IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

SITES

Smart And Innovative Technologies In Engineering And Sciences

Gyan Ganga College of Technology

Vol. 3, Special Issue 4, November 2016

Study of Different Parameters of Narmada Water at Lameta Ghat Jabalpur which causes Pollution

Himanshu Kolhatkar[1], Salomi Rao[2]

Asst. Professor, Department of Chemistry, Gyan Ganga Institute of Technology & Sciences, Jabalpur (MP), India[1,2]

Abstract: Water pollution has been one of the main topics in the environmental issue of Narmada river water in Jabalpur region. This study was conducted to find out the pollution situation of Narmada River and the health problem of the surrounding residents. The results clearly determine that the water quality of Narmada river may be in a position to sustain the aquatic life and suitable for using domestic purpose. This is indicated by the measured parameters in the river. The maximum recorded values of pH, turbidity hardness, total dissolved solids (TDS). The maximum concentration of turbidity, pH, hardness, Total Solid, found in the Narmada river is not much higher than the standard permissible limit. The study also provides evidence that local communities are not suffering from a variety of health problems including skin, diarrhea, dysentery, and respiratory illnesses. Dengue, malaria and other epidemic diseases are not available in this area.

Keywords: Water, Quality, Analysis, Pollution.

I. INTRODUCTION

Water is the most important amongst those substances which are essential for life. Though water is found at various places abundantly but water obtained from any source is always contaminated with some impurities. Surface water (rivers and lakes) contains suspended impurities, organic matter, sand, clay, minerals, salts (calcium, magnesium, sodium, chloride & sulphate) & bacteria. (1)

Drinking of impure water is injurious to health therefore it is necessary to know the type of impurities and their magnitude in sample water.(2) Hence analysis of water is essential.

Water quality criteria are developed by scientists and provide basic scientific information about the effects of water pollutants on a specific water use. They also describe water quality requirements for protecting and maintaining an individual use. Water quality criteria are based on variables that characterize the quality of water. For some other water quality variables, such as, turbidity, pH, hardness, Total Solid are set at the minimum acceptable concentration to ensure the maintenance of biological functions.

Most industrial processes pose less demanding requirements on the quality of freshwater and therefore criteria are usually developed for raw water in relation to its use as a source of water for drinking-water supply, agriculture and recreation, or as a habitat for biological communities. Criteria may also be developed in relation to the functioning of aquatic ecosystems.(3) The protection and maintenance of these water uses usually impose different requirements on water quality and, therefore, the associated water quality criteria are often different for each use.

II. MATERIAL AND METHOD

pH Value of water

pH is a term used to indicate the alkalinity or acidity of a substance as ranked on a scale from 1.0 to 14.0. The pH scale measures the logarithmic concentration of hydrogen (H+) and hydroxide (OH-) ions, which make up water (H+ + OH- = H2O). When both types of ions are in equal concentration, the pH is 7.0 or neutral. Below 7.0, the water is acidic (there are more hydrogen ions than hydroxide ions). When the pH is above 7.0, the water is alkaline, or basic (there are more hydroxide ions than hydrogen ions).(4) Since the scale is logarithmic, a drop in the pH by 1.0 unit is equivalent to a 10-fold increase in acidity. So, a water sample with a pH of 5.0 is 10 times as acidic as one with a pH of 6.0, and pH 4.0 is 100 times as acidic as pH 6.0.

Turbidity of water

Turbidity is a measure of water clarity how much the material suspended in water decreases the passage of light through the water. Suspended materials include soil particles (clay, silt, and sand), algae, plankton, microbes, and other substances.(5) Turbidity is generally measured by using a turbidity meter. A turbidity meter consists of a light source that illuminates a water sample and a photoelectric cell that measures the intensity of light scattered at a 90 angle by the particles in the sample. It measures turbidity in nephelometric turbidity units or NTUs.

Hardness of water

The ions involved in water hardness, i.e. Ca2+(aq) and Mg2+(aq), can be determined by titration with a chelating agent, ethylenediaminetetraacetic acid (EDTA), usually in the form of disodium salt (H2Y2-).

IARJSET
ISSN (Online) 2393-8021
ISSN (Print) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
SITES
Smart And Innovative Technologies In Engineering And Sciences
Gyan Ganga College of Technology
Vol. 3, Special Issue 4, November 2016

Eriochrome Black T is commonly used as indicator for the above titration. At pH 10, Ca2+(aq) ion first complexes with the indicator as CaIn+(aq) which is wine red. As the stronger ligand EDTA is added, the CaIn+(aq) complex is replaced by the CaY2-(aq) complex which is blue. The end point of titration is indicated by a sharp colour change from wine red to blue.

Total Dissolved Solid of water

A well mixed sample is filtered through a standard glass fibre filter and the filtrate is evaporated to dryness in a weighted dish and dried to constant weight at 179- 181^0 C. The increase in the weight of dish represents the total dissolved solid.

III. RESULT AND DISCUSSION

pH

pH affects many chemical and biological processes in the water. For example, different organisms flourish within different ranges of pH. The largest variety of aquatic animals prefers a range of 6.5-8.0. pH outside this range reduces the diversity in the stream because it stresses the physiological systems of most organisms and can reduce reproduction. Low pH can also allow toxic elements and compounds to become mobile and "available" for uptake by aquatic plants and animals.(4) This can produce conditions that are toxic to aquatic life, particularly to sensitive species like rainbow trout. Changes in acidity can be caused by atmospheric deposition (acid rain), surrounding rock, and certain wastewater discharges.

The pH of our water sample is almost 6.8 (Table No. 1) that mean water is slightly acidic and suitable for domestic, agricultural, industrial as well as for power generation plants.

Turbidity

Turbidity of tested water sample is 2.5 Nephelometric Turbidity Units (**NTU**) (Table No. 1) which means it is suitable for drinking purpose and aquaculture.

Higher turbidity increases water temperatures because suspended particles absorb more heat. This, in turn, reduces the concentration of dissolved oxygen (DO) because warm water holds less DO than cold.

Higher turbidity also reduces the amount of light penetrating the water, which reduces photosynthesis and the production of DO. Suspended materials can clog fish gills, reducing resistance to disease in fish, lowering growth rates, and affecting egg and larval development.

Hardness

There are no known health risks associated with the consumption of hard water. In fact, studies have shown that people who regularly consume hard water throughout their lifetime have a lower rate of cardiovascular disease.

There are some problems associated with hard water. These include:

Gray staining of washed clothes

Scum on wash and bath water following use of soap or detergent

Reduced lathering of soaps

Buildup of scale on electric heating elements and boilers

Reduced water flow in hot water distribution pipes due to scale buildup

Accumulation of whitish-gray scale in tea kettles and other containers used to boil water (5)

Hardness of tested water sample is 110 ppm (Table No. 1). This value is in the range of moderator hardness and it indicates that water sample is suitable for suitable (6) for drinking purpose, industrial use as well as power plants.

Total dissolved solid

Total Dissolved Solids (TDS) are the total amount of mobile charged ions, including minerals, salts or metals dissolved in a given volume of water, expressed in units of mg per unit volume of water (mg/L), also referred to as parts per million (ppm). TDS is directly related to the purity of water and the quality of water purification systems and affects everything that consumes, lives in, or uses water, whether organic or inorganic, whether for better or for worse. (7)

The permissible value of TDS is 400 ppm In our water sample it is in the range of 250- 275 (Table No. 1) ppm which indicates that it is acceptable for industrial and domestic use. (8)

Table No. 1

S.No.	Water analysis Parameters	Standard value	Value of water sample
1	pH	7	6.8
2	Turbidy	4 NTU	2.5 NTU
3	Hardness	(Moderately hard) 60-120 ppm	110 ppm
4	Total Dissolved Sold	400 ppm	25.-275 ppm

IV. CONCLUSION

Water quality objectives for multipurpose uses of water should be set at a level that provides for the protection of the most sensitive use of a water body. Among all identified water uses, the most stringent water quality criterion for a given water quality variables should be adopted as a water quality objective. The results shows that the water qualiy of Narmada water at Lameta ghat Jabalpur is inacceptable range according to table number 1. That means the water of Narmada water at Lameta ghat Jabalpur is pollution free and can be used for domestic as well as industrial purpose.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

SITES

Smart And Innovative Technologies In Engineering And Sciences

Gyan Ganga College of Technology

Vol. 3, Special Issue 4, November 2016

ACKNOWLEDGMENT

I would like to acknowledge with much appreciation the crucial role of the staff of Laboratory, who gave the permission to use all required machinery and the necessary material to complete the research practical work. A special thanks goes to **Prof. Vikas Ranjan Shukla** HOD Chemistry Department, GGITS, Dr. Vinod Kapse Principal GGITS, Jabalpur who help me and gave suggestion during my practical work.

REFERENCES

1. Alabaster, J.S. and Lloyd, R. 1982 Water Quality Criteria for Freshwater Fish. 2nd edition. Published on behalf of Food and Agriculture Organization of the United Nations by Butterworth, London, 361 pp.
2. CCREM 1987 Canadian Water Quality Guidelines. Prepared by the Task Force on Water Quality Guidelines of the Canadian Council of Resource and Environment Ministers, Ottawa.
3. Dick, R.I. 1975 Water Quality Criteria, Goals and Standards. Second WHO Regional Seminar on Environmental Pollution: Water Pollution, Manila, WPR/W.POLL/3, WHO Regional Office for the Western Pacific, Manila.
4. EPA 1976 Quality Criteria for Water. EPA-440/9-76-023, United States Environmental Protection Agency, Washington, D.C.
5. ESCAP 1990 Water Quality Monitoring in the Asian and Pacific Region. Water Resources Series No. 67, United Nations Economic and Social Commission for Asia and the Pacific, United Nations, New York.
6. NRA 1994 Water Quality Objectives. Procedures used by the National Rivers Authority for the Purpose of the Surface Waters (River Ecosystem) (Classification) Regulation 1994. National Rivers Authority, England and Wales, Bristol.
7. WHO 1984 Guidelines for Drinking-Water Quality, Volume 2, Health Criteria and Other Supporting Information. World Health Organization, Geneva.
8. WHO 1993 Guidelines for Drinking-Water Quality, Volume 1, Recommendations. 2nd edition, World Health Organization, Gene