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ORIGINAL ARTICLE

# STATUS AND WATER QUALITY ASSESSMENT IN SONEGAON TALAVA, NAGPUR DISTRICT M.S. INDIA

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**Abstract:**

*The Present study has been carried out to investigate the effect of some physical, chemical and bacteriological aspects of Sonegaon Talava. The samples were analyzed for non-biological and bacteriological appearance colour, pH, turbidity, TDS, conductivity, temperature, DO, chloride, sulphate, phosphate, fluoride, COD and MPN. Water samples were collected seasonally from Sonegaon Talava at 8.30 to 10.30 am. The analysis carried out as per APHA (2005). The estimated water quality parameters have been compared with WHO, ICMR and ISI standards.*

**KEY WORDS:**

MPN, DO, bacteriology, sodium.

## INTRODUCTION

Water is one of the essential requirements of life. Without water neither individual nor the organized community can survive. A plentiful good quality of water supply is essential for the survival of a human beings, flora and fauna. Status of assessment is of prime importance in our nation from anthropogenic activities for survival of any form of life. It is our first duty to conserve a precious resource for future generation. (Kataria 1997, Tijare 2001). Water is polluted due to anthropogenic activities, religious events like Gauri-Ganesh, Durga idol immersion, surface run off and inflow of city sewage water. The decaying bottom of the lake shows black mud due to decaying organic matter. The marginal area of lake is heavily covered by vegetations. Physicochemical parameters influence the aquatic ecosystem both individually and collectively and their interaction creates a biotic environment (Salaskar & Yeragi, 1997). The present study was carried out with effect of some physico-chemical and bacteriological aspects of Sonegaon Talava of Nagpur district.

## MATERIALAND METHODS:

Seasonal water samples were collected from June 2007 to May 2008, at 8.30 to 10.30 a.m. The present study deals with quality for the same source from different seasons. viz. monsoon (S1), winter (S2) and summer (S3). Samples were collected in clean and sterilized bottles and followed standard procedure of APHA (2005).

## RESULT AND DISCUSSION:

The estimated values of physico-chemical and bacteriological parameters of water samples have been presented in Table-1 for three seasons namely monsoon (S1), winter (S2) and summer (S3) of Sonegaon Talava. The standard physico-chemical and bacteriological values of drinking water samples are

presented in Table-2. The physico-chemical and bacteriological study denote that all the parameters were found well and within the permissible limit and represented in figure A. All collected samples were clear and colourless in winter and summer except monsoon.

**COLOUR AND TEMPERATURE :**

All the water samples were colourless, clear indicating the absence of colloidal substances, suspended and decomposed vegetation. Temperature is basically important for the chemical and biological reactions of organisms in water. The increase in temperature decreases the potability of water because of elevated temperature. The temperature of sample lies between 19.8 and 30.0 ºC, (Table-1).

**Hydrogen ion concentration (pH) :**

pH of natural water is an important environmental factor, the pH are linked with the chemical changes, species composition and life processes. It is generally considered as an index for suitability of the environment. In the present work pH was observed to vary from 7.9-8.2. for drinking water pH range of 6.0-8.5is recommended. pH of water is regulated by CO2 and bicarbonates (Hutchinson 1957). In the present study, alkaline pH levels observed during summer season could be due to enhanced rate of evaporation, (Ingole 2009).

**Turbidity :**

Turbidity is a striking characteristic feature to know the physical status of talava. The suspended particle, soil particles, discharged effluents, decomposed organic matter, total dissolved solids as well as the microscopic organisms increase the turbidity of water, which interfere with the penetration of light. The turbidity was recorded maximum during the monsoon 9.0 NTU while the winter season turbidity was recorded as 3.0 NTU and minimum recorded during summer season as 2.0 NTU. The turbidity also depends on the rainfall.

**Total solids :**

Total solid values were found to be in the range between 718.0 and 900.0 mg/lit. It was maximum in the monsoon and minimum in the summer season (Pawar 2009). The higher values of total solids during monsoon may be attributed to an increased load of soluble salts from the catchment areas due to the surface runoff.

**Conductivity :**

Conductance of water sample varied from (1.21 – 1.38 mmho/cm). The conductivity was recorded maximum during the summer season (1.38 mmho/cm) and low in winter season (1.21 mmho/cm).

**Total Alkalinity :**

The total alkalinity in the talava has been recorded high in summer (196.0 mg/lit). while it was minimum in winter season (155.0 mg/lit). The total alkalinity shows marked seasonal variations. The values during the study period were high in summer and low during winter season.

**Total Hardness :**

The total hardness is maximum recorded during the summer season (218.0)mg/lit., while it was moderate in winter season (192.0)mg/lit., and minimum during monsoon season (165.0)mg/lit., (Jayaseeti 2006). The major cations present in natural water as calcium and magnesium, as its main source being leaching of rocks in the catchments. Its concentration restricts water used, while it is an important in the exoskeletons of arthropods and shells in mollusks. Very high concentration of hardness imparts an unpleasant taste to the potable water, (Piska 2001).

**Chloride :**

Chloride content of water sample range between(10.7 and 21.8 mg/lit). The observation was

within prescribed limit. The presence of chloride in natural water can be attributed to dissolution of salt deposits, discharges of effluents, sewage discharge, drainage contamination from refuge leachates. Each of the sources may results in local contamination of both surface and ground water.

**Dissolved oxygen :**

Dissolved oxygen is essential for growth of algae and fish production. It did not show any definite annual pattern but its higher concentration during winter and early monsoon months are related with water temperature. In the present work dissolved oxygen concentration was observed (6.3 - 7.1 mg/lit).

**Sodium :**

Sodium of water samples collected lies in the range from (12.72-15.68 mg/lit). All the samples collected were within the permissible limit.

**Potassium :**

Potassium of water samples collected lies in the range from (7.31-7.98 mg/lit). All the samples collected were within the permissible limit. High potassium values may cause nervous and digestive disorder, (Tiwari 2001).

**Fluoride :**

Fluoride of water sample collected was in the range of (0.381-0.538 mg/lit). All the samples were within the prescribed limit

Higher concentration of fluoride causes dental fluorosis at the same time less concentration than 0.5 mg/lit., causes dental carries and dental molting, (Karunakaran 2009).

**Chemical Oxygen Demand :**

The chemical oxygen demand is a measure of oxygen equivalent to the requirement of oxidizing organic matter contents by a strong oxidizing agent. The COD test is helpful in indicating toxic conditions and the presence of biologically resistant organic substances. In the present study COD was found to be (68.0-79.0)mg/lit.

**Sulphate :**

Sulphate of water samples collected lies in the range of 23.08-32.81 mg/lit. All the samples collected are within the prescribed limit.

**Phosphate :**

The phosphate was noted to be between 0.73 and 0.93 mg/lit. All the samples collected are within the prescribed limit. More phosphate causes eutrophic condition and changes in status of water, (Kachnwaha 1999).

**MPN :**

Most Probable Number was observed in the range of (1.0-2.0)/100 ml water sample. MPN found within permissible limit during the study period. More coliforms create faecal pollution. The season wise variation and status of water quality are given in figure-A.

The assessment of water sample by Physico-chemical and bacteriological parameters of Sonegaon Talava reveals that all physico-chemical and bacteriological parameters were found to be well in condition and met guidelines for all seasons except during winter (S2) and summer (S3) for alkalinity and hardness as prescribed by Indian standard specification. However, monitoring and assessment is important to detect contamination and status of precious resource and provide information to aware the people. The result and discussion reveal that there is no major fluctuation and noted the present resource is pollution free. The status of water is good and oligotrophic.

**Table -1. Quality of Water for Three Seasons (2007-2008) in Sonegaon Talava, Nagpur, M.S.**

| Parameters | Monsoon $s_1$ | Winter $s_2$ | Summer $s_3$ |
|---|---|---|---|
| Appearance | Yellowish | clear | clear |
| Colour | Yellowish | clear | clear |
| pH | 7.9 | 7.89 | 8.2 |
| Turbidity (NTU) | 9.0 | 3.0 | 2.0 |
| Total Solids | 900.0 | 798.0 | 718.0 |
| Conductivity(mmho/cm) | 1.27 | 1.21 | 1.38 |
| Temperature | 21.5 | 19.8 | 30.0 |
| Total Alkalinity | 172.0 | 155.0 | 196.0 |
| Total Hardness | 165.0 | 192.0 | 218.0 |
| Chloride | 12.9 | 10.7 | 21.8 |
| Dissolved Oxygen | 6.5 | 7.1 | 6.3 |
| Sodium | 13.66 | 12.72 | 15.68 |
| Potassium | 7.43 | 7.31 | 7.98 |
| Fluoride | 0.431 | 0.381 | 0.538 |
| COD | 77.0 | 68.0 | 79.0 |
| Sulphate | 25.52 | 23.08 | 32.81 |
| Phosphate | 0.8 | 0.73 | 0.93 |
| MPN / 100ml | 2 | 1 | 2 |

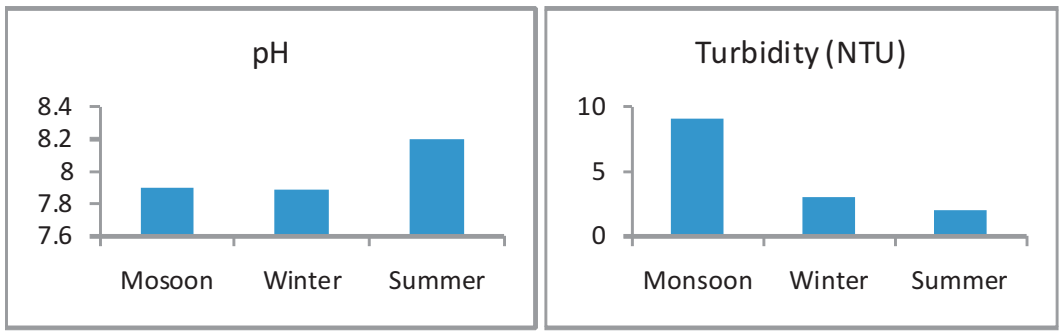
All parameters are expressed in mg/lit except pH, turbidity, temperature, conductivity & MPN.

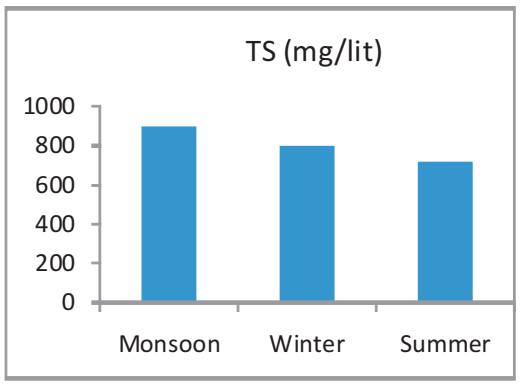
**Table -2. The Standard Physico-Chemical and Bacteriological Values of Drinking Water.**

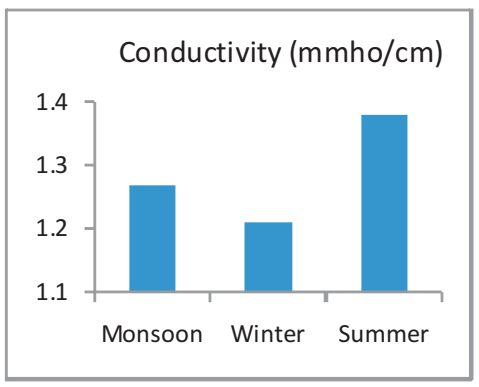
| Parameters | ISI | ICMR | WHO |
|---|---|---|---|
| Colour | 10 | 5 | 5 |
| Turbidity | 10 | 5 | 5 |
| Conductivity | - | - | 1400 |
| pH | 6.5-6.8 | 7.0-8.5 | 7.0-8.5 |
| TDS | - | - | 500 |
| TA | - | - | 1200 |
| TH | 300 | 300 | - |
| Chlorides | 250 | 250 | 200 |
| Fluorides | 0.6-1.2 | 1.0 | 0.5 |
| Sulphate | 150 | 200 | 200 |
| TS | 5000 | - | - |
| DO | 4-6 | - | - |
| Sodium | 200 | - | - |
| Potassium | - | - | - |
| MPN/100 | - | 4 | - |

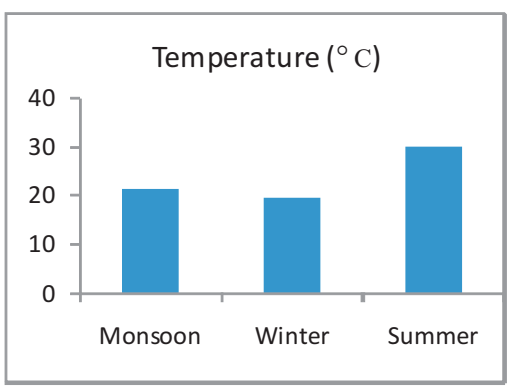
Note: All units are expect pH, temperature, conductivity and MPN in mg/lit.

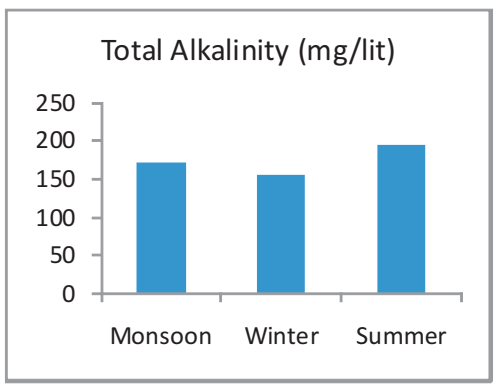
**Figure-A. Showing the Physico-chemical Parameters for Three Seasons in Sonegaon Talava During (2007-2008).**

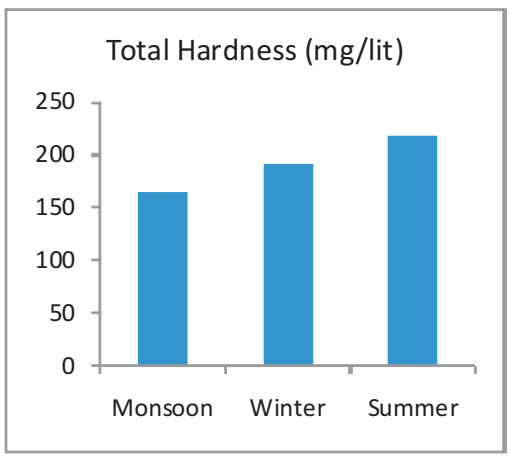


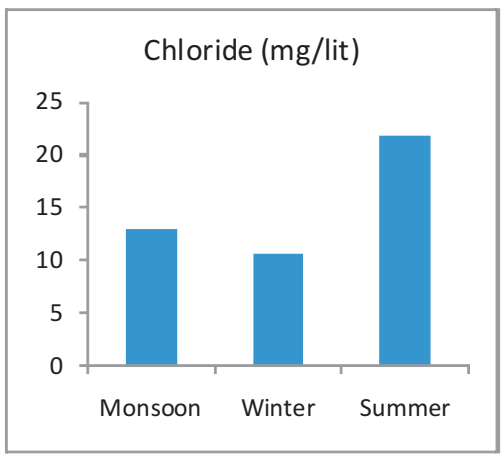

TS (mg/lit)
1000
800
600
400
200
0
Monsoon
Winter
Summer

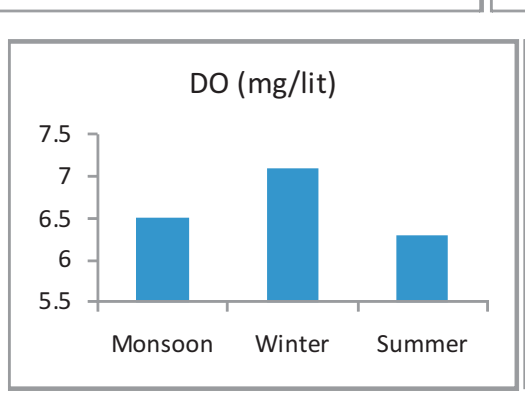

Conductivity (mmho/cm)
1.4
1.3
1.2
1.1
Monsoon
Winter
Summer

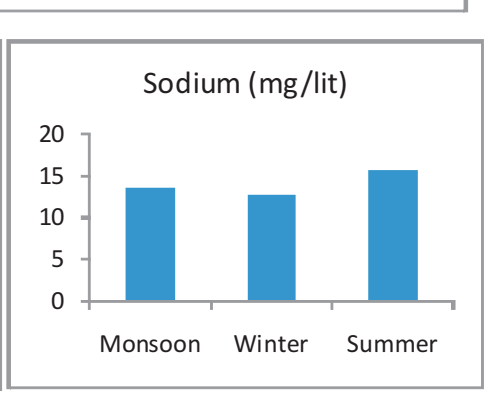

Temperature (° C)
40
30
20
10
0
Monsoon
Winter
Summer

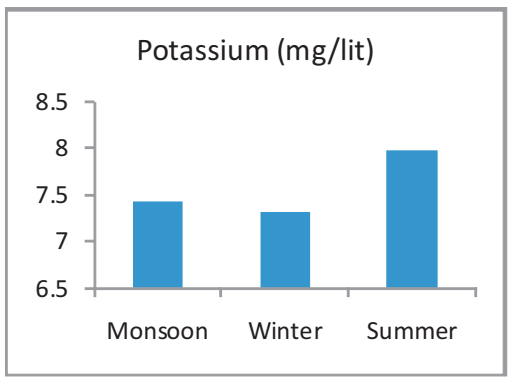

Total Alkalinity (mg/lit)
250
200
150
100
50
0
Monsoon
Winter
Summer

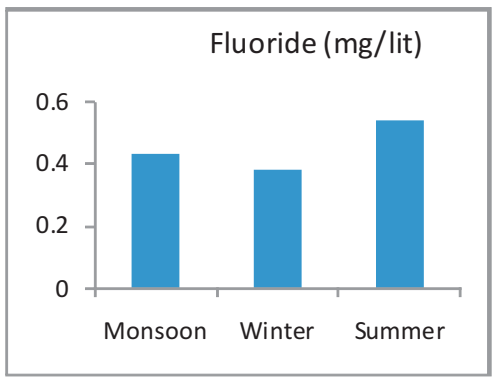

Total Hardness (mg/lit)
250
200
150
100
50
0
Monsoon
Winter
Summer

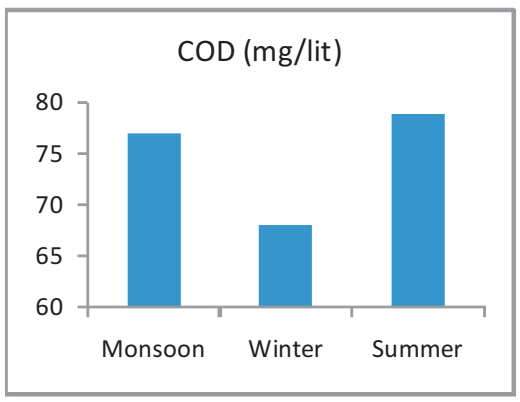

Chloride (mg/lit)
25
20
15
10
5
0
Monsoon
Winter
Summer

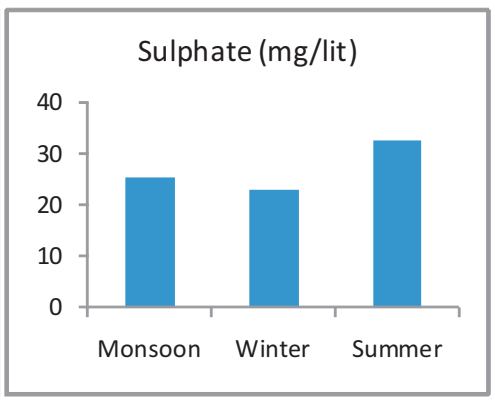

DO (mg/lit)
7.5
7
6.5
6
5.5
Monsoon
Winter
Summer

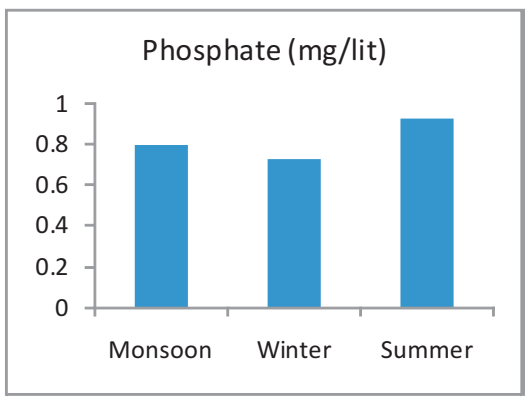

Sodium (mg/lit)
20
15
10
5
0
Monsoon
Winter
Summer




**CONCLUSION :**

To summarize, the present investigation, it can be concluded that the physico-chemical and bacteriological parameters of Sonegaon Talava viz, temperature, pH, chloride, fluoride, COD, sulphate, phosphate, MPN and total solids are in permissible limit. Variations are mostly due to climatic change, bathing cattle, interferences of raw waste, washing cloths, throwing chemicals, through detergent and idol immersion. The water from present talava is good for fishing, drinking after normal processing. Therefore it is recommended to conserve this water body for future generation.

**REFERENCES :**

1.APHA, (2005) standard methods fro the examination of water and wastewater, American Public Health Association 21st Edition; Washington D.C., USA.
2. Hutchinson, G. E. (1957), A treatise on limnology, Vol-1. Wiley Publishers, New York. 1015.
3.ICMR (1975): Manual standard quality for drinking water supplies, Special report series No. 44, 2nd

edition.
4.labal S.A. and Katariya H.C. (1995): Physico-chemical analysis and water quality assessment of upper lake of Bhopal Ind. J., of Env. Protection Vol. 15 (7): 504-509.
5.Ingole, S.B., R.G. Pawale and P. N. Wavde (2009), Water quality studies on Majalgaon dam, Beed ,district, Maharashtra., J. Aqua. Biol.,Vol-24 (1), 71-76.
6.Jeyasseti A, Priya, A.K. (2006): Critical analysis of ground water quality of Nilakkottai Taluk of TamilNadu, India. J. Curr. Sci., 9 (2) : 931-936.
7.Kachnwana, A. (1999): Rapid methods for examination of faecal contamination in drinking water. Indian J. of Govt. Protection Vol (40) : 46-48.
8.Karunakaran, K. and P. Thamilarasu (2009), Statastical study on physico-chemical characteristics of ground water in and around Namakkal, Tamilnadu, India. E- Journal of chemistry, Vol-6 (3), 909-914.
9.Nawlakhe, W.G., S. L.Lutade, P.M. Patni (1995), Ground water quality in Shivpuri district in Madhyapadesh. Indian J. Environ H, 37 (4): 278-284.
10.Pawar, S.K. (2009), Physico-chemical Studies of Panshewadi Dam water in Kandhar taluka, district Nanded, M.S. India. Shodh, Samiksha aur Mulyankan ( International Research Journal) Vol ( II ), 817.
11. Piska, R.S. (2001) Fisheries of minor reservoir, Sharthamraj, Hyderabad. Ind. J. fish. 48(2): 119-122.
12.Tiware, D.R. (2001), Indian.J. Environ Health, 43(1), 176.