

Study of Nitrate Concentration in the River Godavari near Shahagad

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Abstract: Humans require water as much as they require oxygen. Surface water is the most important water source among the supply of water for drinking purposes for humans and other living beings. The river plays a crucial role in the sustenance of life. As industrialization and urbanization increase, it degrades the river, which is being polluted due to developmental activities. Nitrate contamination in rivers has been a source of worry around the world, especially in arid river basins. Nitrate concentration in surface water bodies increases with rapid urbanization and industrialization. High nitrate concentration is dangerous for human and other animals' health, and it is also responsible for the eutrophication of the aquatic system, threatening aquatic biodiversity. On this background, to know the present status of nitrate concentration and degree of pollution of river Godavari this study is carried out. The nitrate content from two locations of Godavari river near Shahagad were monitored during January 2018 to December 2018. The nitrate level from both sampling sites were found below acceptable limit of BIS 2012.

Keywords: Godavari, Nitrate, Eutrophication

1. Introduction

Worst quality of water and water deficiency are connected, due to pollution of water the cost of its treatment rises and also affect its availability. Prevention of pollution is economic way to increase availability of water (carpenter et al, 1998). Wide use of nitrogen fertilizers increases the agricultural production, but extra supply of nitrogen can cause pollution of air, water and soil. (Wick et al.2012).

Nitrates level increases after application of fertilizer and it mixes with water bodies through leaching and overflowing of surface water. Methemoglobinemia develops when nitrate levels rise more than 10 mg/l $\text{NO}_3\text{-N}$, which is lethal (Maghanga et al.2013).

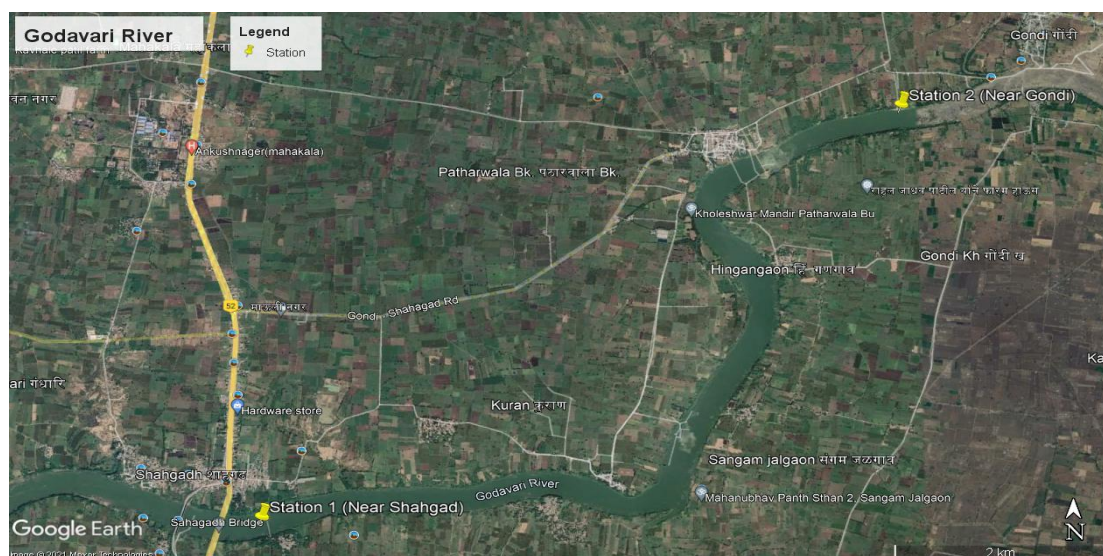
Nitrates are mainly taken from vegetables and water. Its consumption plays a good and harmful role in human

bodies. Excessive nitrate consumption raises the chance of illness development. Need of excellent agricultural practices and public awareness about food habits are necessary to reduce nitrate intake in human. (hmelakgorenjak, and cencić 2013).

Therefore, to understand the nitrate toxicity in water and health risks, this study was to determine the nitrate concentrations in Godavari river near Shahagad and Gondi Inambad tehsil of Jalana district.

2. Study Area

Shahagad and Gondi are situated in Ambad tehsil of Jalna district. Godavari river near Shahagad and Gondi had two sampling sites for analysis of nitrate content.



Two sampling sites of river Godavari near Shahagad and Gondi village, Ambad tehsil, Distjalna, Maharashtra, India.

3. Material and Methods

Water samples were collected from two sampling sites, i.e. S1 (station 1) is Shahagad and S2 (station 2) is Gondi, at an interval of one month from January 2018 to December 2018. The nitrates from collected water samples were estimated by using spectrophotometer method as described by maiti (2004) and the results were expressed in MG/LIT.

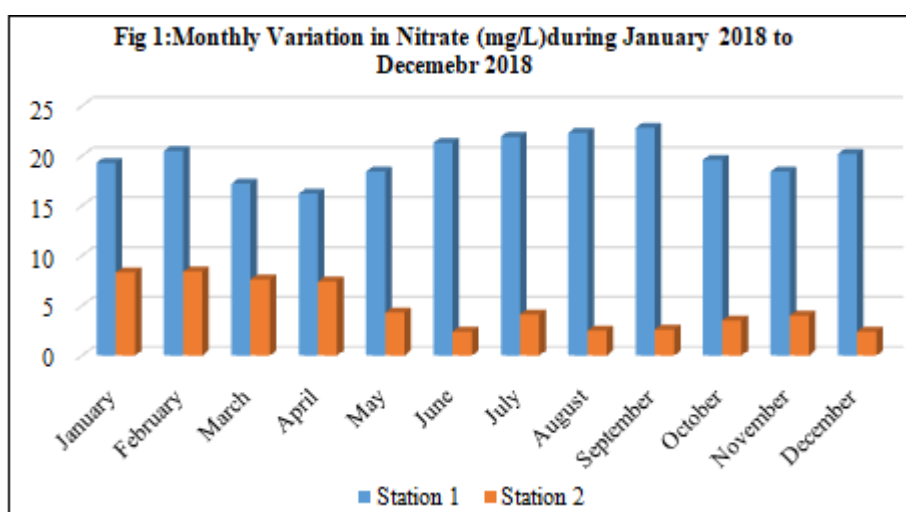
4. Results and Discussion

Table 1: Monthly values of Nitrate in mg/liter from two stations of river Godavari (near Shahagad and Gondi)

| Month | S1 (Station 1) | S2 (Station 2) |
|-----------|----------------|----------------|
| January | 19.3 | 8.3 |
| February | 20.5 | 8.4 |
| March | 17.2 | 7.6 |
| April | 16.2 | 7.4 |
| May | 18.4 | 4.3 |
| June | 21.3 | 2.4 |
| July | 21.9 | 4.1 |
| August | 22.3 | 2.5 |
| September | 22.8 | 2.6 |
| October | 19.6 | 3.5 |
| November | 18.4 | 4.0 |
| December | 20.2 | 2.4 |

Station 1: Shahagad

Station 2: Gondi



(Table 1) The observed range of nitrate in the study area ranged from 2.4 mg/lit to 22.8 mg/lit. The maximum nitrate concentration was in the month of September, 22.8 mg/lit at station 1 and minimum concentration was recorded as 2.4 mg/lit in the month of June and December at station 2. As our study area is concerned, all the values of nitrate concentration are below the acceptable limit of BIS. The probable reason for more Nitrate in S1 (station 1) was may be due to domestic sewage and agriculture runoff.

(Yakovlev et al., 2015) studied different rivers from east Ukraine and found the levels of nitrate range from 0.25 to 37.2 mg/L.

(Amish and Mathiarasi, 2018) studied the nitrate levels in the surface water of Moolikulam Pond in Tirunelveli, Tamilnadu ranged from 0.15 mg/l to 0.70 mg/l, and observed the main source of nitrate contamination is biodegradation of organic matter.

(Dixit et al. 2005) examined the nitrate content in Bhopal's Freshwater Lake ranged from 2.02 to 15.22 ppm and observed the nitrate content increased significantly due to rising anthropogenic influence on the lake.

5. Conclusion

The present study it is concluded that the nitrate content in river water from two sampling station of a study area was within acceptable limit as per the BIS standards 2012. The nitrate concentration near Shahagad site showed higher values as compared to site near Gondi

References

- [1] Carpenter, S. R., Caraco, N. F., Correll, D. L., Howarth, R. W., Sharpley, A. N. and Smith, V. H., 1998. Nonpoint Pollution of Surface Waters with Phosphorus and Nitrogen. *Ecological Applications*, 8 (3), Pp.559-568.
- [2] Wick, K., Heumesser, C., & Schmid, E. (2012). Groundwater Nitrate Contamination: Factors and Indicators. *Journal of Environmental Management*, 111, 178-186.
- [3] Maghanga, J. K., Kituyi, J. L., Kisinyo, P. O., & Ng'etich, W. K. (2013). Impact of Nitrogen Fertilizer Applications on Surface Water Nitrate Levels within A Kenyan Tea Plantation. *Journal of Chemistry*, Hindawi Publishing Corporation, 2013, 1-4.

- [4] Hmelak Gorenjak, A., &Cencič, A. (2013). Nitrate in Vegetables and their Impact on Human Health. A Review. *Acta Alimentaria*, 42 (2), 158-172.
- [5] https://en.wikipedia.org/wiki/Godavari_River_Near_Shahagad
- [6] Maiti, S. K (2004): *Handbook of Methods in Environmental Studies, Vol.1 Water and Waste Water Analysis*, Abd Publisher, Jaipur, India.
- [7] IS 10500: 2012. *Drinking Water Specification (Second Revision)*. Bureau of Indian Standards, New Delhi, 110002.
- [8] Yakovlev, V., Vystavna, Y., Diadin, D., &Vergeles, Y. (2015). Nitrates in Springs and Rivers of East Ukraine: Distribution, Contamination and Fluxes. *Applied Geochemistry*, 53, 71-78.
- [9] Amish A. D., Mathiarasip. (2018) Evaluation of Hydrological Parameters And Phytoplankton Diversity of Moolikulam Pond In Tirunelveli, Tamilnadu, *International Journal of Science And Research (Ijsr)* (7) 8, 266-270.
- [10] Dixit, S., Gupta, S. K., & Tiwari, S. (2005). Nutrient Overloading of Fresh Water Lake of Bhopal, India. *Electronic Green Journal*, 1 (21).