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Sewage Analyze from Industrial Effluents of Industrial area, Solapur, Maharashtra, India

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***Abstract:** In India rapid industrialization along with the other human activities has adversely effected to the environment. Major industries have insufficient effluent treatment facility. Its affected in environmental degradation. The present research work deals with the study of some important physico-chemical parameters of industrial waste water from, Nilam Nagar, Akkalkot road, Solapur. Industrial area which Latitude 17° 39' 19.1484'' N and Longitude 75° 55' 45.9948''E. Analysis of physico-chemical characteristics from industrial effluents samples were collected from industrial effluent sites in Solapur. Physico chemical parameter were studied by month from Jan 2017- Dec 2017 for one year. This study shows variation of monthly and seasonal of physico-chemical parameter. The parameters invented Temperature, pH, EC, DO, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS), Chloride, Iron, Sulphate, Hardness, Alkalinity, Oil & Grease.. Results indicated that these are some parameter not permissible for most aquatic species. Its impact goes to loss of aquatic ecosystem. The study showed that most of the water parameters of the Industrial effluent are not able to mix the fresh water bodies.*

***Keywords:** Development, Environment, Industries, Sewage, Health.*

I. INTRODUCTION

Solapur is a city located in the south-western region of the Indian state of Maharashtra, close to its border with Karnataka. Solapur is located on major Highway, rail routes between Mumbai, Pune, Bangalore and Hyderabad, with a branch line to the cities of Bijapur and Gadag in the neighboring state of Karnataka. It is the 5th biggest city in Maharashtra and the 49th most populous city in India and 43rd largest urban agglomeration. Industrialization has become an important factor to the development of a country's economy, through the establishment of plants and factories. However, the waste or by-products discharged from them are severely disastrous to the environment consists various kind of contaminant which contaminate the surface water, ground water and soil. There are a number of reasons the waste are not safely treated. One of the reasons is mainly due to the lacking of highly efficient and economic treatment technology. The focus of this study is to give a detail illustration at the effect of industrial discharge and on the environment and human health. Some corrective actions shall also be illustrated in the later part of this study, to overcome the contamination of industrial discharge. Industrialization is an important activity for growth and development of the Indian economy. Therefore, the industrial activity has expanded in all over India, State and Central Government announces and allots the land, water and electricity in all Taluka places for launching the industries Industrial Development policy of India (1948, 1956, 1977, 1985, 1991). Today, it has become a matter of major task in the debasement of the environment. Government releases the facility and subsidy about establishing the industry the rate of industries was increased in last some decades. About installation of heavy pollution industries the pollution control board announces and declares the rules of control of pollution. But lot of industrialist not operates the pollution control system forever. In India effect of the rapid growth of industries the pollution of natural water by industrial waste water has increased tremendously Arshad Husen *et, al,*.(2015). Major industries from India have treatment facilities for industrial effluents. But this treatment facility is established in on metro cities or very high cost industries it is not found in the case of small scale industries and small city industrial area. Some industries cannot manage excessive expenses in pollution control equipment as their business profit margin is very low. Subsequently, the water pollution problem particularly due to toxic metals has become threatening concern Snehal D.Kale and N.N.Bandela (2016). Correspondingly in more industrial area from India there inacceptable information found inappropriate with the omission of industrial wastes. More industries are left effluent in the common drainage and common drainage are left in the small river small rivers are connected to big rivers. In well-equipped industrial area also responsible for pollution in rainy season run off or flood run towards river with industrial waste. Industrial water pollution is global issue. Industrial water pollution caused by factories and other industries can be the most severe predicament in an environment. Such types of pollution can lead reflective problem to human and animal health problems likewise widespread crushing to the natural world. This is an enormous worriment, and intermittently it can be so serious it's inconceivable to effectively unblemished KumudTanwar and Jaya Mathur (2016).

It is appear that one-third part of the water pollution participate from the total water pollution in India enter through industrial effluent discharge, solid wastes and other hazardous wastes are mixed in water. India has defeated in industrial water pollution management scenario. That's double percussion on Indian economy one side Government give facility and subsidy to launch industry and expense on recover environment disabled by industry example Ganga river is polluted by industry and it is repaired by Government of India. Our present research area is the Solapur industrial region, of Maharashtra, India. It is undergoing rapid urbanization and industrialization since last three decades. It has many Food processing, Textile and readymade garment, Engineering and Steel furniture, Paper, Printing press, Chemical, Plastic, Drinking water, Oil mill, Dall mill, and Electrical industries. Effluents rising from their industries and cause to pollute water resources, the present paper is intended to detail study of physico-chemical properties industrial effluents of Solapur Industrial area.

Water is the most integral wealth for all kinds of life on the earth, but it is being negatively affected for all kinds of organisms. Today most of the rivers and fresh water bodies receive millions of liter sewage domestic waste and industrial effluents containing varying in characteristics from simple nutrient to highly toxic substances. In recent years, increasing industrialization and developmental activities with the population explosion leads to generation of large amount of waste water from industries and other sources. Studies of water quality in various effluents revealed that manmade activities have an important negative impact on water quality in the downstream sections of the major rivers and fresh water bodies. This is a result of cumulative effects from upstream development but also from inadequate or deficient wastewater treatment facilities Amit (2013).

II. MATERIAL AND METHOD

A. Study Area

The study was carried out at Solapur from Maharashtra Industrial Development Corporation where are large and medium scale industries like engineering units, steel processing industries, chemical units, paints, textile, oil mill, dal mill, rice mill, bakery, food processing, scrap processing, marble and tiles, and battery industries etc.

B. Industrial Effluent Sampling and Preservation

The industrial effluent samples were collected randomly month by month from January 2018 to December 2018 in polythene cans for a period of twelve months from two sites which are East and West side of Industrial area. The sample container cans were thoroughly cleaned with hydrochloric acid, cleaned with tap water for free of acid, washed with distilled water twice, again rinsed with the water sample to be collected and then filled up the cans with the sample leaving only a small air gap at the top. The sample cans were Stoppard and sealed. Each sample was labelled properly and brought back to the laboratory for the analysis.

C. Physico-Chemical Study

The samples were collected and analyzed for Temperature, pH, EC, DO, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS), Chloride, Iron, Sulphate, Hardness, Alkalinity, Phosphorus, Nitrate, Oil & Grease. The techniques and methods followed for collection, preservation and analysis are given by (APHA, 1995). Trivedy and Goyal (1998).

Table 1 West side of MIDC Area

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temperature	29.2	29.1	30.9	31.2	32.1	29.9	28.6	29.1	30.1	29.7	29.4	28.9
pH	7.1	7.6	8.4	8.9	8.9	7.8	7.9	7.2	7.9	8.6	8.2	7.8
EC	1140	1165	1296	1225	1292	1326	1345	1369	1273	1322	1324	1311
DO	1.9	1.8	1.7	1.9	1.7	1.8	1.9	1.7	1.8	1.9	1.8	1.9
BOD	496	493	462	465	462	529	564	582	620	592	567	497
COD	896	885	886	849	868	796	789	785	796	810	795	792
TDS	2186	2168	2080	2064	2030	1869	1847	1895	1965	2110	2060	2054
Chloride	696	668	678	698	680	695	645	762	782	708	710	725
Iron	2.22	2.26	2.67	3.10	2.68	2.46	2.58	2.68	2.28	2.38	3.38	3.28
Sulphate	668	638	618	638	628	668	674	662	628	528	668	628
Hardness	1162	1178	1182	1140	1092	1096	998	1024	1068	1120	1160	1090
Alkalinity	1048	1038	1168	1138	1168	1240	1380	1320	1340	1344	1292	1028
Potassium	20	24	22	38	42	44	18	28	38	42	46	48
Nitrate	0.4	0.10	0.16	0.68	0.10	0.49	0.28	0.38	0.52	0.61	0.58	0.56
Oil & grease	68	62	48	58	42	64	68	62	56	52	58	58

Table 2 West Side of MIDC Area

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temperature	28.8	28.9	29.6	31.6	31.9	28.9	29.4	29.6	29.4	28.6	28.2	28.4
pH	6.9	7.7	8.6	8.9	8.4	8.4	7.8	7.8	7.4	8.6	8.4	7.6
EC	996	1068	1198	1246	1294	1310	1320	1360	1246	1260	1270	1268
DO	1.2	1.2	1.3	1.1	1.4	1.3	1.4	1.5	1.4	1.4	1.5	1.4
BOD	468	458	430	446	480	530	540	590	620	580	540	510
COD	840	865	886	882	868	740	768	782	748	786	778	774
TDS	2165	2115	2028	1858	1568	1098	1298	1628	1820	1968	1882	1898
Chloride	680	668	684	628	660	650	630	670	668	668	712	792
Iron	2.76	2.84	2.82	2.82	2.96	2.86	2.98	2.86	2.76	2.90	2.90	2.82
Sulphate	686	648	668	648	664	698	690	656	572	586	682	668
Hardness	1020	980	1030	1040	1030	990	950	1040	1060	1140	1080	1020
Alkalinity	1048	920	1168	1160	1145	1270	1330	1380	1365	1360	1320	1070
Potassium	24	28	32	30	28	28	42	38	36	44	42	40
Nitrate	0.5	0.10	0.15	0.50	0.68	0.58	0.62	0.48	0.67	0.28	0.54	0.94
Oil & grease	68	62	56	48	58	48	54	58	52	46	58	64

III. RESULT AND DISCUSSION

Temperature recorded between 28.6℃ to 32.1℃ in west side industrial area and 28.2℃ to 31.9℃ recorded east side industrial area similar reported by K.G. Akpomie and F.A. Dawodu (2015). pH obtained between 7.1 to 8.9 west side industrial area and 6.9 to 8.9 in ease side industrial area equal reported by Priyanks Dhingra et,al,. (2015) . Electrical conductivity ranged between 1140uS/cm to 1369 uS/cm in west side area and 996uS/cm to 1360uS/cm in east side industrial area Vikramjit Singh *et,al,.*(2016), Snehal and Bandela (2016). Dissolved oxygen recorded between 1.7 mg/lit to 1.9 mg/lit in west side industrial area and 1.1 mg/lit to 1.5 mg/lit in east side industrial area same researched by M.B. Likita *et, al,.* (2016). Biological oxygen demand recorded 462 mg/lit to 620 mg/lit in west side industrial area and 430 mg/lit to 620 mg/lit in east side industrial area similar searched by Hangargekar P. A. And Takpere K. P. (2015). Chemical oxygen demand was recorded in 785 mg/lit to 896 mg/lit in west side industrial area and 740 mg/lit to 886 mg/lit in east side industrial area studied by Hangargekar P. A. And Takpere K. P. (2015). Total dissolved solids are 1847 mg/lit to 2186 mg/lit in west side industrial area and 1098 mg/lit to 2165 mg/lit in east side industrial area reported by P. Manikandan *et, al,.* (2015). Chloride recorded 645 to 782 in west industrial area and 628 to 792 in east side area reported Nizzy & Kannan (2014). Iron ranged between 2.22 mg/lit to 3.38 mg/lit west side industrial area and 2.76 mg/lit to 2.98 mg/lit in east side industrial area Vandana Sharma and Yogesh Kumar Walia(2015). Sulphate showed 528 mg/lit to 674 mg/lit in west side industrial area and 572 mg/lit to 698 mg/lit in east side industrial area reported by Usha & Vikram (2012). Hardness recorded 998 mg/lit to 1182 mg/lit in west side industrial area and 950 mg/lit to 1140 mg/lit in east side industrial area same reported by Vijay Sharma et, al,. (2014). Alkalinity showed 1028 mg/lit to 1380 mg/lit in west side industrial area and 920 mg/lit to 1380 mg/lit in east side industrial area same searched by P.V. Tekade*et, al,.* (2011). Potassium recorded 20 mg/lit to 48 mg / lit for West side industrial area and 24 mg/ lit to 44 mg/lit recorded in east side industrial area. This is recorded by Varsharani B.Jadhav and S.N. Nandan (2016). Nitrate found 0.4 ppm to 0.61 ppm in west side industrial area and 0.50 ppm to 0.67 ppm recorded in east side industrial area. Same reported as Manoj Kumar Tiwari (2016). Oil and grease reported 42 mg/lit to 68 mg/lit in west side industrial area and 46 mg/lit to 68 mg/lit recorded in east side industrial area equal reported by Ram S. Lokhande et, al,. (2011).

So it is need of find the solution to treat such samples and have a common policy applicable to all the industries so that the effluents will be free from such harmful content and the aquatic life run can be pollution free.

IV. CONCLUSION

The industrial effluents carries various types of contaminants to the river, lake and groundwater. The quality of freshwater is very important which is affected by industrial effluent as it is highly consumed by human for drinking, bathing, irrigation and etc. The obtained contaminant from industrial effluent are reduce the yield of crops and the growth of plant and contaminate the soil, it will harmful to the aquatic flora and fauna and various diseased to human and live stock.

A. River

River is a system of fresh water current but its nature now changed by industrial effluents. Dumped material by industry is carrying and these material is dissolved in water so affect goes all flora and fauna. These dissolved substance moves downstream and will be experiencing chemical and biological changes. Thus, the water chemistry of a river is affected by the lithology of the reservoir, atmospheric, and anthropogenic inputs. Furthermore, the transport of natural and anthropogenic sources to the oceans. It affected as a geochemical reactor and its heterogeneous reaction could bring the understanding on the fate of metals, organic and inorganic matters along the river to the ocean. Through the studies conducted by Jonathan et al. (2008).

B. Metals

The contamination of metals is a major environmental problem and especially in the aquatic environment. Some metals are potentially toxic or carcinogenic even at very low concentration and are thus, hazardous to human if they enter the food chain. Metals are usually dissolved into the aquatic system through natural or anthropogenic sources. Metal ions are distributed thoroughly during their transport in different compartments of the aquatic ecosystems, in biotic or abiotic compartment such as algae, aquatic plants, fishes, frogs, water, sediment. Remaining metals are contaminate in sediments and accumulate in microorganisms which is part of food of higher animals and entering into the food chain and eventually affect human well being (Shakeri & Moore, 2010).

This study noted that the industrial effluent is hazardous to fresh water bodies due to metal. Metal in sediment is affected by mineralogical and chemical composition of suspended material which is affected to living organism or aquatic plant (Jain et al., 2005). Suspended and bottom sediment are play an important role in compartment to buffer metal concentration in an aquatic system. (Jain & Ali, 2000; Jain, 2001; Jain & Sharma, 2002; Jain et al., 2004). However, the metal discharges from industry may change the role of water of fresh water current and mix in sediment which may not be able to act as a sink and buffer to higher concentration of metal. (Singh et al., 2005; Shakeri & Moore, 2010).

Through the studies, we can deduce that most of the industrial discharge carries toxic substances. The result of these case studies will then be presented as a solid evident for the effects of metals ions, organic and inorganic matters to environment. The interactions and impacts which caused by these chemical contaminants towards the environment will be further explained.

V. SUGGESTION

Industries must treat their own effluent in theirs industry.

Government banned such industry which are dump their effluent out side of their industry.

Invent reuse of industrial effluents.

Use common treatment plant for industrial area for control the toxic content of effluent.

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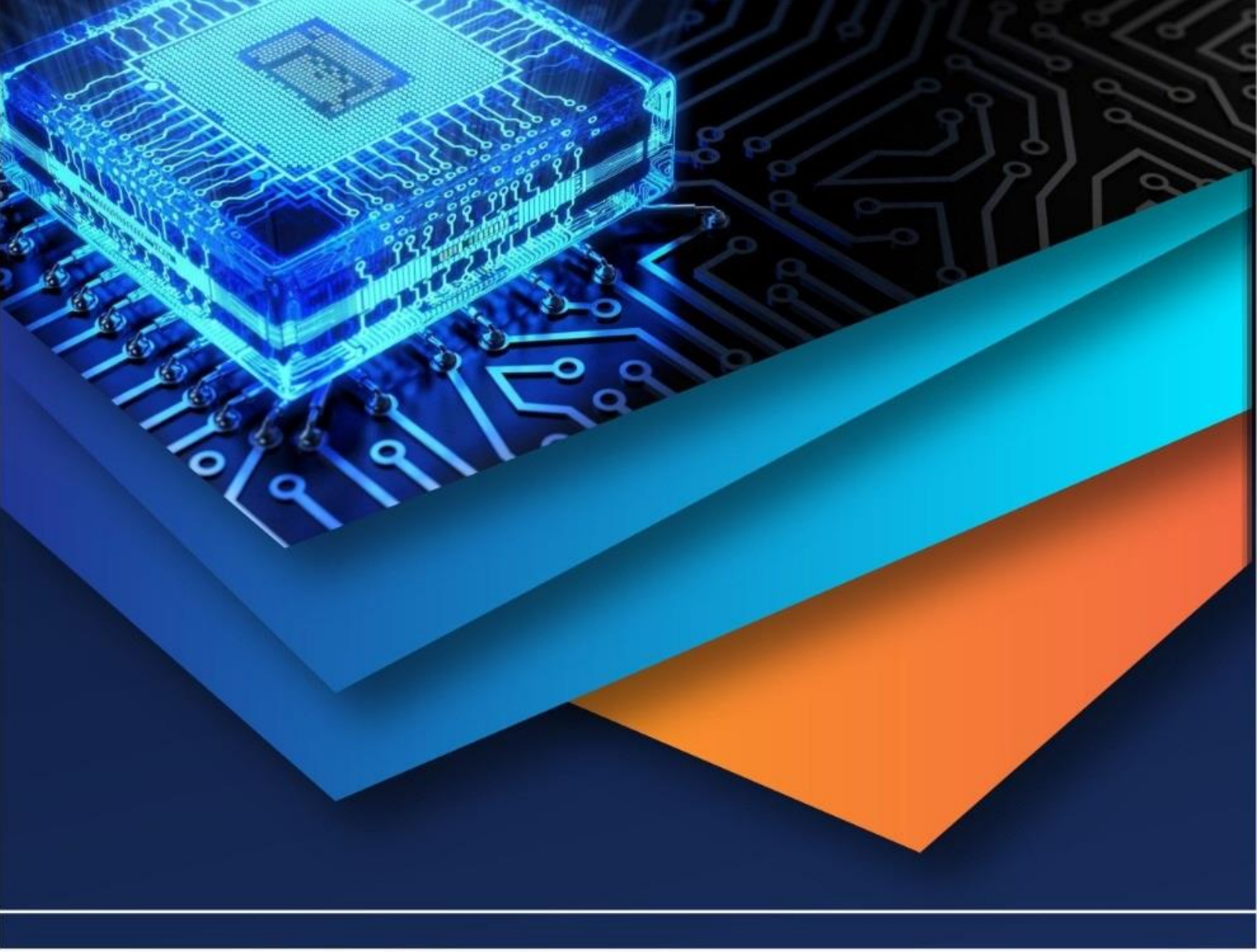

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