



PHYSICO-CHEMICAL ANALYSIS OF SUGAR MILL EFFLUENTS IN GHANSAWANGI TQ. DIST-JALNA (MH) INDIA

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Abstract: Sugar factories are discharging and contaminate the water bodies and land a lot of wastewater as profluent. The sugar plant effluents are having high measure of suspended solids, broke up solids, BOD, COD, chlorides, sulfates and so on. In the present study, physico-chemical parameters of sugar factory profluent were studied.

Key words: Sugar mill effluent Treated and Untreated effluent, Physico-chemical analysis

Introduction: India is horticulture based nation and a noteworthy client of water asset for watering system. Sugar industry is a standout amongst the most imperative agro based commercial ventures in India. Differing nature of sugar modern effluents from different commercial enterprises are arranged off into soil and water bodies, which has been bringing about real contamination issue. The sugar business assumes an imperative part in the monetary improvement of India, yet the effluents discharged produce a high level of natural contamination in both sea-going and physical Ecosystems. (Ayyasamy et al.,2008). The most imperative gushing releasing businesses are warm power plants, paper plants, materials, refineries, compost unit, electroplating plants, tannery commercial ventures, sugar factories, sago processing plants, oil refineries, pesticide and herbicide commercial ventures. Mechanical effluents containing overwhelming metals represent a danger to the biological system. Utilization of these modern gushing and sewage slop on horticultural area has turned into a typical practice in India as a consequence of which these lethal metals can be exchanged and get amassed into plant tissues from soil. This metal affects plants themselves and might turn into a wellbeing issue to man and creatures. A noteworthy substantial measure of waste is created amid the assembling of sugar and contains a high measure of generation load especially in things of suspended solids, natural matters, press-mud, and bagasses and air contamination. (Bevan, 1971, Hendrickson et.al.1971). The effluents additionally change the physico-compound attributes, and widely varied vegetation of getting sea- going bodies. Fish mortality and harm to paddy crops because of sugar industry waste-waters entering rural area have been accounted for. Since sugar industry effluents are generally utilized for watering system, it is vital to decide how trims react when presented to mechanical effluents.

Materials and methods: For the present study the effluent was collected in 5 filter can from the different sugar factories like sugar factories, Sagar sugar factories, Teerthpuri, Smarth sugar factories ,Ankus Nagar Smruddhi Sugar factories, Devidahegaon. From these sources water sample was collected and preserved for long period. The physico-chemical parameters were analyzed by standard procedures given by (Trivedi et.al.1984).

Results & discussion: 1. Colour: in the present investigation the colour of the untreated effluent was dark brownish to brown and treated effluent appeared whitish to yellow. Colour is very important factor for the aquatic life for making food from sun-rays. Photosynthesis activity gets reduced due to dark coloration and affects other parameters like temperature D.O. and B.O.D. etc.

2. Odour: Most of the odorous substances derived from anaerobic decomposition of organic matter contain sulfur and nitrogen. In the present study the smell of untreated effluent is decaying molasses smell and that of the treated effluent is normal.

3. Temperature: In the present study temperature of the untreated profluent was recorded in November 42°C and in December 40°C separately, and temperature of the regarded emanating was recorded as 31°C and 30°C in November and December individually. The ascent in temperature quickened the synthetic response in oxygen. Beruch et.al., (1993). Kannan and Rajasekaran, (1991), recorded the estimation of temperature of printing emanating 28.0°C

4. pH: In the present examination the pH estimation of the untreated effluents was 2.5 and 3.0 in November and December separately and treated gushing was 7.5 and 7.5 in November and December respectively. Senthil et.al. (2001), watched the pH of sugar plant emanating is in the middle of 6.0 to 7.6, Avasn (2001), observed the pH of the sugar plant profluent releases from Sagar sugar production line, was 6.5 to 8.8 territories. Matkar. S. (2002), observed the pH of sugar plant gushing is 4.5. Thorat et al., (1999), watched the pH of the ooze test was 8.4 Rao et.al., (1993), watched the pH of material industry profluent shifted from 11.0 to 8.0.

Table 1: Physico-Chemical analysis of Sugar mill effluents of Sagar sugar factories

Sr.no	Parameter	Untreated Effluent November	Untreated Effluent December	Treated Effluent November	Treated Effluent December	ISI Standards
1	Colour	DarkBrownish	DarkBrownish	WhitishYellow	WhitishYellow	
2	Odour	foul	foul	Normal	Normal	
3	Temperature	42 ^o C	40 ^o C	31 ^o C	30 ^o C	
4	pH	2.5	3	7.5	7.5	5.5 to 9.0
5	D.O	1.29 mg/lit	1.5 mg/lit	3.2 mg/lit	3.5 mg/lit	6.0 mg/lit
6	B.O.D	1850mg/lit	1660mg/lit	30 mg/lit & 100(irrigation)	30 mg/lit & 100(irrigation)	30 mg/lit & 100 (irrigation)
7	C.O.D	3990 mg/lit	3780mg/lit	250 mg/lit	250 mg/lit	250 mg/lit
8	T.D.S	2980 mg/lit	2960mg/lit	1920 mg/lit	1910 mg/lit	2100 mg/lit
9	T.S	3010mg/lit	3075mg/lit	2020 mg/lit	2015 mg/lit	2700 mg/lit
10	Total Hardness	473mg/lit	480 mg/lit	-	-	-
11	Chlorides	200 mg/lit	205 mg/lit	185 mg/lit	190 mg/lit	600 mg/lit
12	Sulphates	660 mg/lit	650 mg/lit	320 mg/lit	305 mg/lit	1000 mg/lit
13	Oil and Grease	18 mg/lit	12 mg/lit	8 mg/lit	8 mg/lit	10 mg/lit

Table 2: Physico-Chemical analysis of Sugar mill effluents of Samrudhi sugar factories

Sr.no	Parameter	Untreated Effluent November	Untreated Effluent December	Treated Effluent November	Treated Effluent December	ISI Standards
1	Colour	Dark Brownish	Dark Brownish	Whitish Yellow	Whitish Yellow	
2	Odour	Foul	Foul	Foul	Foul	
3	Temperature	41 ^o C	40 ^o C	30 ^o C	30 ^o C	
4	pH	2.5	2.4	7.5	7.5	5.5 to 9.0
5	D.O	2.29 mg/lit	1.5 mg/lit	2.2 mg/lit	3.5 mg/lit	6.0 mg/lit
6	B.O.D	1750mg/lit	1660mg/lit	30 mg/lit & 100(irrigation)	30 mg/lit & 100(irrigation)	30 mg/lit & 100 (irrigation)
7	C.O.D	3890 mg/lit	3180mg/lit	255 mg/lit	256 mg/lit	250 mg/lit
8	T.D.S	2740 mg/lit	2360mg/lit	1120 mg/lit	1812 mg/lit	2100 mg/lit
9	T.S	3110mg/lit	2975mg/lit	1020 mg/lit	2015 mg/lit	2700 mg/lit
10	Total Hardness	473mg/lit	580 mg/lit	-	-	-
11	Chlorides	200 mg/lit	209 mg/lit	198 mg/lit	195 mg/lit	600 mg/lit
12	Sulphate	660 mg/lit	656 mg/lit	325 mg/lit	308 mg/lit	1000 mg/lit
13	Oil and Grease	18 mg/lit	13 mg/lit	9 mg/lit	8 mg/lit	10 mg/lit

5. Dissolved Oxygen: DO is fundamental to keep up assortment of shaping of natural life in water and the impact of water release in water body are generally controlled by oxygen parity of the framework, non-contaminated surface water remaining typically soaked with broke down oxygen. It can be quickly expelled from the water by release of oxygen requesting waste. Mitra (1982), reported the prescribed estimation of broke down oxygen in ordinary drinking water was 8 mg/lit. Devi (1980), additionally reported high DO amid rainstorm and low amid summer in Asmaansagar. Mohan (1980) recorded disintegrated oxygen range as 4.61 mg/lit to 6.68 mg/lit in the winter season. In the present investigation DO of the untreated effluent is 1.29 mg/lit and 1.50 mg/lit in November and December respectively and the treated effluent was 3.2 mg/lit and 3.5 mg/lit in November and December respectively. Throat et. al., (1999), observed the DO in untreated effluent 0.5 mg/lit and treated effluent 0.8 mg/lit. Avasan et. al., (2001), observed the DO of sugar mill is ranging between 0-2.0. He observed that if DO is low then it cause anoxic conditions. This causes respiratory distress of fish and fish shows erratic movements.

6. Biochemical Oxygen Demand (B.O.D.): B.O.D. is characterized as measure of oxygen required by microorganism while settling natural decomposable natural matter in water vigorous conditions. Beruch et.al., (1993), recommended that oxidation of the natural waste by common microorganisms make abnormal state of BOD (1920 mg/lit of 2100 mg/lit). Natural oxygen interest is an essential parameter that shows the size of water contamination, by the oxidizable natural matter and the oxygen used to oxidize inorganic material, for example, sulfides and ferrous particles. In normal source the oxidizable matter on oxidation goes into biogeochemical cycle. The estimation of BOD is low nearly in more extensive months which might be because of lesser amount of aggregate solids, broke up solids, and suspended solids in water and in addition to the quantitative number microbial contamination (Avasan and Rao, 2001). In the present study the untreated effluents BOD was 1850 mg/lit



and 1660 mg/lit in November and December individually and treated profluent BOD demonstrated 30 mg/lit and 30mg/lit in November and December separately and it is 100mg/lit when permitted to the rural area for watering system purpose. Senthil et.al., (2001), watched the BOD of sugar factory emanating in a scope of 635 mg/lit to 950 mg/lit. Trivedi et. al., (1986), watched the emanating of a material industry from various unit BOD estimation of blended profluent extended between 320 mg/lit to 720 mg/lit and last gushing 80 mg/lit to 640 mg/lit.

7. Chemical Oxygen Demand (C.O.D.): The COD is a test, which is utilized to quantify contamination of local and modern waste. COD is a helpful device in pinpointing poisonous condition and vicinity of organic resistance substances. In the present study the COD of untreated effluents was 3990 mg/lit and 3780 mg/lit in November and December individually and treated emanating COD is 250 mg/lit and 250 mg/lit in November and December separately and COD is totally truant in the water supplied to the fields. Trivedi et.al.,(1986), watched COD esteem range from 300 mg/lit to 2400 mg/lit of material industry profluent.

8. Total Dissolved Solids: Hosetti et.al.,(1994), have reported aggregate broken up solids in extent 488 mg/lit in waste water for Jayanthi nala. In the present study the disintegrated solids of untreated effluents was 2980mg/lit and 2960 mg/lit in November and December individually and treated examples are 1920 mg/lit and 1910 mg/lit in November December separately. Avasan (2001), watched the sugar plant gushing and the watched that the aggregate broke up solids running between 400 to 1650 mg/lit. Thorat et.al., (1999), examined tannery squander and watched all out broke down solids in emanating 2850 mg/lit. Rao et.al., (1993), examined material mechanical emanating and recorded aggregate broke down strong worth which goes from 8500 mg/lit to 10000 mg/lit

9.Total solids (T.S.): In the present study the amount of aggregate solids in untreated emanating was 3010 mg/lit and 3075 mg/lit in November and December individually and that of treated gushing is 2020 mg/lit and 2015mg/lit. in November and December separately. Senthil (2001), watched that the emanating released from sugar plant is running between 4485.0 to 1520 mg/lit with expanding separation (0 to 5 km). Avasan (2001), watched the aggregate solids from the Tummanals sugar industrial facility gushing it extended between 870 to 1950 mg/lit. Ammathusalam. A. (2002), watched the aggregate solids from the sugar business emanating it going between 1979 to 1820 mg/lit.

10. Total hardness: Hardness is generally reported as a proportionate measure of calcium carbonate (CaCO_3). Water hardness is the conventional measure of the limit of water to respond with cleanser. WHO suggested (100-500 mg/L) as protected passable cutoff for hardness. In ground water, hardness is fundamentally because of carbonates, bicarbonates, sulfates and chlorides of Ca and Mg. In the present study the aggregate hardness of water in untreated profluent is 473 mg/lit with calcium 293mg/lit and magnesium 180mg/lit where as in treated gushing it is totally truant in both the months of November and December. (Table-2)

11. Chloride: The presence of chloride in natural water attributed to dissolution of salt deposits discharge of effluents from chemical industries oil well operations, sewage discharges initiation drainage, contamination from refuse leachates, and sea water intrusion in coastal area. In the present study chlorides of untreated effluents was 200 mg/lit and 205 mg/lit in November and December respectively and treated effluent showed 185 mg/lit and 190 mg/ lit in November and December respectively. Matkar (2002), observed that the effluent from sugar industry is having 450 mg/lit and 455 mg/lit untreated effluent and the treated effluent was 156mg/lit and 162 mg/lit in November and December respectively.

12. Sulphate: In the present study sulfate of untreated effluents was 660 mg/lit and 650 mg/lit in November and December individually and treated gushing ought to 320 mg/lit and 305 mg/lit in November and December separately. Manal (2002), watched sulfate in sugar industry gushing that was 550 mg/lit and 555 mg/lit in November and December individually which in untreated and treated profluent demonstrated 256 mg/lit and 262 mg/lit in November and December separately. Senthil et.al.,(2001), watched sulfate range between 200 mg/lit to 93 mg/lit by separation from gushing releasing unit to 5 km long.

13. Oil and Grease: In the present study oil and oil present in untreated effluents was 18 mg/lit and 12mg/lit in November and December separately and the treated emanating demonstrated 8 mg/lit and 8 mg/lit in November and December individually. Manal (2002), reported oil and extraordinary in sugar industry gushing extent in the middle of 14 mg/lit to 11 mg/lit (untreated). Thorat et. al., (1999), reported oil and extraordinary was 12 mg/lit and 7 mg/lit separately. Trivedi et. al., (1986), reported oil and oil in material industry emanating from 230 mg/lit to 1798 mg/lit.

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