

NOTE

Study of Sulfate Concentration of Mula-Mutha Rivers in Pune (Maharashtra)

D.G. KANASE*, S.D. JADHAV†, R.W. JAWALE† and M.S. KADAM‡

*Department of Chemistry, Yashwantrao Mohite College,
Bharati Vidyapeeth Deemed University, Pune-411 038, India*

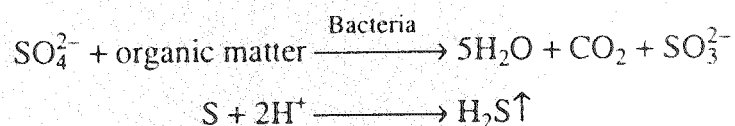
The sulfate concentration of Mula-Mutha rivers was assessed from Garware Causeway to Koregaon Park. The samples were collected along the course of rivers and it was observed that the rivers receive industrial effluents and domestic waste along with the heavy loads of agricultural run-off. As a whole the River Mutha is a more polluted river than Mula.

Key Words: Mula-Mutha rivers, Industrial effluents, Domestic sewage, Water pollution, Agricultural run-off.

Many causes of water pollution including sewage and fertilizers contain nutrients¹ (such as sulfates (SO_4^-), phosphates (PO_4^{3-}), nitrates (NO_3^-). If added in excess levels, nutrients overstimulate the growth of aquatic plants and algae.

Sulfates and sulphides are formed due to decomposition of various sulphurous compounds present in water.

Anaerobic bacteria chemically reduce sulfates to sulphides and hydrogen sulphide as



The H_2S gas so produced gives bad smell and odour to the matter. Moreover, H_2S gas gets oxidized to sulphuric acid. Sulphuric acid corrodes the sewage water pipes. If high concentration of sulfate ion (SO_4^{2-}) is consumed in drinking water, its taste changes and it renders unwanted laxative effects.

High sulfate levels can also have a corrosive effect on plumbing. Water containing sulfate may also contain bacteria, which produce hydrogen sulphide. The foul; rotten egg smell in some waters comes from hydrogen sulphide. The gas can be generated in a number of ways. Decaying organic matter, like that which forms coal or peat moss, can create this gas. A second way to generate this gas is from the reaction of acidic water with the aquifer that has a sulfur content. The third way is as the by-product of bacteria that use iron or manganese as part of their diet.

The area of study under this investigation is the stretch of the rivers Mula-Mutha. Mula river besides industrial and domestic wastes, receives heavy loads of agricultural run-off through non-point sources. Mutha river since it passes through the city of Pune as it flows downstream from the Kharakvasla dam, receives heavy loads of

†Department of Chemistry, College of Engineering, Bharati Vidyapeeth Deemed University, Pune 411 043, India.

domestic sewage which is organic and it is a waste of biological oxygen demand². It also receives considerable amount of effluent from small scale industries which are located at the bank of the river. From both the rivers, sampling stations were selected to give a reasonable comparison of the river's water quality in pune and its suburbs (up to 15 km).

For the present study, six stations have been considered which are as follows:

TABLE-1

| Station No. | Name of the station |
|-------------|------------------------------------|
| A | Garware Causway (Mutha River) |
| B | Sangam Bridge (Mutha River) |
| C | Holkar Bridge (Mutha River) |
| D | Phule Nagar (Eravada) (Mula River) |
| E | Bund Garden (Mula-Mutha River) |
| F | Koregaon Park (Mula-Mutha River) |

The water samples were collected in the month of January 2004. The samples were collected separately in clear 2 L stoppered polythene cans. Ultra-spectrophotometer model no. CL 54 D (Elico) was used for analysis; 1 ml HCl of 1 N strength was added in each sample and was evaluated.

TABLE-2

| Stations | Sulfate (mg/L) |
|----------|----------------|
| A | 34.048 |
| B | 15.772 |
| C | 26.537 |
| D | 12.768 |
| E | 16.773 |
| F | 19.527 |

The results obtained at the above mentioned sampling stations are given in the Observation Table-2. In Mutha river, the major cause of water pollution is the population density and obviously the discharge of domestic sewage from point and non-point sources. Industrial effluents also contribute to its population load. As a whole the river Mutha is a more polluted river than Mula². Mula river, which receives lesser amount of domestic sewage but more of agricultural run-off, stays lesser polluted than Mutha. Sulfate levels at 500 ppm or greater can have a laxative effect and impart an astringent after-taste to the water.

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