***Corresponding author:** K. Rajkumar, M/s Senthil Papers and Boards Private Limited, Ikkaraithathappalli Village, Sathyamangalam, Erode, Tamil Nadu, India, Tel: +919865310077; E-mail: krkenvnano@gmail.com

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S No	Parameters	Hydraulic Retention Time (Hrs)	Volume (m^3)
1	Mechanical Drum Screen	0.4	12
2	Sedicell	1.9	350205 BD Tm(350)TjETEMC

were analyzed using analytical grade chemicals and all the parameters were analyzed using the Standard Methods for the Examination of Water and Wastewater of the American Public Health Association (APHA, 1995) and are approved by the U.S. Environmental Protection Agency (USEPA). In solid waste sample analyses were performed in Scanning Electron Microscopy (SEM) quanta FEG 250 FEI Company, Czech Republic and Perkin Elmer optima 5300DV ICP-OES.

Results and Discussion

Wastewater characteristics

Pollution loading of the paper board industrial wastewater depends signi cantly on the raw material used. Wastewater characteristics were analyzed in order to see the uctuations in loadings during board machine production process. e e uent was characterized for various physicochemical parameters like: pH, Temperature, TSS, TDS,

microbes [16]. ere are di erent types of bacteria (Psychrophiles exist at 5°C-35°C, Mesophile at 25°C-40°C and ermophiles at 25°C-75°C) depending on the temperature range. Figure 3 shows that the range of temperature observed during the one month study of wastewater characteristics fall between 25°C - 30°C.

pH: pH of wastewater is very important to be monitored as it determines the feasibility of a particular sample to be biologically treated [17,18]. Biological treatment can be suitably applied to wastewater only if pH values are near neutral. Acidic and basic character

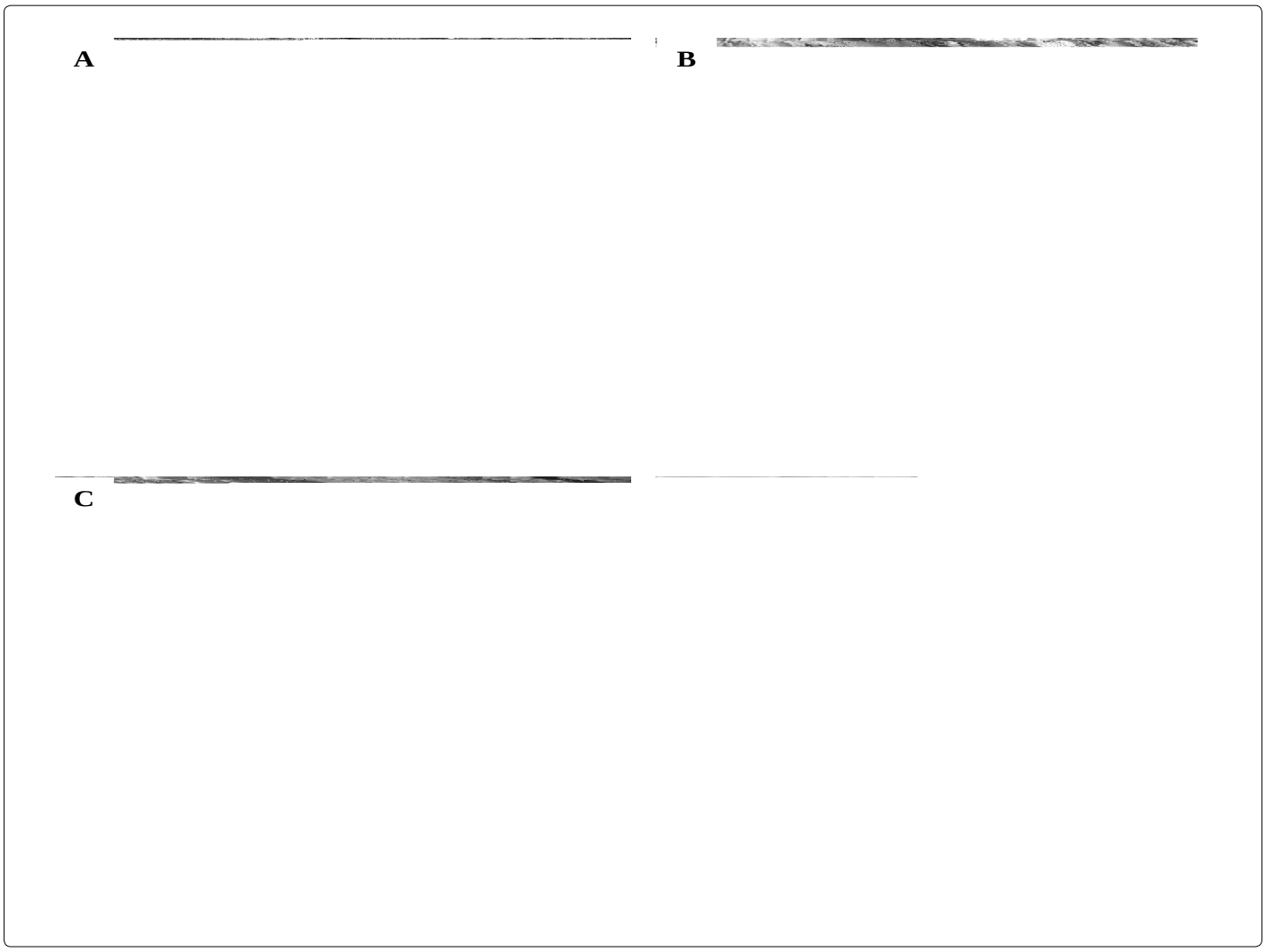
can decrease the metabolism of the micro-organisms and the e ciency of the process. e optimum range for the DO in the treatment plants were in between 2-3.5 mg/L.

F/M ratio: e food to microorganism ratio is de ned as the ratio between the amount of food (organic matter) entering the treatment plant and the mass of micro-organisms (MLSS) in the aeration tank [23]. e F/M ratio is an important control parameter as the quantity of biomass present will in uence the removal e ciency. e F/M ratio is indirectly proportional to the MLSS. If F/M ratio is low, then MLSS is high with low dissolve oxygen concentration. Due to which lamentous bulking occurs that cause poor settling problems. Figure 7 shows that the conversional and extended aeration tank F/M ratio e ective to treat the wastewater. If F/M ratio is high then, MLSS is low which will a ect the treatment process. If any uctuation occurs in the production process and the wastewater entering the treatment system with high organic load than at that time the entire system fails because this will not be encountered properly by the low MLSS treatment system. is treatment results in e ective BOD removal but face several problems. Low F/M ratio leads inadequate food for the population of microorganisms and problem arises in maintaining the su cient dissolved oxygen concentration [24].

Nutrient dosing:

Table 2 shows the concentration of suspended solids measured from in uent 756 mg/L a er treatment the concentration of suspended solids measured from treated e uent 12 mg/L respectively. ETP operation performance to total suspended solids reduced 74% due to the presence of sedicell recover bres system in ETP. A sedicell

pollutants depends on the nature of the pollutant. However, the cost of the treatment terms of electrical units ($kWhm^{-3}$). In the case of ETP, the estimation of the price per unit (oxygen added), as the aeration is directly related to the speci c energy consumption of aerators ($kWhm^{-3}$


A
B
C

El	AN	Series	Coun.	C norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]	
Ca	20	K-series	41.03	66.06	47.28	1.50	
O	8	K-series	8.68	13.97	25.05	2.26	
Al	13	K-series	4.88	7.85	8.35	0.43	
C	6	K-series	3.38	5.44	12.98	0.93	
Si	14	K-series	2.75	4.42	4.52	0.28	
Cl	17	K-series	1.40	2.25	1.82	0.13	8.
Al	13	33	33	33	31	30	8.6980.253( ).3

S No	Parameters	Units	Equalization	Primary Clarifer	Aeration Tank - I	Secondary Clarifer -A	Aeration Tank - II	Secondary Clarifer -B	Tertiary Clarifer	Treated Effuent	SPCB stranded
			1	2	3	4	5	6	7	8	
1	pH		7.19	7.11	7.22	7.38	7.23	7.56	7.42	7.5	6.5-8.0
2	TSS	mg/L	756	152	5036	16	3980	12	16	12	100
3	TDS	mg/L	1599	1612	1708	1843	1893	1878	1891	1946	2100
4	Chloride	mg/L	734	783	910	881	861	812	822	812	1000
5	Sulphate	mg/L	469	490	585	656	624	651	611	626	1000
6	BOD	mg/L	225	80	1800	4	1100	10	9	9	30
7	COD	mg/L	932	264	4480	88	3200	56	56	56	250
8	Oil and Grease	mg/L	18	12	24	4*	22	4*	4*	4*	10

*Below detectable limit

Table 3: Characteristics of paper board industry wastewater and ETP stage wise pollutants reduction.

Sludge	Proximate analysis				Sodium (%) ODB*	Chloride (%) ODB*	Calorifc Value (kCal/kg)
	%)B TC20 1 Tf7 0 0 7 338783 555372imate analysis						

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