



COMPARATIVE ACCOUNT OF EFFLUENT ANALYSIS FROM DIFFERENT INDUSTRIES IN AND AROUND TIRUCHIRAPALLI DISTRICT IN THE YEAR 2004

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ABSTRACT

With the rapid growth of industries, pollution in natural waters by industrial wastes has increased tremendously. Due to lack of treatment and improper modes of disposal of wastes, the water bodies are polluted and they carry deadly substances. The present work aims at studying the nature of effluent from different industries and hence to make a comparison of the quality of effluent water that are discharged into the water system. Seven effluent samples were collected from different industries and physico-chemical parameters were analyzed. The results were compared with ISI standard. The results are tabulated and conclusions are drawn.

Key words: Effluent, Analysis, Physico-Chemical parameter, water samples.

INTRODUCTION

Water contains a variety of physical, chemical and biological substances, which are either dissolved or suspended in it. The untreated effluent water usually contains numerous pathogenic micro organisms and nutrients that can stimulate the growth of aquatic plants. Effluent components are much higher than the WHO and ISI prescribed permissible limits. So the industrial effluent are completely treated, and then discharged into sewage or land. The present work is undertaken with a view to study the nature of effluents from different industries and hence to make a comparison of the quality of effluent water. A total of 7 samples were collected in the year 2004 from the following industries like (i) textile&dyeing (ii) tannery (iii) foods factory (iv) milk (v) metal (vi) distilleries and chemicals limited (vii) automobile industry.

EXPERIMENTAL

Effluent water samples were collected from different industries using spot sampling procedure in previously washed and dried polythene containers.

The physical, chemical and biological parameters, such as pH, Conductivity, Total hardness, Total Dissolved solids [TDS], Chlorides, Sulphates, Dissolved oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) were analyzed using volumetry and colorimetry¹⁻⁴.

RESULTS AND DISCUSSION

The quantity and quality of the characteristics of the effluents differ from industry to industry. The industrial effluents are characterized by foul, odour, strong colour, high BOD, high pH and TDS with very low DO contents. The treated effluents were compared from different industries by estimating a few physico-chemical parameters. The data obtained are tabulated in the Table-1.

pH

The treated effluent water should have a pH range of 5.5 to 9.0. All the samples were found to be within the ISI permissible limit. Out of 7 samples, 6 samples were found to have pH value greater than 7, indicating the presence of significant amount of exchangeable hydroxide ions.

Electrical conductivity

Electrical Conductivity is a measure of the total ionisable dissolved solids present in water. Electrical Conductivity was found to be maximum in samples 5 and 6. The cause for the observed increase in the Electrical Conductivity & the corresponding increase in total solids & total dissolved solids can be traced to be due to the presence of general soluble inorganic salts in the effluents.

Total Hardness & Total Dissolved Solids

The total hardness measured in the four samples was found to be greater than 500 ppm which can be traced to the presence of calcium and magnesium salts. The total dissolved solids consist of both volatile and non-volatile solids and their excessive amounts in water leads to laxative effects. Samples 1, 3, 4 & 7 were found to possess the amount of dissolved salts in accordance with the ISI specification.

Chlorides & Sulphate

Permissible limit according to ISI is 1000, mg L⁻¹. The sample 6 was found to be beyond the permissible limit and other samples were found to be within the permissible limit. The high concentrations of salts are expected to affect the nature of the soil and hence it is definitely not fit for the irrigation purposes. In all the samples, the concentration of sulphate was observed within the permissible limit.

DO, BOD & COD

The permissible limit for DO is 4 to 6, mg mL⁻¹. Three samples 1, 2 & 5 have a lower value of DO indicating the presence of organic load and requires further treatment. The BOD is widely recognized as an important parameter for the measurement of the organic strength of waste water. The BOD data is essential for design of waste water treatment plants and are used to assess the performance of such plants. The permissible limit is 100, mg L⁻¹. Except the samples 2 & 4, the BOD was found to be within the permissible limit for all other samples.

The COD values give a measure of organic & inorganic pollutants which can be chemically oxidized. The permissible limit is 250, mg L⁻¹. Samples 1, 2 & 4 were found to be above the permissible limit of ISI. The maximum value of COD is attributed to the presence of high amount of organic matter and solid particles.

CONCLUSION

It can be seen that all the values are within the ISI permissible limit for sample 3 and 7. So the other industrial effluents are further treated then it is discharged in to the nearby water system.

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Table-1:Treated effluent water samples

Parameter	S-1	S-2	S-3	S-4	S-5	S-6	S-7	ISI Permissible limits
pH	8	7.45	7.5	8.01	6.83	8.3	7.9	5.5-9.0
EC,mho cm ⁻¹	2.9	6.01	0.7	1.78	15	16	1.7	2.25
Total Hardness,ppm	800	1000	260	540	35	522	79	300
TDS,mg L ⁻¹	1300	4120	414	986	3985	5472	914	2100
Chloride, mg L ⁻¹	294	800	73	168	672	1148	33	1000
Sulphate,mg L ⁻¹	4	500	17	63	14.8	270	17	1000
DO,mg mL ⁻¹	3.5	3.7	4.5	5.3	3.1	4.3	5.1	4-6
BOD,mg L ⁻¹	99	190	29	128	42	47	13	100
COD,mg L ⁻¹	325	512	81	420	180	226	54	250

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