

REVIEW ARTICLE

Causes and Impacts of Water Pollution on Rivers in Maharashtra-A Review

*¹Bagul V. R.; ²Shinde D. N.; ³Chavan R. P.; ²Patil C.L.

¹Department of chemistry, Arts science commerce college, Surgana (Nashik) Maharashtra.

²Department of chemistry B.N.N.CollegeBhivandi. (Thane) Maharashtra.

³Department of Chemistry, Dnyanasadhana College (Thane) Maharashtra.

ABSTRACT

Water resources and water quality affect the economic, social and political development of the society. When water becomes contaminated by unexpected substances, it is considered as harmful for human and aquatic lives. This water is termed as polluted water. Various causes are responsible for polluting water. Some natural causes are mixture of biodegraded portion of animal and plants to pure water, siltation by erosion of river banks etc. Domestic wastes, industrial wastes, fertilizers etc. are manmade pollutants of water. The state of surface water pollution in Maharashtra is alarming. Necessity of water for each and every living being needs no description. They intake water directly or indirectly for physiological activities. If this intaking water is polluted, it will do harm that is for sure. The worst part is, this transports to others through food chain. Therefore, we must be aware of the adverse influence polluted water may have on us. At present, we cannot prevent water being polluted cent percent, but minimization is very much needed. It is time we took some steps to start working on it.

Key Words: River, Pollutants, Wastewater, Environment, Pollution, Human Health, Maharashtra.

Received 11.08.2015 Accepted 29.10.2015

© 2015 AELS, INDIA

INTRODUCTION

Water is vital resource required by living organisms. It is a most essential basic component to all living being as most of the biochemical reactions that takes place through the metabolism and growth of living organisms involve water. Without water no life is possible to sustain on this planet earth hence it is termed as 'Natural liquid Gold'. It is also called 'universal solvent' almost of the inorganic chemicals are dissolved in water. Water occupies 71% of the planet earth surface, out of all the available water on the earth surface only 3% constitute fresh water which is present in the form of ice caps, glaciers, rivers, lakes, ponds, streams and ground water resources. The most important and vulnerable freshwater system is the river and plays a critical role in the sustenance of all life. The decline in the quality of water in freshwater systems threatens its sustainability and has become a cause for concern (1).

The Indian environmental researchers have recently explained the condition of freshwater resources in India and their management as a serious environmental problem which includes nutrition enrichment, acidification and domestic waste, agricultural waste, sewage and industrial effluents toxic substances identified as major impacts (2;3;4).

A study has revealed that almost in India 70% of surface water resource and ground water reserves have been contaminated by biological, organic and inorganic wastes (5).The wastewater pollutants are harmful to environment and public health. The biological decomposition of organic compounds could result in killing of fishes and generation of foul odors. There are many pollutants that could exhibit toxic effects on aquatic life and the public health. Water borne diseases are also eliminated through proper wastewater treatment. The wastewater treatment is removal of contaminants from water (6).

The chemical contamination of water sources due to certain industries or from natural sources (7).High turbidity can inhibit the effects of disinfection against micro-organisms and enable bacterial growth. Drinking water should be colorless, since drinking water coloration may be due to the presence of colored organic matter. Organic substances cause water odour, though odours may result from many factors, including biological activity and industrial pollution and from microbial pathogens cause health hazards (8).

Pollution of water is due to increased human population, industrialization, use of fertilizers in agriculture and manmade activity. The water quality refers to the presence components of water in their optimum level such that it supports the growth of plants and animals. Temperature, turbidity, nutrients, hardness, alkalinity, dissolved oxygen etc. are some of the important factors that play a vital role for the growth of living organisms in the water body. Water quality indicates the relation of all hydrological properties including physical, chemical and biological properties of the water body. Hence water quality assessment involves analysis of physic-chemical, biological and microbiological parameters that reflects the biotic and abiotic status of ecosystem (9).

Objectives:

The objectives of the study are:

1. To identify the causes and sources of water pollution of rivers in Maharashtra
2. To know impacts of water pollution on rivers in Maharashtra
3. Analysis of data and Information.

CAUSES AND SOURCES OF WATER POLLUTION

Natural and Man-made Causes

There are various causes of water pollution of river. These causes can be divided broadly in two divisions, namely: a) Natural causes b) Man-made causes.

a) Natural causes: The biodegraded portions of plants and animals mix with water and pollute it. Erosion of river banks cause siltation and this silt sometimes hamper aquatic lives. Many kinds of natural salts and other substances mix with rain water and finally fall in the rivers and ponds.

b) Man-made causes: The major portion of water pollution of rivers in Maharashtra occurred by man-made causes. Industrial wastes, agricultural wastes, domestic wastes, excess use of fertilizer, pesticides etc. are notable man-made pollutants. Water is seriously polluted by these pollutants. Water, polluted by such types of pollutants, is very harmful for both human and aquatic lives.

Sources of Pollution:

Untreated wastes of industries, solid wastes of urban and commercial area, wastes of sewerage in municipality, feces of animals, pesticides, fertilizers, radioactive wastes, erosion of lands river banks etc., are the main sources of water pollution. Oil from industries also pollutes water of rivers in Maharashtra.

The main pollutants:

The main water pollutants in Maharashtra are:

- Liquid Organic wastes
- Liquid Inorganic wastes
- Micro-organisms/germs
- Nutrient substances
- Synthetic compounds
- Inorganic chemicals
- Silt and sediment
- Hot water
- Industrial, Municipal and urban waste

Liquid Organic Wastes: Wastes when disposed of in water, bacteria and other micro-organisms combine with oxygen dissolved in water to break them down, can be termed as "oxygen demanding" wastes. Liquid organic wastes include sewage, many wastes from industries (especially industries producing agricultural and tannery products) and run-off from rains, floods and storms which picks up organic wastes from land, before flowing into streams, rivers, lakes or seas. As concentration of dissolved oxygen decreases, so fish and aquatic plant life suffer or die. Many rivers in Maharashtra show BOD between 20-180 mg/l. A wide spread of fish deaths have occurred in these areas, and thousands of fishermen have lost their jobs. The industrial areas in Maharashtra are situated in the midst of densely populated regions. There are many hazardous and potentially dangerous polluting industries situated in the cities of Maharashtra. In Maharashtra at Pune, Aurangabad and Nashik area, food processing industries are situated along with chemical and heavy metal processing industries.

Liquid Inorganic wastes: Most of the inorganic liquid wastes come from industry, and their dilution in large river waters renders them harmless. Some inorganic toxic wastes can become concentrated up the food chain to fish. Many of the pollution incidents which have been resulted in largest number of deaths and serious injuries from water pollution have been arisen from human ingestion of fish, or crops contaminated with heavy metals or other inorganic compounds.

Micro-organisms/Germs: With the feces of animals, wastes of sewerage, latrines etc. various kinds of bacteria, virus and other organisms spread out in the water bodies and pollute it. Poultry farms, tanneries and slaughter-houses always supply such kinds of micro-organisms to the water bodies.

Nutrient substances: Domestic substances, excess fertilizers, minerals occurring nitrate are mixing with water. This nutrient substances caused fast growth of unexpected plants, rotting these plants make water offensive taste and odor. Such kind of abnormal growth of aquatic plants is called "eutrophication".

Synthetic compounds: Various cleaning agents, soaps, detergents, pesticides and other chemical substances are belonging to this group. Industries also excrete such kind of compounds.

Inorganic chemicals; many metals like lead, zinc, cadmium, mercury, arsenic and their compounds are inorganic pollutants. Many salts are also in this group

Silt and sediment: Soil erosion gives rise silt and sediment in water bodies. Soil erosion enhanced 5 to 10 times as a result of agricultural and about 100 times due to construction activities.

Hot water: Thermal industries use huge amount of cold water to cool their engines from overheating. This hot water is thrown to the nearby water bodies and caused depletion of DO.

IMPACTS OF WATER POLLUTION

Impacts of Shortage of DO:

A large amount of urea is used for cultivation. Only 40% of dissolved urea is absorbed by plants. Remaining is mixed with water. If caused quick growth of unexpected plants. For biodegrading of these plants oxygen is taken from water. As a result amount of dissolved oxygen (DO) is depleted. Industrial wastes also caused depletion of DO by occurring chemical reaction.

Impacts of pH:

There is no normal pH that applies to all fishes. Because fish originate in ponds, rivers, lakes, oceans that have different pH levels. But sudden change of pH can be harmful or even fatal to fishes. In the dry season The DO level becomes very low and the river becomes very toxic.

Impacts of trace elements/ions:

Arsenic, lead, mercury, cadmium, chromium, nitrates, nitrites etc. May mix with water directly may be produced from the pollutants. However exceeding limit of this trace elements or ions caused various harm for human and other living beings

Impacts of germs/micro-organisms:

The people who are living by the river which is polluted by various germs and micro-organisms are severely suffering from various diseases like cholera, diarrhea, dysentery etc, often.

Impacts of silts:

Silt may cover the leaves of aquatic plants and increase the turbidity of water, as a result, sunlight cannot reach to the leaves of the plants and photosynthesis reaction is hampered. So, plants cannot produce oxygen and food for them. Consequently, ecosystem is hampered.

ANALYSIS OF DATA AND INFORMATION

The data and information presented here shows the causes and Impacts of water pollution of rivers in Maharashtra. Surface water of Maharashtra is polluted by industrial effluents, agro-chemicals, domestic and sewerage dirt, oil spillage and sediment. Maximum industries excrete toxic substances to water. Some sources spread germs and caused diseases. Excess use of fertilizer caused water pollution by supplying nutrient for unexpected plants which finally causes depletion of DO through eutrophication. Again most of the nitrate of urea goes through the soil to the ground water. Silt and sedimentation refrains sun light from passing through water to the aquatic plants. As a result, photosynthesis cannot take place. DO is very much essential for aquatic animals. Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) rising means substances which consume oxygen from water increases in water bodies. So, higher the BOD and COD mean lower the DO and more hazards for aquatic animals. Components of pesticides, specially chlorinated pesticides are dangerous water pollutants. They affect human nerve accumulating through food chain.

RESEARCH FINDINGS

Analyzing the data and information presented in this review paper findings that got are-

- No water is found actually pure. Naturally some substances are mixed with water. Again some natural pollutants removed automatically.
- Rivers are highly polluted by both natural and man-made sources like industries and agro chemicals.
- Unconsciousness of people is also responsible for water pollution. Especially rural people should teach that using excess fertilizers and pesticides do not give more crop yield.
- Polluted water can do harm to human and aquatic plants directly or indirectly. That is, water pollution affects the ecosystem.

- Toxic substances directly affect living being through drinking water. Some toxic substances accumulate in the body and then express its contamination.
- Less water flow is one of the reasons for toxicity in water, Because of less amount of water flow, the concentration of pollutants become high.

REFERENCES

1. Venkatesharaju K., Ravikumar P., SomashekharR.K.,Prakash K.L, Physico- chemical and Bacteriological investigation on the River Cauvery of Kollegal stretch in Karnataka, *J. Sci., Engin. and tech.*,**6 (1)**, 50-59. **(2010)**.
2. Sachidanandamurthy, K.L and Yajurvedi H.N., A study on physicochemical parameters of an aquaculture body in Mysore city, Karnataka, India, *J. Environ. Biol.*,**27**, 615-618 **(2006)**.
3. Parashar, C., Verma N., Dixit S. and ShrivastavaR.,Multivariate analysis of drinking water quality parameters in Bhopal, India, *Environ. Monit. Assess.*,**140**, 119-122 **(2008)**.
4. Laskar H. S and Susmita.G, Phytoplankton diversity and dynamics of Chatla floodplain lake, Barak Valley, Assam, North East India - A seasonal study, *J. Environ. Biol.*,**30**, 1007-1012 **(2009)**.
5. Joseph P.V.andClaramma J., Physicochemical characteristics of Pennar River, a fresh water wetland in Kerala, India, *J. Chem.*,**7(4)**,1266-1273 **(2010)**.
6. Zhang L. Y., Zhang L., Liu Y. D., Shen Y. W., Liu H., Xiong Y., Effect of limited artificial aeration on constructed wetland treatment of domestic wastewater. *Desalination***250**(3), 915-920 **(2010)**.
7. Wang Y. C., Peng Y. A., Li Y. M., The characteristics of water pollution and engineering-oriented prevention on Dianchi. *Areal Research and Development***23**, 88-92 **(2004)**.
8. Mahananda M. R., Mohanty B. P., Behera N. R., Physico-chemical analysis of surface and ground water of Bargarh district, Orissa, India. *IJRRAS*, **2(3)**, 284-295 **(2010)**.
9. MushiniVenkataSubba Rao, VaddiDhilleswara Rao and Bethapudi Samuel AnandAndrews , Assessment of Quality of Drinking Water at Srikurumam in Srikakulam District, Andhra Pradesh, India, *I. Res. J. Environ. Sci.*,**1(2)** 13-20 **(2012)**.

CITE THIS ARTICLE

Bagul V. R.; Shinde D. N.; Chavan R. P.; Patil C.L.. Causes and Impacts of Water Pollution on Rivers in Maharashtra-A Review. *Res. J. Chem. Env. Sci.* Vol 3 [6] December 2015. 01-04