REDUCTION OF TOTAL DISSOLVED SOLIDS FROM SOLAR EVAPORATION PAN BY TYPHA IN TEXTILE INDUSTRY

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Abstract

The total dissolved solids are those solids remain as soluble in textile Effulent. There are several methods available for removal of TDS. In this study the textile effluent is received from common Effluent Treatment plant (CETP).In this industries final effluent has high TDS. Mostly in textile industries the effluent are stored in form of salt to overcome this problem. The plant species TYPHA was directly analyzed in Evaporation Pan TDS was found to be 2, 65,000 mg/L to 900000 mg/L. The salt is produced in RO reject. So the plant typha is introduced in RO reject and to treat TDS reduction in RO reject. Textile industry is one of the most developing industries in India. In this study the textile industry from SIPCOT area was taken in consideration. The plant species were collected from local area. Then the effluent is allowed in rectangular box contains layer of filters and is test after detention time of interval of Two hour and observe the TDS reduction. It consumes high amount of water, processed water and produce highly polluted discharge water in large amounts. In textile industry final effluent has high TDS. The effluents are stored in the form of salt (Nacl). The TDS of the textile effluent was found to be reduced from 265000mg/l to 25000mg/l. The removal efficiency is about 96% and pH removal efficiency about 6.5%. In this study the TDS of the textile industry can be effectively reduced by introducing salt tolerant plants.

Keywords*: Total dissolved solids, Textile Effluent, Evaporation Pan, and Typha*

Introduction

Textile Dyeing Waste Water Risk

Discharged wastewater by some industries under uncontrolled and unsuitable conditions is causing significant environmental problems. The importance of the pollution control and treatment is undoubtedly the key factor in the human future. If a textile mill discharges the wastewater into the local environment without any treatment, it will have a serious impact on natural water bodies and land in the surrounding area. High values of COD and BOD5, presence of particulate matter and sediments, and oil and grease in the effluent causes depletion of dissolved oxygen, which has an adverse effect on the aquatic ecological system. Effluent from textile mills also contains chromium, which has a cumulative effect, and higher possibilities for entering into the food chain. Due to usage of dyes and chemicals, effluents are dark in color, which increases the turbidity of water body. This in turn hampers the photosynthesis process, causing alteration in the habitat. In this paper Studied

about the evaporation waste water and analyzed the characterization of wastewater and salt and also predicted the reduce of TDS by using **Typha**

Characterization of the Sample

Sodium Chloride (Nacl)

Sodium chloride is commonly known as salt is an ionic compound with the ratio1:1 of sodium and chloride ions. Sodium chloride is the salt most responsible for salinity of seawater and extra cellular fluid and many multicellular organisms. It is commonly used as condiment and food preservative. It is a major source of sodium and chlorine compounds used as a feedstock.

Figure 1 Salt Sample

Characterization of Waste Water

The wastewater generates from textile industries was found to contain a high degree of pollutants with high TDS and suspended solids. The wastewater is highly colored and viscous due to dyestuff and suspended solids. Sodium is only major cation due to high consumption of sodium salts in processing units. Chloride is major anion found in wastewater but concentration of bicarbonate, sulphate and nitrate is also high. Sodium salts of these anions are most commonly used in this process. The Wastewater also has high BOD and COD indication its polluting nature.

Figure 2 Waste Water Sample

Typha

The common Cattail is a large marsh plant that measures from 90 to 270cm in height. This unique plant is best characterized by its large cylindrical brown spike of female flowers .The plant Typha which is locally available in my village area are taken in this study.

Figure 3 Typha

Results and Discussion

Effect of PH Test

By varying PH PO was analyzed for a detention period of 5 days. They were done twice per day

Table 1 Effect of PH on day one

S.No	Detention Time	Trial 1	Trial 2
1	Initial	9.4	9.4
2	2hr	9.3	9.2
3	4hr	9.2	9.2
4	6hr	9.1	9.2

Table 2 Effect of PH on Day Two

S.No	Detention Time	Trial 1	Trial 2
1	Initial	9.4	9.4
2	2hr	9.1	9.2
4	4hr	9.3	9.2
5	6hr	9.2	9.1

Table 3 Effect of PH on Day Three

S.No	Detention Time	Trial 1	Trial 2
1	INITIAL	9.4	9.4
2	2HR	9.4	9.3
3	4HR	9.1	9.1
4	6HR	9.0	9.0

Table 4 Effect of pH on Day Four

S.No	Detention Time	Trial 1	Trial 2
1	Initial	9.4	9.2
2	2hr	9.1	9.1
4	4hr	9.0	9.0
5	6hr	8.9	8.9

Table 5 Effect of pH on Day Five

S.No	Detention Time	Trial 1	Trial 2
1	Initial	9.4	9.3
2	2hr	9.2	8.89
4	4hr	8.9	9.0
5	6hr	8.91	9.0

Table 6 Effect of TDS and PH at Detention Time 2hr in Ro-Feed

Day	TDS	TDS Removal Efficiency (%)	PH	PH Removal efficiency (%)
day1	2500	0	9.1	0
day2	2350	6	9.1	0
day3	2300	6	9.0	1.09
day4	2200	12	8.9	2.19
day5	2180	12.8	8.6	5.49
day6	2000	20	8.5	6.59
day7	1700	32	8.3	8.79
day8	1650	34	8.2	8.79
day9	1500	40	8.2	8.79
day10	1200	52	8.1	10.9

Table 7 Effect of TDS and PH at Detention Time 6hr in RO-Feed

Day	TDS	TDS Removal Efficiency (%)	PH	PH Removal Efficiency (%)
Day 1	2500	0	9.1	0
Day 2	2350	6	9.0	1.09
Day 3	2100	16	9.0	1.0
Day 4	2100	16	8.9	2.19
Day 5	2000	20	8.6	5.4
Day 6	1980	20.08	8.4	7.6
Day 7	1600	36	8.3	8.7
Day 8	1500	40	8.3	8.7
Day 9	1200	52	8.2	9.8
Day 10	1000	60	7.9	13.5

Table 8 Effect of TDS and PH at Detention Time 8hr in RO-Feed

Day	TDS	TDS Removal efficiency (%)	pH	PH Removal Efficiency (%)
day1	2300	8	9.0	1.09
day2	2300	8	8.9	2.19
day3	2200	12	8.7	4.39
day4	1860	25	8.6	5.49
day5	1800	28	8.6	5.49
day6	1400	44	8.5	6.59
day7	1200	52	8.3	6.59
day8	1150	54	8.2	9.89
day9	1000	60	8.0	12.1
day10	800	68	7.9	13.2

Table 9 Effect of TDS and PH at Detention Time 2hr in RO- Rejecter

Day	TDS	TDS Removal Efficiency (%)	pH	PH Removal Efficiency (%)
day1	23000	0	9.6	0
day2	22000	4	9.2	4.1
day3	21200	7.2	9.1	5.4
day4	21000	8.6	9.0	6.25
day5	20000	13.04	9.0	6.25
day6	19800	13.9	8.9	7.29
Day7	18600	19.1	8.6	10.4
Day8	18300	20.4	8.5	11.4
Day 9	17800	22.6	8.3	13.5
Day10	17000	26.08	8.2	14.5

Table 10 Effect of TDS and PH at Detention Time 6 hr in RO- Rejecter

Day	TDS	TDS Removal Efficiency (%)	PH	PH Removal Efficiency (%)
day1	22000	4.34	9.6	0
day2	21800	5	9.4	4.1
Day3	20400	11.3	9.3	5.4
day4	19080	17.04	9.1	6.25
day5	18600	19.13	9.0	6.25
day6	17500	23.9	8.7	7.29
day7	16600	27.8	8.6	10.4

day8	16350	28.9	8.5	11.4
day9	16000	30.04	8.3	13.5
day10	15600	32.17	8.2	14.5

Conclusion

The sample collect from common effluent treatment plant .sample salt sample should be collect from of solid form and the waste water also collect in semi liquid stage. TDS reduction was analyzed by wetland plant called typha. TDS reduction was analyzed (RO-reject, RO-feed, RO-reject+ RO-feed) and found to be 71% though its efficiency was less by comparing other plants its survival capacity was higher. By introducing salt tolerant plants TDS was reduced up to minimum in preliminary stage itself. Unless it will results in the production of solid waste. According to approach which can neither be reused nor recycled but it can be reduced. In this way the treatment cost for final effluent will be economical.

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