	220	211	230	270	250
TDS	165	172	168.5	175	195	185	210	270	240
TH	95	99	97	110	120	115	140	145	142.5
Ca <sup>++</sup>	25	32	28.5	29	35	32	35	45	40
Mg <sup>++</sup>	20	23	21.5	19	25	22	22	30	26
TA	119	122	160.5	124	130	127	131	137	134

Temperature (°C), EC(µs/cm.), Other in mg/l.

Total hardness in water is the sum of concentration of alkaline earth metal cat ion such as  $\text{Ca}^{++}$  and  $\text{Mg}^{++}$  including Sulphates and Chlorides [3]. The total hardness average was observed between 110 mg/l. to 142.5 mg/l in the study period. Maximum hardness was observed 145 mg/l in month of April and minimum 95 mg/l. was observed in month of June in the study period [10]. Calcium ion average was observed between 29 mg/l. to 40 mg/l. and Magnesium ion was observed between 19mg/l. to 26 mg/l. in the study period.

Total alkalinity of the Tapti river drinking water in Varangaon region varied average from 124 mg/l. to 134 mg/l. in study period. Maximum value of TA 137 mg/l. was measured in month of May [9]. And minimum value 119 mg/l observed in month of September in the study period [11, 12].

### CONCLUSION

Most of the parameters in the region were found to be under desirable limit for drinking water. Moreover parameters are changed by seasons

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