Impact of Human Activities on Physico - Chemical Condition of Yamuna River Water at Mathura

Ashok Kumar, *Dr. Praveen Sharma, Dr. D.D. Dwivedi,
DEPT. OF ZOOLOGY, BSA (PG) COLLEGE, MATHURA (UP) INDIA.
*Corresponding Author.

DOI: 10.29322/IJSRP.8.9.2018.p8117
http://dx.doi.org/10.29322/IJSRP.8.9.2018.p8117

Abstract: An attempt has been made to study on physico - chemical condition of Yamuna river water. Three sampling sites were selected for the study. The duration of study was July 2016 to June 2017. The parameters studied were temperature, turbidity, pH, hardness, TDS, DO, BOD, and COD were found above the tolerance limit. Thus the water of river Yamuna was unfit for human consumption.

Key words- Turbidity, pollution, pollutants, DO, BOD

Introduction

The reverine system of India has been the centre of human activities, and since the time immemorial, human dwellings gathered in the form of villages and cities near or around this system. Mathura, the sacred birth place of lord Krishna is situated on the right bank of holy river Yamuna flowing from Delhi to Agra direction.

Due to rapid civilization & industrialization, many pollutants (in the form of domestic, industrial, agricultural effluents, cremation residues etc.) disposed of directly or indirectly in the river Yamuna. Mathura being religious town, millions of pilgrims from the every corner of the world visit this place every year. According to a ritual, a bath in the river Yamuna gives the desired fruits of the devotees. Therefore, everyday there is a large gathering of people at the bank of the river Yamuna. Yamuna water receives pollutants is the form of detergents, flowers, raw milk, sweets and other pooja materials.

Material and Methods

From the chosen three sites, the sampling was done on second week of every month in glass bottles of capacity 300 ml. Some physico-chemical parameters were determined on the spot with the help of portable water detection kit (model No. CK 710, manufactured by Century Instruments Pvt. Ltd. Chandigarh). Other parameters were determined in laboratory from samples using the methods suggested by APHA- 1985, and NEERI manual 1986. The results were compared with standard permitting parameters as suggested by WHO and ISI.

Results and Discussion

Temperature in an important physical parameter. Temperature was found accordance with the seasonal changes. It ranged between 17.7°C to 34.7 °C. It was higher in summer months and lower in winter months. Turbidity is caused by untreated and undecomposed organic matters, It is a common indicator of pollution, sewage and industrial waste. It was maximum (121 NTU) in July 2016 and minimum (67 NTU) in January 2017.
### Table: Physico-chemical characteristics of river Yamuna

*Values are the average of Three different sampling sites in 2016-2017*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>29.9</td>
<td>29.3</td>
<td>22.4</td>
<td>23.4</td>
<td>21.8</td>
<td>18.9</td>
<td>17.7</td>
<td>22.3</td>
<td>23.4</td>
<td>27.8</td>
<td>31.1</td>
<td>34.7</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>121</td>
<td>117</td>
<td>107</td>
<td>87</td>
<td>77</td>
<td>104</td>
<td>67</td>
<td>91</td>
<td>72</td>
<td>73</td>
<td>87</td>
<td>111</td>
</tr>
<tr>
<td>pH</td>
<td>7.4</td>
<td>7.3</td>
<td>7.7</td>
<td>8.3</td>
<td>7.8</td>
<td>8.5</td>
<td>7.9</td>
<td>7.8</td>
<td>7.5</td>
<td>8.2</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>Hardness (mg/l)</td>
<td>467</td>
<td>482</td>
<td>390</td>
<td>3.4</td>
<td>340</td>
<td>432</td>
<td>432</td>
<td>294</td>
<td>408</td>
<td>378</td>
<td>341</td>
<td>417</td>
</tr>
<tr>
<td>TDS (mg/l)</td>
<td>497</td>
<td>411</td>
<td>401</td>
<td>526</td>
<td>588</td>
<td>477</td>
<td>477</td>
<td>503</td>
<td>651</td>
<td>605</td>
<td>616</td>
<td>675</td>
</tr>
<tr>
<td>TSS (mg/l)</td>
<td>419</td>
<td>407</td>
<td>478</td>
<td>381</td>
<td>437</td>
<td>501</td>
<td>501</td>
<td>422</td>
<td>478</td>
<td>432</td>
<td>477</td>
<td>505</td>
</tr>
<tr>
<td>DO (mg/l)</td>
<td>2.1</td>
<td>2.2</td>
<td>4.1</td>
<td>6.5</td>
<td>4.3</td>
<td>8.2</td>
<td>8.2</td>
<td>3.9</td>
<td>9.8</td>
<td>5.4</td>
<td>2.1</td>
<td>1.9</td>
</tr>
<tr>
<td>BOD (mg/l)</td>
<td>33.3</td>
<td>32.4</td>
<td>6.7</td>
<td>9.8</td>
<td>18.1</td>
<td>6.5</td>
<td>6.5</td>
<td>30.3</td>
<td>11.2</td>
<td>22.7</td>
<td>39.4</td>
<td>41.2</td>
</tr>
<tr>
<td>COD (mg/l)</td>
<td>44.2</td>
<td>30.4</td>
<td>14.5</td>
<td>22.2</td>
<td>33.1</td>
<td>19.4</td>
<td>19.4</td>
<td>33.8</td>
<td>21.0</td>
<td>54.4</td>
<td>46.8</td>
<td>55.4</td>
</tr>
</tbody>
</table>

The acidic or alkaline nature of water indicates by pH, the Yamuna water was found slightly alkaline. It ranged between 7.3 to 8.5. The findings are accordance with Kumar and Sharma 2004, 2005. Hardness of water is due to the presence of Ca and Mg salts. Hard water does not form lather with soap and have high boiling points. Hardness ranged between 294 to 482 mg/l.

Total dissolved solids indicate the severness of pollution. TDS show highly fluctuations. It ranged between 401 to 675 mg/l. (Sexena et al.1971). total suspended solids were found higher in summer while lower in winter. TSS ranged between 381 to 505 mg/l. The observations were similar to Mathur et al. 1987, Sexena et al. (1991) and Shangi et al. 1993.

Oxygen is essential for the decomposition of chemicals waste and dead matter. It ranged between 1.9 to 9.8 mg/l. It show highly fluctuating values (Kumar and Sharma, 2005). BOD is the amount of oxygen required by living organisms for the decomposition organic waste material. It was found very high in summer and lower in winter (6.1 to 41.2 mg/l). COD is the amount of oxygen required for decomposition of chemical wastes. A high value of COD shows a high accumulation of organic water in water body. It ranged between 12.1 to 55.4 mg/l. (Shankar et al. 1986, Reddy et al, 1985, and Sanger et al 1983).

### Summary and Conclusion

Above study indicates that water quality of river Yamuna at Mathura is severely polluted and the use of its polluted water may cause severe health problems. Remedial measures are required to sustain the good quality of water and also to save the life of people.

### References


****