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EVALUATION OF EFFECT OF INDUSTRIAL EFFLUENTS ON WATER

S. R. WARHATE[*] and T. P. CHAVAN[a]

Department of Chemistry, Lokmanya Tilak Mahavidyalaya, WANI (M.S.) INDIA
[a]Department of Chemistry, Amolakchand Mahavidyalaya, YAVATMAL (M.S.) INDIA

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ABSTRACT

The quality of Sukhana river water at Chikalthana near Aurangabad have been investigated at pH range 6.1 to 7.9 at station E_1 , E_2, E_3, E_4, and E_5. The studies indicated the severely polluted condition of Sukhana river water at most of the monitoring stations.

Key words: Water pollution, Impact, Effluent.

INTRODUCTION

Water is one of the most amazing compounds in nature consist of two common elements hydrogen and oxygen; it is indispensable for life, both for plants and animals. It acts as a solvent for many more compounds than any other liquid providing ionic balance and nutrients which support life. Pollution in general is particularly in relation to water poses burning problem to human populations; water quality degenerate and water is said to be polluted due to sewage industrial discharge, degeneration of protein materials and surface runoff water entering ponds, lakes and rivers form land treated with chemical and pesticides to protect crops. The pollution of Indian rivers if goes beyond certain limit then cost of water treatment for maintenance of water quality becomes an extra burden of the country. This may adversely affect all uses of water, such as domestic, agriculture, aquaculture, industrial, recreation, aesthetic, navigation, power generation, etc. The condition may be more worst if entire aquatic system is thrown out of gear which leads to biological imbalance causing ecological disaster in the biosphere. In agricultural country like India, application of organic waste on load should issue a high priority. Hence it is essential to involve a rational basis for fixing effluents standards for different types of agro based industries.

The present investigation has been undertaken to assess quality of Sukhana river water at Chikalthana near Aurangabad. To study Physico-Chemical characteristics of water which determines water quality essential for human use ? The water is used for domestic, industrial, agricultural and recreational purpose.

Available online at www.sadgurupublications.com
[*]Author for correspondence; E-mail: srwarhate@rediffmail.com

EXPERIMENTAL

Materials and methods

Five sites selected as station in the present study. E1 – samples Near M/s Radiant Agro Ltd, E2 – samples of Nalha flowing towards M/s R. L. steel Ltd., E3 – well water samples near Navegaon Village which serve as base line & upstream side of Location of M/s Maharastra Distillary, E4 – Down stream of M/s Maharastra Distillary near Chikhalthana, E5 – Samples near primary school Mastanpur.

All the Chemicals used were AR/GR grade. The standard method of American public Health Association (APHA 1985) and water and waste water analysis by NEERI (1989) were used for the analysis of samples.

Table 1.

S. No.	Parameter	Sampling sites				
		E_1	$E_{2`}$	E_3	E_4	E_5
1	**pH**	7.2	6.9	7.4	7.8	7.7
2	**Temp.**	27.6	28.6	27.5	26.6	26.7
3	**DO**	1.9	2.7	0.42	3.1	5.5
4	**BOD**	217	218	349	211	74.5
5	**COD**	792	761	1098	632	220
6	**Oil & grease**	6.43	7.65	11.85	5.6	NIL
7	**TSS**	41.5	115.7	61	42.5	38.5
8	**TDS**	1007	2653	1528	731	1403
9	**Total hardness**	383.5	676.5	727	364.5	444
10	**Calcium**	75	134	121.5	65.5	59
11	**Magnesium**	47.65	82.57	102.75	48.8	71.97
12	**Chloride**	355.5	434.5	595.5	154.5	371
13	**Phosphate**	2.05	2.75	5.55	3.8	0.022
14	**Sulphate**	127.5	196	137	114.5	81.5
15	**Iron**	0.019	0.705	0.027	0.039	NIL
16	**Nickel**	0.009	0.022	0.001	0.001	NIL
17	**Lead**	0.002	0.002	0.003	0.002	NIL
18	**Chromium**	0.034	0.012	0.023	0.001	NIL
19	**Sodium**	139	109.5	151.5	69.5	107.5
20	**Potassium**	44	69	55	34.2	26
21	**Nitrate**	1.3	2.6	4.6	3.35	1.4
22	**Alkalinity**	287	359.5	470	177	221

RESULTS AND DISCUSSION

The studies clearly indicated the severely condition of Sukhana river water sample at most of the monitoring station and the degree of pollution was very high. Sampling was carried in fifteen days intervals from February 99 to April 99 were taken in consideration of all the parameters. To assess the quality of river as well as ground water of the study area, Indian drinking water quality standard. IS 10500 (1990) has been adopted. The term desirable limits in the standard applies to water that would be acceptable to consumers as such, water with higher than the desirable limits may have adverse effect. However such type of water can be utilized where better quality of water is not available. For this reason maximum permissible limits have been suggested for drinking water. The values more than maximum permissible limits markedly impair the potability of water.

In the present work the pH range were 6.66 to 7.9 at station E1, 6.1 to 7.7 at station, E2, 6.8 to 7.8 at station, E3, 7.3 to 8.5 at station, E4, 7.6 to 7.8 at station E5.

The max values of water temp during the present investigation were recorded in summer season is 27.6^{o}C at station E1, 26.8^{o}C at station, E2, 25.6^{o}C at station, E3, 25.6^{o}C at station, E4, and 26.7^{o}C at E5.

In present work BOD average values are 217 at station E1, 218 at station E2, 349 at station E3, 211 at station E4 and 74.5 at station E5.

The chemical oxygen demand test determines the oxygen required for chemical oxidation of organic matter with the help of strong chemical oxidant. COD is a test which is used to measure the pollution of domestic & industrial wastes, sing & Vinal Kumar (1988), Shobha Chaturved et al., (1996) Shivkumar et at., (2000) contributed to the COD evolution in fresh water.

Knowledge of the quantity of oil & grease present is helpful in proper design and operation of waste water treatment systems and also may call attention to certain difficulties. In present work the average value of first five months is 6.43 at E1, 7.65 at station E2, 11.85 at E3, 5.6 at station E4 & Nil value at station E5.

In present work the average values of TSS is 41.5 at station E1, 115.7 at station E2, 61 at station E3, 42.5 at station E4 & 38.5 at station E5.

Gupta & saxena (1997) Shrivastav & Chaudhari (1997) and Abbssi and Vinithan (1999) Contributed to TDS evaluation in fresh water. In present work the average values of TDS are 1007 at station E1, 2653 at station E2, 1528 at station E3, 731 at station E4 and 1403 at station E5.

In present work the average value of total harness are 383.5 at station E1, 676.5 at station E2, 727 at station E3, 364.5 at station E4 and 447 at station E5.

Kofoid 1908 Rein hard 1931, Roy 1955, Blum 1957, Chankrabanty et al., 1959, Rajgoplan et al., 1970 and Rai 1974 reported Sharp increase in chloride concentration at sewage pollution station of the rivers. In present work the average value of chloride were 355.5 at station E1, 634.5 at station E2, 595.5 at station E3, 154.5 at station E4 and 371 at station E5.

Sodium is a major component of potable water the average level of sodium in present work in above 100 mg/L.

Potassium is not present in high concentration as a rule ratio of sodium to potassium is 10 : 1 or 20 : 1. In present work the average values of potassium were 44 at station E1, 69 at station E2, 55 at station E3, 34.25 at station E4 and 26 at station E5.

Nitrate is the most highly oxidized form of Nitrogen compounds commonly present in natural waters because it is the product of an aerobic decomposition of organic nitrogenous matter. In present work the average values of nitrates are within the limits.

The alkalinity values provide guidance in applying proper doses of chemicals in water and waste water treatment process. Chandraprakash et at., (1988) observed moderate alkalinity values during different seasons in River Jamuna at Agra. In present work the average values were 287 at station E1, 349.5 at station E2, 470 at station E3, 177 at station E4 and 221 at station E5.

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