



Hydro-chemical Monitoring of Sakkardara Lake at Nagpur (M.S.)

B. S. Tapase

Dept. of Environmental Science,
Sevadal Mahila Mahavidyalaya, Nagpur. (M.S.)
E-mail: tapasebharati@rediffmail.com

Abstract:

The present paper includes an assessment of the quality of water reservoir situated near Chota Taj Bagh, Sakkardara Square, Nagpur. Dist. Nagpur, Maharashtra. Since 'good' water quality will produce healthier humans than one with 'poor' water quality, an analysis on the hydro-chemical parameters of Sakkardara Lake water was made. The lake is situated near Raghuji Nagar in old city area. And beneficial to recreation in present days and fulfill scarcity of water in future. The use of water is mostly for recreation, idol immersion and fishing purpose. The findings of the analysis will prove to be quite informative, to the daily consumers of the water. The water samples were analyzed from June 2012 to May 2013. Water samples from this site were analyzed for pH, Conductivity, TDS, Chloride, alkalinity, Hardness, DO and Sulphate. The results reveal that the range of variation in different parameters was pH 8.0 to 8.2, TDS 789 to 992mg/l, hardness 210 to 299 mg/l, DO 5.7 to 7.2 mg/l, alkalinity 123 to 148 ppm, chloride 136 to 193 mg/l, sulphate 82 to 130 mg/l. All the hydro-chemical parameters of Sakkardara Lake water are within the highest desirable limit or maximum permissible limit set by WHO.

Keywords:

Hydro-chemical parameters, Sakkardara Lake, Hardness, Variation.

Introduction:

Urbanization created serious problems of water pollution of our rivers and lakes. Water has unique property of dissolving and carrying suspension, a huge variety of chemicals, has the undesirable consequence that water can easily become contaminated (Chaudhari, 1995). Before water can be described as potable, it has to comply with certain physical, chemical and microbiological standards, which are designed to ensure that the water is palatable and safe for drinking (Tebutt, 1983). Therefore, an immediate and most critical environmental problems faced by almost all cities in India is lack of safe drinking water, a comprised quality of vital life resources, grossly insufficient waste management practices and apathy towards pollution control.

Sakkardara Lake which was built in the 18th century, during the Bhonsla rule in Eastern Nagpur is about 5 Kms. south-east of Nagpur near Ayodhya Nagar. The beautiful Sakkardara Garden on the Shore of Sakkardara Lake is the favorite weekend spot of the locals. The picturesque surrounding of the garden with vast playing area, the breathtaking view of sunrise and sunset





all make Sakkardara lake garden an amazing picnic spot. It covers an area about 21 acres and lies between 21°7'8"N and 79°6'55"E

Currently, the lake bears a dirty look with nirmalya and other waste floating around. This is posing a serious threat to the lake.

Material and methods:

Sampling programme for present study commenced from June 2012 and completed in the Month of May 2013. Water sample for hydro-chemical analysis were collected from site of water bodies in five liter plastic cans during 10.00 am to 12.00 pm. samples for dissolved oxygen determination was collected in 300ml capacity BOD bottle from just below the surface slowing to avoid any air bubble entering into the bottle and fixed by Winkler A and Winkler B Solution at the site. The parameters like pH, Conductivity were analyzed with the help of digital pH meter and conductivity meter for the analysis of chemical parameter. The samples were collected in plastic cans and immediately transported to the Laboratory, Hydro-chemical parameters were analyzed with the help of the procedures given by Kodarkar (1992), APHA (1998), Bhalerao (1998), Khanna (2005), Sharma (1998), Day (1985) and NEERI (1988).

Result and Discussion:

Results of various hydro-chemical parameters of Sakkardara Lake water have been depicted in Table-1.

pH: Hydrogen ion concentration plays an important role in the biological process of almost all aquatic organisms. In the fluctuation of pH were recorded 8.0 to 8.2. The pH value was maximum in the winter season and minimum in summer season (K. M. Nagraj and Goudappa M. Patil, 2008).

Conductivity: Conductivity is directly related to the concentration of ionized substances in water. Conductivity of water was fluctuated within the range of 0.271 to 0.239. Maximum in summer and minimum in winter season (R.N. Deshmukh and J.L.Tarar, 2012).

Total Dissolved Solids: T.D.S. values are also within permissible limit of drinking water standards (500 to 1500 mg/lit) suggested by WHO. The minimum value found was 789 mg/l and maximum value found was 992 mg/l.

Chloride: The desirable limit for chloride is 250 mg/l and in our study it ranged from 136 to 193 mg/l. The concentration of chloride is directly correlated to the pollution level (Munnavar, 1970)). In Sakkardara Lake water it is within the permissible limit.





Alkalinity: In the present study total alkalinity ranged between 123 to 148 ppm. That is also within permissible limits suggested by WHO (1984), (S.M.Dhonde, 2012)

Hardness:Total hardness which is very important parameter determining usefulness of water in different sectors is also very much below the permissible limit that is, 210 to 299 mg/lit. This denotes that water is soft and good for drinking purpose.

Dissolved Oxygen: TheDO is one of the most important factor in any aquatic ecosystem. The main source of DO is from dissolution from atmosphere and the photosynthesis. The DO was varied from 5.7 to 7.2mg/l. DO was maximum in summer and minimum in monsoon season.

Sulphate: The maximum permissible limit for Sulphate is 200 mg/l and in our study it ranged from 82 to 130 mg/l, which is quite below the desirable limit for drinking water standards. Sulphate was maximum in summer and minimum in winter season.

Table-1 Comparison of different hydro-chemical parameters with suggested surface water standards for source suggested by WHO for drinking water supply.

| Parameters | Desirable Standard WHO | Range | | |
|--------------|---------------------------|---------|--------|--------|
| | | Monsoon | Winter | Summer |
| pH | 6.5 to 8.5 | 8.1 | 8.2 | 8.0 |
| Conductivity | 500 to 1500µs/cm | 329 | 271 | 381 |
| TDS | 500 to 1500 mg/l | 992 | 789 | 812 |
| Chloride | 250 mg/l | 136 | 166 | 193 |
| Alkalinity | 30 to 500 mg/l | 148 | 128 | 123 |
| Hardness | 300 mg/l | 286 | 210 | 299 |
| DO | 4 to 6 mg/l | 5.7 | 7.1 | 7.2 |
| Sulphate | 200 mg/l | 129 | 82 | 130 |

Conclusion:

The overall result of present study indicates that the water quality of Sakkardara Lake is not so good in some season and major cause is obviously discharge of domestic waste from the local man made activities as well as from adjacent areas. So that the normal treatment, filtration and proper monitoring makes the lake water potable for drinking.

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