Analytical Study of Toxic Elements Causing Water Pollution of River Krishna in Sangli District[1]

*M. V. Patil, **A. C. Tawate, #S. R. Bamane

*Department of Chemistry, Miraj Mahavidyalaya, Miraj, India,
**Department of Chemistry, Miraj Mahavidyalaya, Miraj, India,
#Sushila Shankarrao Gadave Mahavidyalaya, Khandala, Satara, India

ABSTRACT

Water is most essential commodity for the existence of any life. The use of water by plants, animals and man is universal. Every living organism require water for its survivor. This is an essential requirement for life, health and sanitation. But today pure water become more and more contaminated man himself is the greatest pollutants of his evolvements so it is essential to study water pollution and its analysis.

Keywords : *Water pollution, suspended matter, organic, inorganic and Biological Pollutants, DO, COD, BOD.*

INTRODUCTION

Today man has all possible types of amenities of modem civilization but he if not happy. He is much worried about his drastically changing environment due to pollution. There are diverse types of pollution. Air Pollution, Water Pollution, Food Pollution, Land Pollution, Sound Pollution, Radiation Pollution and what not.

Man himself is the greatest pollutant of his environment. The unbounded growth of population has caused increased demands of food, clothing and shelter. In turn, it has forced rapid urbanization and industrialization. Leading to enchanted technological development. This has caused faster transportation, increased fuel combustion, heavy industrial processing, huge waste disposal, etc. As an effect, variety of emissions are put into the environment rendering it dirty and polluted. This drastically disturbed environment is causing wide spread health hazards ranging from Headache Through Nausea, Anaemia, Gastro, Typhoid, Jaundice, damage of Liver, Kidney and Brain to death.(Narayana, AC. and G.C. Suresh 1989. Chemical quality of groundwater of Mangalore city, Karnataka, Indian Journal of Environmental Health, 31: 228-236)

In India, the problem of water pollution is very acute. Most of the major rivers have been registered under hazardous pollution levels some striking illustrations are as follow.

1. River Krishna is very much polluted by Sherinala at Sangli. This waste water disposal causes Gastro, J aundice and other water - borne diseases Periodically.

    In 1997 Krishna purification project of about fifteen corores and sixty lakhs to be erected to treat sewage of Sheri Nala and to purify Krishna.

2. River Pannchganga is polluted by industrial wastes and water - wastes from Jayanti Nala and Dudhali Nala at Kolhapur. The project of Rs. 4 corores and 70 lakhs is proposed to purify Panchganga during 1997 - 98.

3. In Mumbai - Kalyan belt, millions of liters of industrial and domestic water - wastes are being discharged into sea and other water courses without any treatment.

4. The water of Kallu river near Kalyan has turned to be highly acidic where pH of this water in found to be 1.5.

5. The Ganga has become one of the most polluted rivers of the world. On the river Hooghly near Calcutta. More than 150 industries are flanking on both sides. In the 120km area, there are about 270 outlets of untreated water to the river Hooghly. The entire area is therefore exposed to serious ecological disasters. Thus the area surrounding Calcutta on the bank of river Hooghly is a major pollution centre. World health organization

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[1] *How to cite the article:*

Patil M.V, Tawate A.C., Bamane S.R., Analytical Study of Toxic Elements Causing Water Pollution of River Krishna in Sangli District, IJRST, Apr-Jun 2022, Vol 12, Issue 2, 41-45, DOI: http://doi.org/10.37648/ijrst.v12i02.006

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(WHO) specifies that the raw water quality of Hooghly is much worse than the fourth grade unfit water.

WATER ANALYSIS OF RIVER KRISHNA AT SANGLI & MIRAJ :

Sr. No.	Parameters	% in ppm
1.	pH	8.7
2.	Ar. Senic	0.224 ppm
3.	Chromium	0.0470 ppm
4.	Lead	0.872 ppm
5.	Auoride	2.5 ppm
6.	Chloride	450 ppm
7.	DO	3.5 ppm
8.	Sulphate	770 ppm
9.	TDS	375 ppm
10.	Fe	0.37 ppm
11.	Fluorides	265 ppm
12.	DO	500 ppm
13.	Ca	87 ppm
14.	Cu	0.06 ppm
15.	Mn	0.14 ppm
16.	SO^{2-}	240 ppm
17.	NO_2^-	57 ppm
18.	Fluorides	0.9 ppm
19.	As	0.052 ppm
20.	Pb	0.057 ppm
21.	Zn	47 ppm
22.	Mineral Oil	0.14%
23.	Alkalinity	210 ppm
24.	Al	0.035 ppm

RESOURCES OF WATER AND EFFECT OF WATER POLLUTION ON AGRICULTURAL INDUSTRY:

The source if water may be classified as,
A) Surface water
    a) Rain water
    b) River water
    c) Lake water
    d) Sea water

INDUSTRIAL EFFLUENTS - Wastage water left out from the industrial processes is called Industrial Effluents.

SILTATION - Mixing of insoluble earthen materials into water generally as commonly it is observed in hilly areas.

POTABLE WATER - Water which is suitable for drinking, cleaning purpose and store in pots is potable water.

OTHERS - Festivals are also causing pollution.

SALINE SOIL

SALINE SOIL OR SALT AFFECTED SOIL

Irrigation is important in India, Where $1/3^{rd}$ of the land surface is acid or semiarid and the rainfall is seasonal and erratic and so irrigation is an age old practice. In India because of the excessive irrigation soils become water logged. Due to surface evaporation, the soluble salts get accumulated in the soil leading to salinity in soil. These salts are soluble in water. They are mainly chlorides and sulphate of sodium, magnesium and calcium. Among soluble salts, carbonates are more prominent than chlorides and sulphates. Magnesium is usually higher. Concentration of magnesium causes normal effect on the physical properties of soil and plant also ultimately the soil microflora gets affected by salinity while some field naturally the microorganisms get adapted to the salt and so that soil possesses its own microflora. Normal flora of the soil thus get exposed to the salt concentration. Microorganisms which are very sensitive to these salts. It is estimated that about 70 million hectares of land have been affected by salinity and of alkalinity

conditions in India. The problem is particularly acute in arid and semiarid part where about 33% of the total area is encountered.

A combination of three main factors mainly geological, climatic and hydrological in nature are usually responsible for the formation of saline soils.

GEOLOGIC FACTOR

Rock weathering is the primary source of all kinds soluble salts usually found in soils.

CLIMATIC FACTOR :

Excess evaporation and inadequacy of rain fall, salts formed through weathering of rocks do not leach out of soil profile rather they accumulate year after year and saline the soils.

HYDROLOGIC FACTOR :

Water accumulates in lands with low area which evaporates depositing salts on the surface. It has been observed that salt affected areas have highly saline ground water.

In addition, salts originate in soils due to extensive canal seepage and use of saline irrigation water practices which modify hydrological conditions of a region. Salts also come in through wind-mist carried from sea-shore.

In the state of Punjab, Haryana and Delhi. Approximately 15% of the total area and in Uttar Pradesh and Rajasthan around 6% are salt-affected soils. The information about salt-affected area development on the major canals in Maharashtra collected by the Irrigation Department of Maharashtra (Anonymous, I982) indicates the severity of problem and how much land me can reclaim to improve the crop production in Maharashtra, Andhra Pradesh, Karnataka, Gujarat, Western Madhya Pradesh and some parts of Tamilnadu. Most of these soils have been put under irrigation with large scale tapping of surface water resources. The dams constructed for irrigation

should have been a boon to the agriculture, on contrary irrigation has proven to be a curse in some pockets of irrigation areas in these states. Black soils are more prone to drainage problems cause of low hydraulic conductivity and drainable porosity. The best example of reduced productivity of these soils due to poor drainage is that of sugarcane, where the fields have been reduced from more than 200 Mt ha^{-1} during the initial stages of the introduction of irrigation to 30-40 Mt ha^{-1}. This has been caused by the development of water logging and soil salinity, due to irrigation. The problem of soil salinity was extending throughout India with the spread of irrigated farming. Mann and Tamhane (1910) estimated that in the early part of the century, the barren land increased by 6-7 percent per annum in the Nira valley due to canal irrigation. According to Kulkarni (1961), the development of salt-affected area of the existing major canals of Western Maharashtra showed a sharp rise uptol940 reaching to the extent of 55,000 acres and thereafter a slow rise by another 8000 acres in the next 15 years.

SALINE SOIL IN MAHARASHTRA :

Soils containing excessive soluble salt like sodium as exchangeable base are called saline soil. These are generally called as Khar in Maharashtra. Texture of saline soil is generally sandy in Maharashtra. Saline soil are often recognized by the presence of white salt enorustations or white fluffy deposits of salts on the surface predominantly of chlorides and Sulphate of sodium, calcium and magnesium the pH is generally less than 8.5. The electrical conductivity represents salt concentration in the soil.

SALINE SOIL AND SOIL FERTILITY :

Soils affected by salinity are basically fertile and productive but have gone out of cultivation resulting into decline in crop production, crop substitution and fram income. It is nearby impossible to increase area under cultivation in India to increase agricultural production then only alternative to this is to improve the crop yield production.

DISTRIBUTION OF SALINE SOIL IN MAHARASHTRA.

Sr. No.	State	Area under Saline Soil. (in hundred thousand hectares)
1.	Maharashtra	5.26

DISTRIBUTION OF SALINE SOIL ALONG THE CANALS IN MAHARASHTRA.

Sr. No.	Name of Canal	Affected Area (ha)
1	Krishna Canal	679

SALINITY CLASSES AND EFFECT ON CROP GROWTH.

Soil Salinity classes	Conductivity of the soil saturation extract EC (ds/m)	Effect on crop growth
Non-saline	0-2	Salinity effects neglible
Slightly-saline	2-4	Yield of sensitive crops may be restricted
Moderately-saline	4-8	Yields of many crops restricted
Strongly-saline	8-16	Only tolerant crops yield satisfactorily
Very strongly saline	>16	Only a few very tolerant a crops yield satisfactorily

Environmental pollution is woven in the entire fabric of our modern style of living. Every few years the world is getting a severe shock of pollution disasters, London smog (1952, 1956) Bhopal MIC - disaster (1984), Chemobyl-nuclear power station- disaster (1986) "Brown-snow" (1980), Mirmamata tragedy (Japan), etc. are worth nothing.

"Humanity is conducting an unintended, uncontrolled globally pervasive experiment whose ultimate consequences could be second only to global nuclear war, the Earth's atmosphere is being changed at an unprecedented rate by pollutants resulting from human activities inefficient and wasteful fossil fuel use and the effects of rapid population growth in many regions. These changes represent a major threat to international security."

This statement of the June l988, Toronto Conference on the changing atmosphere, marked the deep concern among the scientists, policy makers and the common about the man's activities that change the ealth's environment. The problems are increasing day-by-day and we are now at the crucial point. Adequate measures have to be found out immediately. The final step in this direction may be the formulation of policies based on strategies and their implementations through proper management so that the effective results are sought out.

Let us look back in retrospect on what we can expect in the near future and what will be the state of our environment. Please, note that there is nothing constant in the universe; Environmental change is a continual process. Being an active member of a highly complex ecosystem, man has to reform if a tolerable environmental equilibrium is to establish. Pago has correctly assessed; he says, "we have met the enemy, and he is us!". Hence the need for the present is global cooperation. In this respect it is worth to recall what "Maurice F. Strong, Secretary-general, United Nations conference on environment and development, Rio de Janeiro (Brazil) (ECO'92) has predicted:

The path way of 'Sherinala' which is directly mixed in river Krishna at Sangli

CONCLUSION

By all above experimental results, it has been observed that all values are exceeding over normal limit it is necessary to treat the water by physical, Chemical and Biological treatments to set up all these values is normal range.

It is necessary to create awareness about water pollution of river Krishna among the society, farmers and students.

Every year due to such type of Water pollution, disease like Cholera, Typhoid, Diarrhea, Jaundice, Gastro etc. are spread in community.

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