Research Paper on The Study on The Performance of Effluent Treatment Plant of UCO Denim Hub Yavatmal

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Abstract- *The present study has been undertaken to evaluate performance efficiency of an Effluent Treatment Plant (ETP) of textile industry located in Lohara Yavatmal Maharashtra. An effluent treatment plant is operating on well-designed Effluent Treatment method with average wastewater inflow of. has been considered for case study. The wastewater is analyzed for major water quality parameters such as Biological Oxygen Demand, Chemical Oxygen demand(COD).Total Dissolved Solid(TDS), Total Suspended solid (TSS).The samples were collected of daily basis .The study Comes under seasonal variation. The raw wastewater was highly alkaline which was then neutralized to make it suitable for biological treatment. The BOD,COD,TDS,TSS reduced significantly as compared with the parameters prescribed by Maharashtra Pollution Control Board(MPCB).*

Keywords- Effluent Treatment Plant, Parameters of ETP

I. INTRODUCTION

The textile industry is one of the leading sectors in Indian economy as it contributed to about 14% of industrial production. The untreated water coming from the textile industry is if directly discharged into the surface sources causes' rapid depletion of Dissolved Oxygen due to its high BOD content. The waste water having very high BOD&COD value leads to toxicity. The high alkalinity traces in water leads to negative impacts on aquatic life and also interferes with biological treatment process. Physiochemical method and biological method can be used for analysis of such effluent. According to this analysis treatment method waste minimization method is applied. Operational and maintenance problems can be adopted. Textile industry generally uses very high amount of water throughout the operation like washing of fiber, bleaching, mercerizing, dyeing and printing and washing of finished product.

II. LITERATURE REVIEW

Calculation of performance efficiency of each unit in treating the pollutant was made. The generated data was compared to make sure that the values are according to the limits prescribed by MPCB and that it meets all the discharge standard limits. The parameters that are calculated are BOD, COD, TSS, TDS, for this samples were collected on daily basis. This study revealedthat the average concentration of BOD, COD, TSS, and TDS meets the effluent standards prescribed by the MPCB.

III. EFFLUENT CHARACTERISTICS FROM TEXTILE INDUSTRY

Process	Effluent composition	Nature
Sizing	Starch,waxes,carboxymethyl,cellulose (CMC), polyvinylalcohol (PVA), wetting agents.	High in BOD, COD
Desizing	Starch, CMC, PVA, waxes, pectin	High in BOD, COD, SS, DS
Bleaching	Sodium hypochlorite, Cl_2,NaOH,H_2O_2,acids,sudfacts,$NaSiO_3$,sodium Phosphate,short cotton fiber.	High alkalinity, high SS
Mercerizing	Sodium hydroxide, cotton wax	High pH, low BOD, High DS
Dyeing	Dyestuff urea, reducing agents, oxidizing agents,acetic acid, detergents, wetting agents.	Strongly colored, high BOD, DS, low SS, heavy metals
Printing	Pastes, urea, starches gums,oils,binders,acids,thickeners, cross linkers, reducing agent,alkali	Highly colored, high BOD, oily appearance, SS, slightly alkaline, low BOD

IV. MATERIALS AND METHODS

To understand the performance of ETP monitoring and analysis was done.For this sampling locations and parameters were decided. Samples of effluent coming from manufacturing process, aeration tank 1, secondary tank 1, PSF & ACF and final permeate effluent after being passed through RO& UF is taken which is indicated as R1, R2, R3, R4 and R5.It involves the collection of samples for 1 month for study at the following different sampling locations of ETP and analyzing them for average of parameters for different major physiochemical parameters. The results obtained from the monitoring and evaluation studies were compared with the

effluent standards prescribed. On the site pH was calculated. The samples from different sampling locations were collected in plastic bottles.Until the analysis was over the samples were kept deep freeze. The influent from process is first passed through bar screens for the removal of fibers, then it is send to two equalization units one of 1700KLD and other of 773KLD for equalization of characteristics of influent. After this it is passed through aeration tank1 were culture is added followed by secondary clarifier1 and aeration tank2 followed by secondary clarifier2 for biological treatment. Then it is send to tertiary clarifier for further treatment and then to collection tank. The water stored in collection tank is passed through PSF & ACF then to treated water holding tank then to RO, Ozonation and UF.

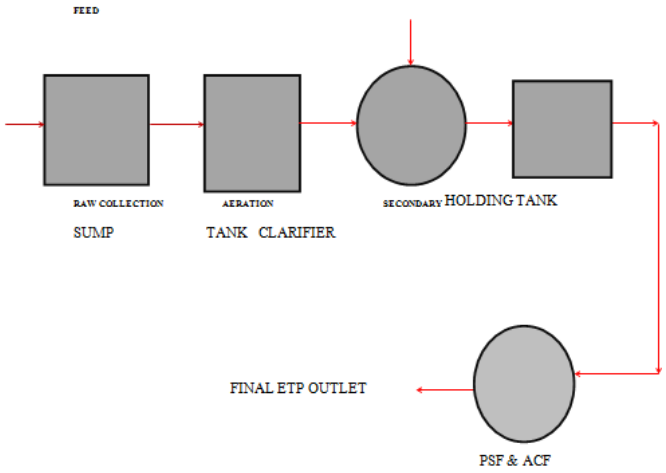


Fig:-Flow Diagram Of Effluent Treatment Plant With Sampling Location

The treated water is further used in manufacturing process, cooling purpose, swimming tank as the Effluent treatment plant of Raymond is based on Zero Liquid Discharge.

INLET NORMS OF MPCB

PARAMETERS	PERMISSIBLE LIMIT
pH	6.5-8.5
Temperature	40°C
Color	100 Units
Suspended solid	100 mg/L
Oil and grease	10 mg/L
Ammonical Nitrogen	50 mg/L
BOD(5 Days at 20°C)	30 mg/L
COD	100 mg/L
TDS	2100 mg/L
Sulphates	1000 mg/L

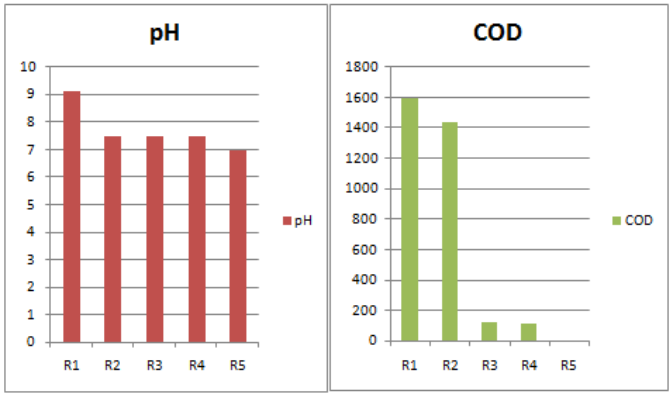
V. RESULT AND DISCUSSION

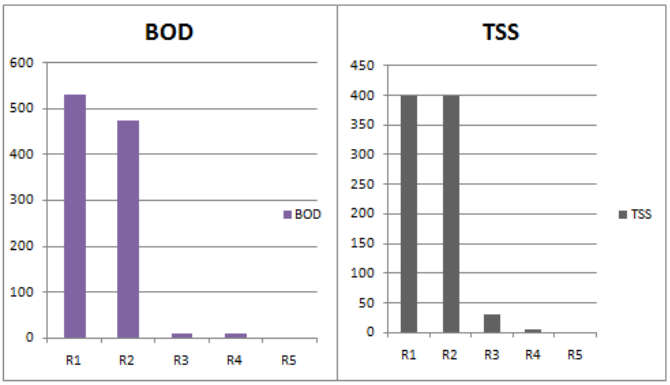
TABLE 3:-Parameters tobe characterized at different sampling locations of ETP

Parameters	Sampling locations				
	Raw Influent(R1)	Feed to Aeration tank(R2)	Inlet secondary clarifier outlet(R3)	PSF & ACF outlet(R4)	RO Permeate (R5)
pH	9.15	7.5	7.5	7.5	7
COD(mg/L)	1600	1440	130	120	10
BOD(mg/L)	530	475	10	10	Nil
TSS(mg/L)	400	400	30	5	Nil
TDS(mg/L)	1600	1280	1280	1280	150

Table -4:Removal efficiency

	BOD	COD	TSS	TDS
Aeration tank	10.37%	10%	0%	20%
Secondary clarifier	97.89%	90.97%	92.5%	0%
PSF & ACF Outlet	0%	7.69%	83.33%	0%
RO Permeate	100%	91.66%	100%	88.28%





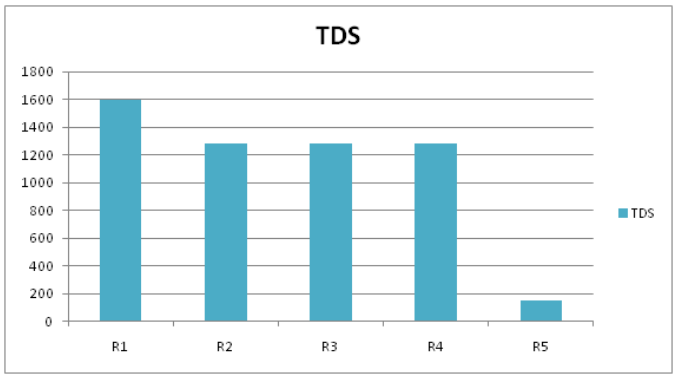


Fig-2: Characteristics pattern of pH, COD, BOD, TSS, TDS at different units of ETP

The capacity of plant is 3800 KLD. The characteristics patterns of pH, COD, BOD, TSS, TDS is as shown in graphs. The maximum pH is 9.15 for the inlet and 7 for outlet. The maximum COD for inlet is 1600mg/L and that for outlet is 10mg/L. The maximum BOD for inlet is 530mg/L followed by 0mg/L value for outlet after being passes through RO and UF. The maximum TSS for inlet is 400mg/L followed by 0mg/L TSS for outlet. The maximum TDS for inlet is 1600mg/L followed by 150mg/L for outlet after passing through RO and UF. Thus all the parameters is within the prescribed limit prescribed by MPCB. The removal efficiency of COD for aeration is 10%,for secondary clarifier is 90.97% , for PSF and ACF is 7.69% and final permeate is 10%. The removal efficiency od BOD for aeration is 10.37%, for secondary is 97.89%, for PSF and ACF it is 0% and for final permeate it is 100%. The removal efficiency of TSS for aeration is 0%, for secondary it is 92.5%, for PSF and ACF it is 83.33% and for final permeate it is 100%. Removal efficiency of TDS for aeration is 20%, for secondary it is 0%, for PSF and ACF it is 0% and for final permeate it is 88.28%.

VI. CONCLUSION

Based on the results obtained from this study, the following points are concluded: At present the Effluent Treatment Plant of textile industry of Raymond in Yavatmal is performing good. The main reasons for good performance of ETP are:

- Frequent study for improvement of plant
- Proper maintenance of the plant
- Properly designed system and proper overlook

All this reasons have helped running of plant in good condition.

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