IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
IJARSCT
Impact Factor: 6.252
Volume 2, Issue 3, March 2022

Correlative an Accounts of Oil, Emulsifier and Agrochemical Pollution in Industrial Area of Kalyan and Dombivli

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Abstract: *Discharge of polluted water contains various toxic metals released by oil and emulsifier as well as agrochemical industries in Dombivli. A correlative account of heavy metals were studied and observed toxic metals like Cu, Ni, Cr, Pb, Fe and Zn. Oils and emulsifier and agrochemical. Oils and emulfifier were studied in details in season wise i.e. Rainy, winter and summer. In all seasonFe toxic metal was higher as compared to other metals in the influent and effluent. In winter season Fe influent was recoded more as compare to effluent while in summer season also increased Fe toxic metal andCu mg/L in Industry S3. Heavy metals were reported in all season like rainy, winter and summer. In rainy season influent and effluent were observed and found Fe and Cu more while in effluent Pb was higher and winter season Fe and Cu also higher amount were recorded effluent was reported in Pb mg/l while in summer six metal were also studied. Fe and Cu were much higher than that of rainy and winter influent and effluent.In presently investigated that the comparative studies of Oils and Surfactants (S3) and Agrochemical (S4) industries in Dombivli manufacturing industries were reported toxic metals viz. Cu, Ni, Cr, Pb, Fe and Zn more or less quantizes were observed Rainy S3 and S4 influent Fe (3.31 and 1.50) and effluent (Fe.25 and Pb in S4. Winter season influent Fe was higher in both Industries but 51.0 Fe was reported highest pollution as compared to effluent of both industries Fe Zn Cr and Cu less amount while in Summer season Fe (15.47 and Cu 12.58) in S3 and Fe(42.67) Cu (29.86)influent more concentrated then other between them and effluent S3(Fe and Zn more while in case of S4 Fe toxic metal was very high conc.*

Keywords: Influent, Effluent, Toxic Metals, waste water, Industrial Belt and Kalyan and Dombivli

I. Introduction

Maharashtra is the most developed industrial area situated in MIDC Kalyan and Dombivli. Oil and emulsifier and agrochemical manufacturing industries release different wastes like solid and liquid. Oil and surfactants and agrochemical industries release huge toxic heavy metals Like Cu,Ni, Cr, Pb, Fe, and Zn. These heavy metals are harmful to aquatic flora and fauna. Before releasing heavy metals toxic pollutant release from industries was required treatment to reduce water pollution. Presently two industrial comparative accounts were studies and reported toxic metals viz. Cu, Ni, Cr, Pb, Fe and Zn. Toxic heavy metals were released more or less concentration observed in rainy season oils and surfactants (S3) and agrochemicals (S4) in influent Few as 3.31mg/Land 1.50 mg/L) and effluent 0.25mg/LFe and Pb in S3and S4. Winter season influent Fe was higher in both Industries but 51.0mg/LFe was reported highest pollution as compared to effluent of both industries Fe Zn Cr and Cu less amount while in Summer season Fe (15.47 mg/Land Cu 12.58mg/L) in S3 and Fe (42.67mg/L) Cu (29.86mg/L) influent more concentrated in S4. Effluent in industries S3(Fe and Zn more while in case of S4 Fe toxic metal was very high conc. Therefore, heavy metals were studied and rapid effects on growth of population and expansion of various developmental activities have both greatly aggravated resource depletion and degradation of the environment in India. Malthusian formulated before the agricultural revolution, presumes that the productivity of environmental resources such as land is fixed. Malthus did not foresee the important technological advances that have accompanied modernization. Writing after the agricultural and industrial revolutions,

II. Materials and Methods

Kalyan and Dombivli industrial area was established by Maharashtra Industrial Development Corporation in around 1964. The industrial belt occupies an area of about 347.88 hectares, is located in Dombivli and Ulhasnagar River and about45.00 km from Mumbai international airport. There are about 30 highly polluting small to large scale chemical industries located in this industrial belt. Quantity of industrial influent and effluent generated in the industrial area is about 15 million liters per day, which is finally discharged into the Kalyan Dombivli and Thane creek through open drainages which was passing through residential area. Tropical climate Dombivli is suitable for enjoying with mean annual temperature of 27.3ºCto 35.9ºC and hottest in April-May temperature rises to 38.0ºC. The humidity is usually in the range about 84 -90 Percent. The average rainfall is in the range of 1850 mm to 2000 mm and average annual rainfall in the region is the range from 1286 to 1233 mm Action, 2010. Heavy metals like Cu, Ni, Cr, Pb, Fe and Zn of industries Oils and surfactant (S3) and agrochemical industry (S4) were analysis. The glassware's used in the analysis were washed with distilled deionized water; the pipettes and burette were rinsed with the experimental solution before final use.

The industrial waste water influent and effluent samples were collected randomly from Dombivli and Kalyan 3 times in a month in morning, afternoon and evening session from S3 and S4 industries like oil and surfactant and agrochemical fine chemical industries of Dombivali. The samples were collected every month from three seaseon like Rainy, winter and summers of conjugative two year i.e.2017 and 2018. Polyethylene bottles of 2.5 L were used to collect the toxic water samples. The bottles were thoroughly cleaned with hydrochloric acid, washed with tape water to render free of acid, washed with distilled water twice, again rinsed with the water sample to be collected and then filled up the bottle with the sample leaving only a small air gap at the top. The sample bottles were finally sealed with paraffin wax. Water samples (500 mL) were filtered using Whatman No. 41 filter paper for estimation of heavy metal content. Filtrate (500 mL) was preserved with 2mL Nitric acid to prevent the precipitation of metals. The samples were concentrated on a water bath depending on the suspected level of the metals (Chen and Ma, 2001). The analysis of the potentially toxic metals like Cu, Ni, Cr, Pb, Fe and Zn was done by Perkin Elmer ASS-280 Flame Atomic Absorption Spectrophotometer. A reagent blank sample was run throughout the method, and the blank readings were subtracted from the samples to correct for reagent impurities and other sources of errors from the environment. Average values of three replicates were calculated for each determination.

III. Results and Discussion

Heavy metals of the Influent and effluent for S3 and S4 industries were given in **Table 1 and 2.** Heavy metals were studied and observed toxic metals like Cu, Ni, Cr, Pb, Fe and Zn. Oils and surfactants and agrochemical. Oils and Surfactants were studied in details in season wise i.e. Rainy, winter and summer. In all season Fe toxic metal was higher as compared to other metals in the influent and effluent. In winter season Fe influent was recoded more as compare to effluent while in summer season also increased Fe toxic metal and Cu mg/L in Industry S3. In rainy season influent and effluent were observed and found Fe and Cu more while in effluent Pb was higher and winter season Fe and Cu also higher amount were recorded effluent was reported in Pb mg/l while in summer six metal were also studied. Fe and Cu were much higher than that of rainy and winter influent and effluent. In presently investigated that the comparative studies of oils and emulsifier (S3) and agrochemical (S4) industries in Dombivli manufacturing industries were reported toxic metals viz. Cu, Ni, Cr, Pb, Fe and Zn more or less quantizes were observed Rainy S3 and S4 influent Fe (3.31 and 1.50 mg/L) and effluent Fe 0..25 S3and Pb in S4. Winter season influent Fe was higher in both Industries but 51.0 Fe was reported highest in S4. Influents of Fe (15.47), Zn(6.15), Cr(1.15) and Cu (29.86) in S4 industries were less amount while in Summer season Fe (15.47 and Cu 12.58) in S3 and Fe(42.67) Cu (29.86) influent more concentrated then other between them and effluent S3(Fe and Zn more while in case of S4 Fe toxic metal was very high conc. Heavy metals viz, copper, nickel and chromium was observed to be less than 1.0 mg/L at effluents for S3 and S4 industries for seasons. Lead, iron and zinc were found to be less. Effluents for S3 industries for conjugative two years it is concluded that the effluent treatment plants (ETPs) is working properly for S3 and S4 industries.Results were also correlated with other researcher the toxic metal content in the industrial waste water effluent samples oil & surfactants and agrochemical industries of Dombivli. Trace elements are those elements which are present in relatively low concentration of less than few mg L^{-1}. Among the special group of trace elements are the potentially toxic metals like Cr, Ni, Zn, Cu, Pb and Fe which are having the potential to create health hazards among humans, plants and other aquatic life. The Cucontent was found to be minimum of 0.41mg/l in the effluents S3 and S4. Results of present investigations were compared with previous finders and correlated with Moore and Ramamoorthy (1984) observed that the toxic metals in natural waters and applied monitoring and impact assessment. Chakravarty et.al. (1959) stated that a quantitative study of the plankton and the physico chemical conditions of the River Jumna at Allahabad. Khurshid et.al (1998) noted that the effect of waste disposal on water quality in parts of Cochin. Zingde and Govindan (2001) observed that the health status of coastal waters of Mumbai and regions around. Pachpande and Ingle (2004) illustrated that the recovery of the chromium by chemical precipitation from tannery effluent. Young(2005) stated that toxicity profiles toxicity summary for cadmium, risk assessment information system. Tiwana et.al (2005) observed that the on the impact of *Ni* on human health due to short-term exposure , however it may results in loss of body weight, damage to heart and liver as well may results in skin irritation on long time exposure. Aghor (2007) illustrated that the chemicals make Thane creek the worst polluted water body. Gbaruko et.al.(2008)recorded that the ecotoxicology of arsenic in the hydrosphere: implications for public health. Rajaram and Das (2008) recorded that the water pollution by industrial effluents in India: discharge scenarios and case for participatory ecosystem specific local regulation. Kazi et. al (2009) noticed that the correlation of arsenic levels in drinking water with the biological samples of skin disorders. Ana et.al 2009) stated that remediation of heavy metals contaminated soil, phytoremediation as potentially promising cleanup technology correlate with present investigation and found similar results. Cai et.al (2009) obsreved that the genes involved in arsenic transformation resistance associated with different levels of arsenic contaminated soils. Saidi(2010) experimental studies on effect on heavy metals presence in industrial waste water on biological treatment. Lokhande et.al (2011) recorded that the toxicity study of toxic metals pollutants in waste water effluent samples collected from Taloja Industrial Estate of Mumbai, India.Ogyoyi et.al (2011) determination of heavy metals contents in water, sediment and microalgae from Lake Victoria east Africa. Singare et.al (2011) noticed that the water pollution by discharge effluents from Gove Industrial Area of Maharashtra, India: Dispersion of Toxic metals and their Toxic effects. Abdullhai (2013) recorded that toxic effect of lead in human and overview. Ognerobor et.al (2014) observed that the heavy metal pollutants in waste water effluents: Sources, effects and remediation.

Akpor (2014) studied heavy metals pollutants in wastewater effluent as sources effect and remediation and found similar results. Gunatilake (2015) suggested that the methods of removing heavy metals from Industrial waste water . Journal of multidiscilinary engineering science studies. Narendra et. al. (2016) suggested that the study of Toxicity of Heavy Metal Pollutants in Waste water Effluent samples International Journal of latest Trends in engineering and Technology. In plants, excess of Cumay cause root da- mage, the growth of roots get inhibited, development of number of short, brownish coloured secondary roots and also results in destroying the normal cell membrane structure. Since Cuis readily accumulated in organisms, its toxicity arises when the absorption rate is more than the excretion rate. Hence it is very important to keep check on the concentration levels of Cuin waste water. The Ni content reported in the present investigation was found to vary between 0.34 mg L^{-1} in the effluents released from pharmaceutical industries, to 1.10 mg L^{-1} in the effluents released from textile industries. Rohitsharma (2020),Analysis of Water Pollution Using Different Physicochemical Parameters: A Study of Yamuna River. Frontiers in environmental science :bdullahi,M.S. (2013).Toxic effect of lead on human: an overview. Global Advanced Journal of Environmental science and Toxicology. 2(6): 157-162.

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Table 1: Estimation of toxic heavy metals from waste water samples of oils and emulsifier (S3) industry in Kalyan Dombivli.

Heavy Metals	Raney season		Winter season		Summer season	
	Influent	Effluent	Influent	Effluent	Influent	Effluent*
Cu(mg/L)	1.14	0.09	5.90	0.21	12.58	0.41
Ni(mg/L)	0.48	0.10	0.67	0.10	1.56	0.10
Cr(mg/L)	0.80	0.10`	1.82	0.10	9.34	0.15
Pb(mg/L)	1.46	0.10	1.00	0.11	1.10	0.11
Fe(mg/L)	3.31	0.25	8.54	0.45	15.47	0.53
Zn(mg/L)	0.89	0.22	1.75	0.35	2.73	0.50

Fig. indicate triplicate means

Table 2: Estimation of toxic heavy metals from waste water samples of agrochemicals (S4) industry in Kalyan and Dombivli.

Heavy metals	Raney season		Winter season		Summer season	
	Influent	effluent	Influent	Effluent	Influent	Effluent *
Cu(mg/L)	1.10	0.05	12.0	0.13	29.86	0.25
Ni(mg/L)	0.47	0.10	0.72	0.10	0.90	0.10
Cr(mg/L)	0.48	0.10	0.84	0.10	1.15	0.10
Pb(mg/L)	0.60	0.25	0.90	0.20	1.20	0.10
Fe(mg/L)	1.50	0.05	51.0	3.18	42.67	2.40
Zn(mg/L)	0.86	0.14	4.0	0.53	6.15	0.57

Fig. indicate three replication of mean.