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PERFORMANCE STATUS OF TEXTILE WASTE WATER TREATMENT PLANT

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Abstract *— The aim of this study is to evaluate the performance of effluent treatment plant of textile industry. An existing effluent treatment plant has an average inflow of 0.06 MLD. The effluent samples were collected from raw effluent and treated effluent for a duration of 5 months to evaluate the performance of effluent treatment plant. The samples of waste water are analyzed for major quality parameters such as Turbidity, COD, BOD, Alkalinity and Acidity. The results obtained are compared with permissible limits. The overall efficiency of the plant in terms of ability to remove these impurities is determined.*

Keywords- *Evaluate, efficiency, Turbidity, COD, BOD, Alkalinity, Acidity, ETP, Textile Industry*

INTRODUCTION

Water is most valuable natural resources in the world, yet it is under constant threat due to high rate of population growth and waste. Now a day there is global water crisis due to the unintentional use of water as well as very high disposal of waste water. The textile industry is mainly concerned with the design and production of yarn, clothes, clothing and their distribution. The raw material may be natural or synthetic using products of the chemical industry. The impacts on the environment by textile industry have been recognized for some time, both in terms of the discharge of pollutants and of the consumption of water and energy. Finishing process can be categorized into purely mechanical and wet processes. The risks are generally associated with the wet process – scouring, desiring, mercerizing, bleaching, dyeing and finishing. Desiring, scouring and bleaching processes produce major quantities of waste water. The aim of the present research work was to determine the behavior of various parameters of the textile industry wastewater. Characterization of waste water was evaluated in terms of Turbidity, COD, BOD, Alkalinity, and Acidity for the influent and effluent from selected plant. The performance of ETP was also evaluated and quality of reclaimed waste water was compared with GPCB standards to determine its suitability for reuse.

MATERIALS AND METHODS

The study was carried out at a textile industry near Kim, Gujarat, India. The industry uses raw water of 0.06MLD. The duration of study was 5 months. The samples were collected from inlet and outlet of each treatment unit. They were analyzed by comparing the concentrations as per Indian standard method. The composite samples were taken using a wide mouth bottle having a diameter 35 mm at the mouth and capacity 120 ml. Table 1 gives capacities of different units of effluent treatment plant and Fig. 1 gives flow diagram of effluent treatment plant of textile industry.

Figure 1: Flow diagram of ETP of textile industry

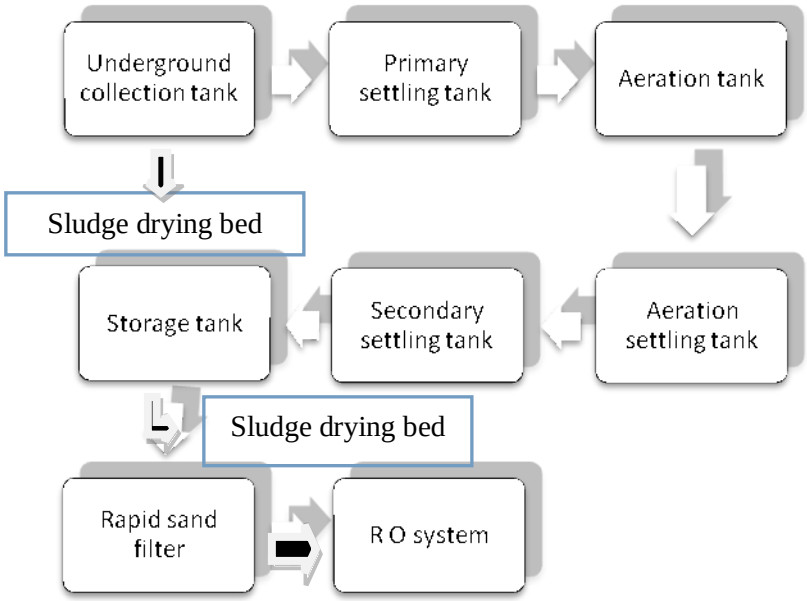


Table 1: Capacities of different units of ETP

Sr. No.	Treatment unit	Capacity(m^3)
1	Collection tank	115
2	Primary settling tank	121.5
3	Aeration tank	110
4	Aeration settling tank	58.8
5	Secondary settling tank	45
6	Storage tank	17
7	Rapid sand filter	85.5
8	Sludge drying bed	30

Table 2: Physico-Chemical characteristic of various units of ETP

Month	ETP UNIT	TURBIDITY		COD		BOD		ALKALINITY		ACIDITY	
		Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Nov	P.S.T.	126.00	55.00	1890.00	1700.00	600.00	400.00	2.00	2.00	3.01	1.90
Dec		119.00	63.00	1910.00	1687.00	625.00	435.00	2.42	1.85	2.74	1.80
Jan		140.00	68.00	1925.00	1550.00	635.00	598.00	2.76	2.17	3.39	2.35
Feb		128.00	76.00	1764.00	1064.00	645.00	584.00	2.23	2.11	3.25	2.58
Mar		110.00	86.00	1975.00	1236.00	634.00	584.00	2.06	1.69	2.59	2.46
Nov	A.T.	55.00	49.00	1700.00	1200.00	400.00	260.00	2.00	2.40	1.90	1.90
Dec		63.00	58.00	1687.00	1400.00	276.00	210.00	1.85	1.11	1.80	1.60
Jan		68.00	56.00	1550.00	1347.00	598.00	286.00	2.17	2.00	2.35	1.83
Feb		126.00	55.00	1890.00	1700.00	600.00	400.00	2.00	2.00	3.01	1.90
Mar		55.00	49.00	1700.00	1200.00	400.00	260.00	2.00	2.40	1.90	1.90
Nov	S.S.T.	49.00	19.60	1200.00	800.00	260.00	60.00	2.40	1.00	1.90	0.20
Dec		58.00	20.60	1400.00	232.00	210.00	180.00	1.11	1.00	1.60	1.50
Jan		56.00	24.60	1347.00	469.00	286.00	197.00	2.00	1.45	1.83	1.50
Feb		59.00	21.50	964.00	210.00	418.00	236.00	1.90	1.30	1.72	1.50
Mar		79.00	30.00	1123.00	560.00	457.00	251.00	1.51	1.10	1.65	1.30
Nov	R.S.F.	19.60	1.50	800.00	39.00	60.00	20.00	1.00	0.50	0.20	0.10
Dec		20.60	2.00	232.00	20.00	180.00	31.00	1.00	0.50	1.50	1.00
Jan		24.60	2.31	469.00	25.00	197.00	28.00	1.45	1.00	1.50	0.90
Feb		21.50	2.67	210.00	50.00	236.00	35.00	1.30	0.80	1.50	1.00
Mar		30.00	2.56	560.00	98.00	251.00	195.00	1.10	0.60	1.30	0.80
Nov	R.O.	1.50	0.00	39.00	0.00	20.00	0.00	0.50	0.00	0.10	0.00
Dec		2.00	0.00	20.00	0.00	31.00	0.00	0.50	0.00	1.00	0.00
Jan		2.31	0.00	25.00	0.00	28.00	0.00	1.00	0.00	0.90	0.00
Feb		2.67	0.00	50.00	0.00	35.00	0.00	0.80	0.00	1.00	0.00
Mar		2.56	0.00	98.00	0.00	195.00	0.00	0.60	0.00	0.80	0.00

RESULTS AND DISCUSSION

The experimental data on physico-chemical properties of effluent from different units of ETP is presented in the Table-2. Table-2 shows value of Turbidity, COD, BOD, Alkalinity, Acidity at inlet and outlet of PST, AT, SST, RSF and RO. By providing tertiary treatment at end of primary and secondary treatment, the percentage removal efficiency of Turbidity, COD, BOD, Alkalinity and Acidity is increased. Chart- 2, 3,4,5,6 shows percentage removal efficiency of BOD and COD at PST, AT, SST, RSF, and R.O respectively.

Chart-2
Percentage Removal efficiency of PST

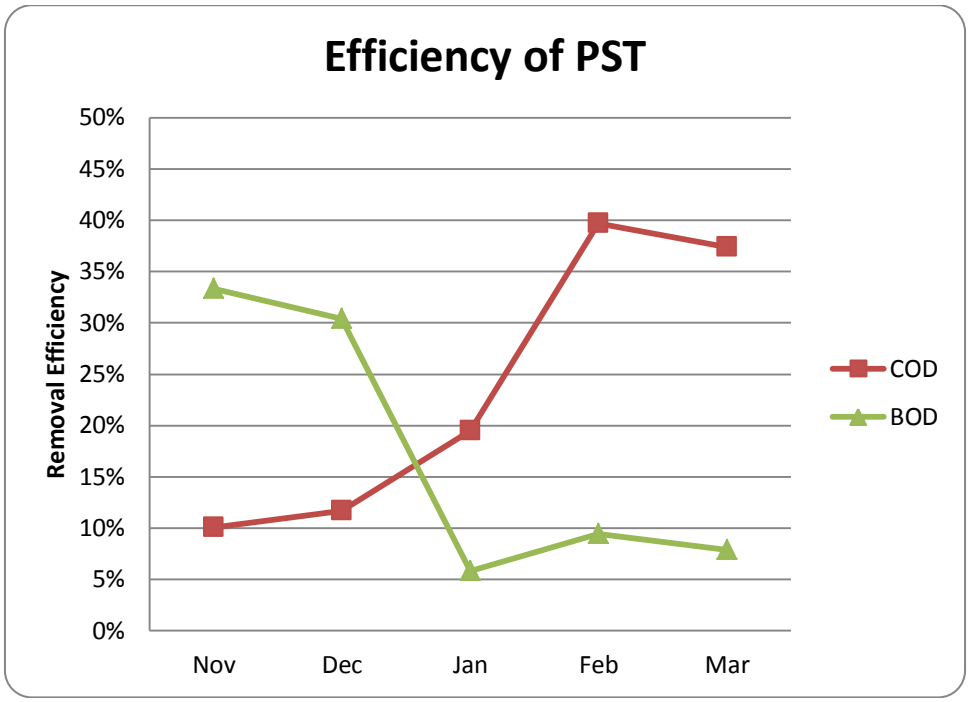


Chart-3
Percentage Removal efficiency of AT

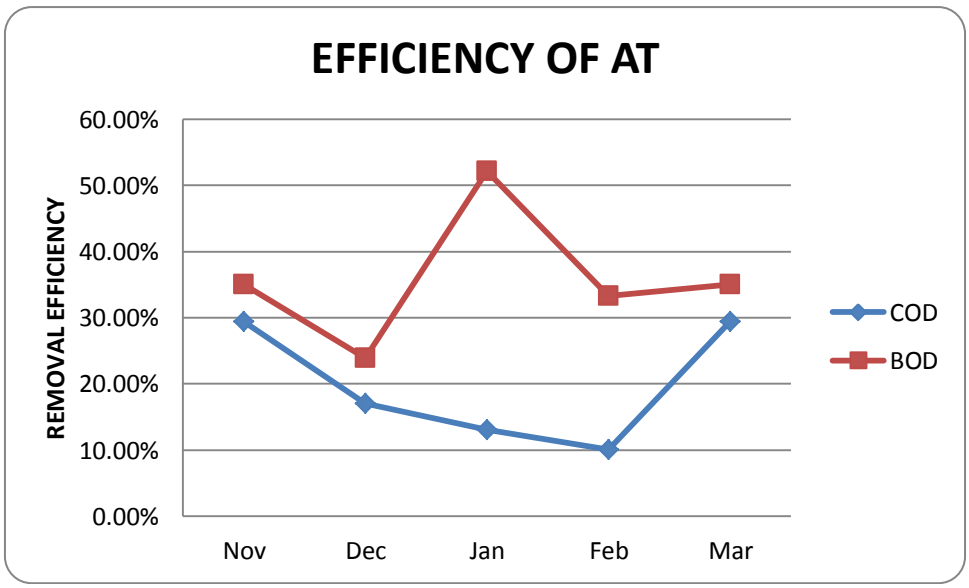


Chart-4
Percentage Removal efficiency of SST

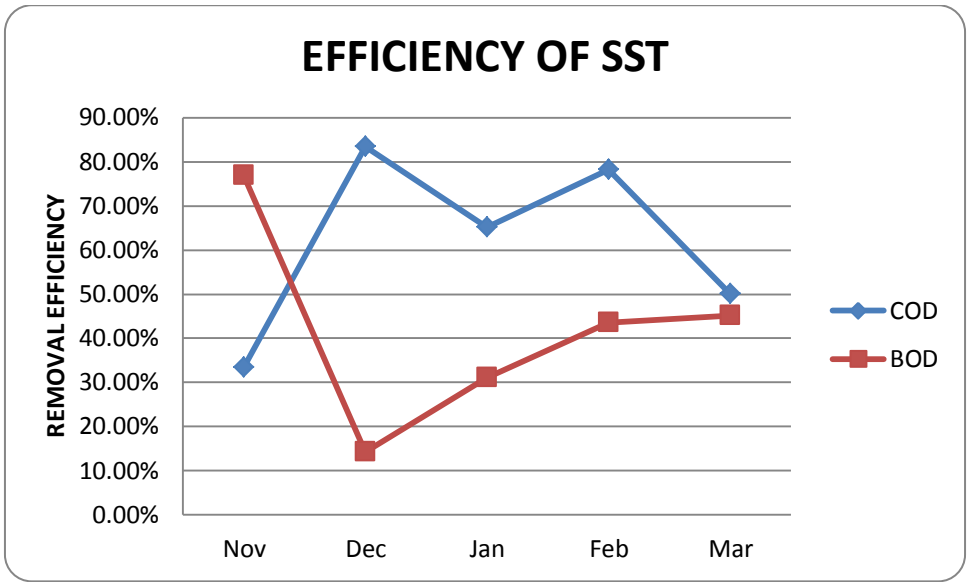


Chart-5
Percentage Removal efficiency of RSF

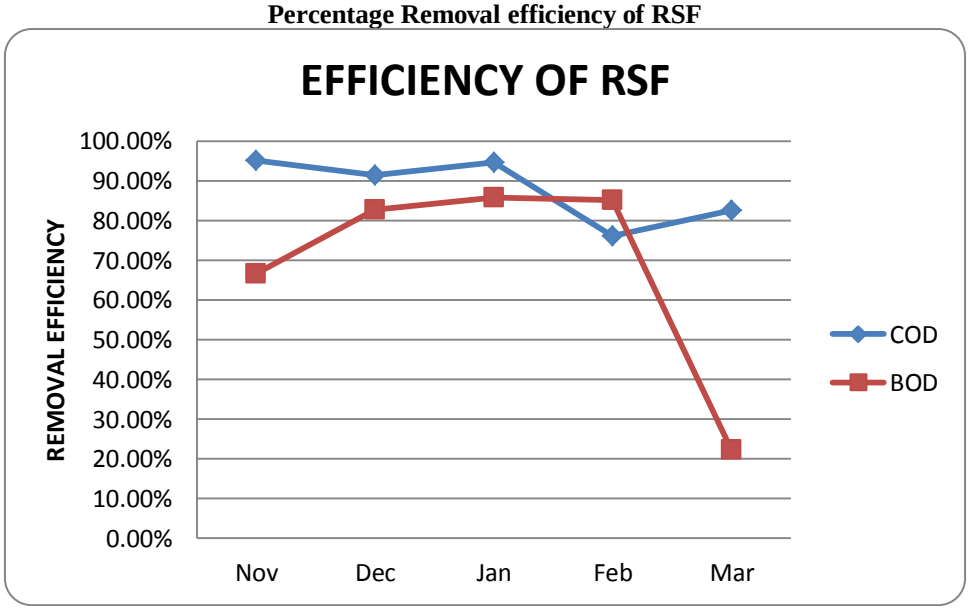
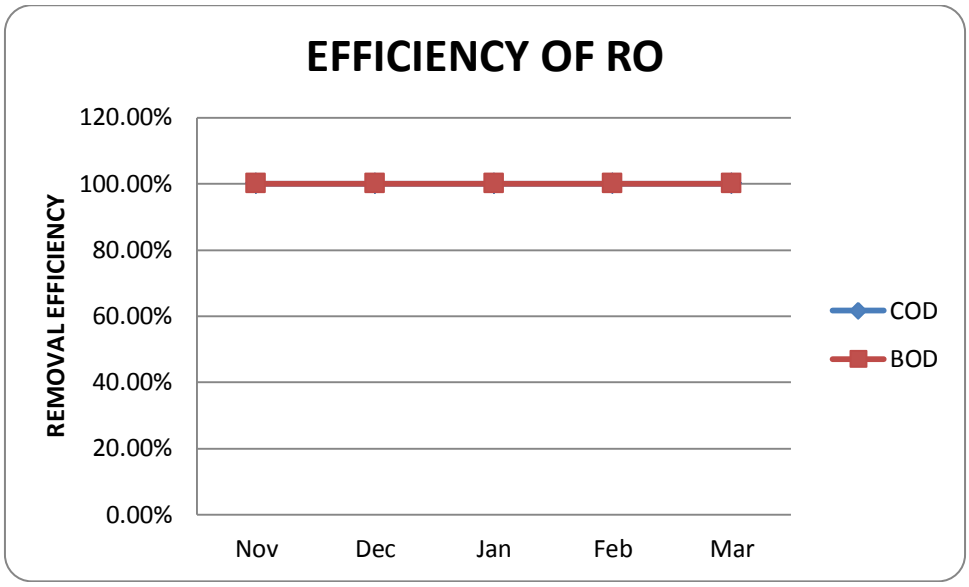


Chart-6
Percentage Removal efficiency of RO



CONCLUSION

A waste water treatment plant of textile industry with primary, secondary and tertiary treatment has been considered for evaluation. Based on above results, it is found that the overall efficiency of the ETP is found to be satisfactory. Industry uses R. O. as tertiary treatment. As per IS standards the values of the parameter are within permissible limits. Industry also reuses treated water so there will be considerable saving of economy and environment.

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