

TREATMENT OF INDUSTRIAL WASTEWATER BY USING SUGARCANE BAGASSE

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Abstract - An experimental investigation was carried out for the treatment of industrial waste water using low cost adsorbents. The sugarcane bagasse is used as adsorbents in this study by carbonization and dehydration (bio sorption) methods and the effect of pH, turbidity, BOD and COD, adsorbent dosage, and adsorbent particle size in removal of pollutants present in wastewater was evaluated. The studies showed that the activated sugarcane bagasse is more effective than the raw sugarcane bagasse in the removal of pollutants from the industrial wastewater. For both raw and activated sugarcane bagasse with high percentage removal of BOD is 41.35 % and 77.82% respectively. The activated bagasse found to be more efficient than raw bagasse, the COD removal is 34.02% and 64.80% respectively, and maximum turbidity removal is 70.30% in ASB and 57.16% in RSB.

Key Words: Raw sugarcane bagasse, Activated sugarcane bagasse, PH, Turbidity, BOD, COD.

1. INTRODUCTION

Water pollution considered to be and huge global concern along with this the high time now that we realize hardstone of the situation. So considering the Removing pollutants which is very settle from water demands an high need of the hour and also as well as developing a cost effective along with this an important environmentally safe method so we will be achieve the same which is an major challenging task for chemical engineers. Considering the man kind as the main care. A dye which is considered to be a colored substance which will be having the affinity to the substrate to which it is being applied. Dyes which will appears to be colored and also because which considering the factor they absorb some wavelengths of light more which known to be compare with others. To save the water is like saving the Planet and mankind will be in safe this will be our main goal to achieve. So while the mankind is growing day by day from technology to comfort and as the world is also digitalizing and also in term we are in the lot of risk and are paying for what we have done to our planet. Because of these consequences under the very growth is environmental and the its major disorder giving rise to an big pollution problem. Anthropogenic and its major activities is reason for a great harm to the quality with deal of our lifeline which is nothing but the water. Crisis has been raised due to fast depletion of the freshwater resources.

1.1 SCOPE OF PRESENT STUDY

Wastewater from the industry contains mainly biodegradable and organic constituents that can distract terrestrial & aquatic environments. To save the water is like saving the Planet and mankind will be in safe this will be our main goal to achieve. So while the mankind is growing day by day from technology to comfort and as the world is also digitalizing and also in term we are in the lot of risk and are paying for what we have done to our planet. Because of these consequences under the very growth is environmental and the its major disorder giving rise to an big pollution problem. Anthropogenic and its major activities is reason for a great harm to the quality with deal of our lifeline which is nothing but the water. Crisis has been raised due to fast depletion of the freshwater resources. By using low cost adsorbent treatment of industrial waste water is main goal. In this experiment sugarcane bagasse is used as low cost adsorbent.

1.2 OBJECTIVES

The Main objective of this work is towards study the effect of treatment of waste water using sugarcane bagasse.

The specific objectives are;

- Using low-cost natural adsorbents for treatment of industrial waste water
- Efficiency removal of physio-chemical parameters
- To supply treated water use for Irrigation, toilet flushing, car washing, gardening, firefighting etc.

2. MATERIALS AND METHODOLOGY

2.1 RAW SUGARCANE BAGASSE

The raw sugarcane bagasse is obtained from local juice stall and it is several times washed with distilled water to remove dirt, impurities and sweet content from bagasse, then the bagasse is dried in sun light before drying in oven then it is dried in oven at temperature of 105oc for 24hours. Then the bagasse is powdered and sieved from 230 micron and obtained as a raw sugarcane bagasse adsorbent.



Fig -1: Raw Sugarcane Bagasse

2.2 ACTIVATION OF SUGARCANE BAGASSE

The bagasse is treated with one portion of sulphuric acid one portion of raw bagasse. The treated bagasse is oven dried for 24hours at 105oc. The it is removed from oven and it is washed with distilled water to remove acid content by neutralizing PH then 1% sodium bicarbonate is added to the bagasse to remove the residue acid and it is allowed over night. The PH of bagasse is neutralized by washing it with distilled water and dried in oven for 200o c and obtained as activated adsorbent



Fig2-Activated Sugarcane Bagasse

Table 1: Initial characteristics of Industrial Waste water

Sl No	Parameters	Values
1	PH	7.24
2	Turbidity(NTU)	382.6
3	Absorption (ml)	8
4	TDS (PPT)	1.1
5	Conductivity(ms/cm)	1.79
6	BOD (mg/l)	1596
7	COD (mg/l)	9400
8	Chlorides (mg/l)	739.77

3. TREATMENT METHODOLOGY

Initially the samples initial values are analyzed before the sample is treated with bagasse, the parameters analyzed for samples are PH, Turbidity, Conductivity, TDS, BOD and COD.

For the adsorption process the samples are taken in 250ml conical flask by measuring sample volume. The samples are taken in clean and dry conical flask. The sample is measured and poured in conical flask. The adsorbent dosage is weighed and added as per dosage interval of 2,4,6,8,10,12,14 mg/l, the sample is stirred with glass rod and then it is kept in orbiter rotary shaker at 150rpm at 160mins, then the sample is carefully removed and allowed for settlement and filtered.

4. RESULTS & DISCUSSION

4.1 Effect of adsorbent Dosage

The X-axis represents the different amount of adsorbent dosage in g/l and y-axis represent the % removal after treatment with respect to adsorbent. The adsorbent dosage is varied between 2gm/l to 14g/l.

4.2 Effects on PH

Dosage g/l	ASB (in %)	RSB (in %)
2	7.33	6.14
4	6.86	5.05
6	6.44	5.5
8	6.06	5.1
10	6.14	4.75
12	5.99	4.73
14	5.54	4.96

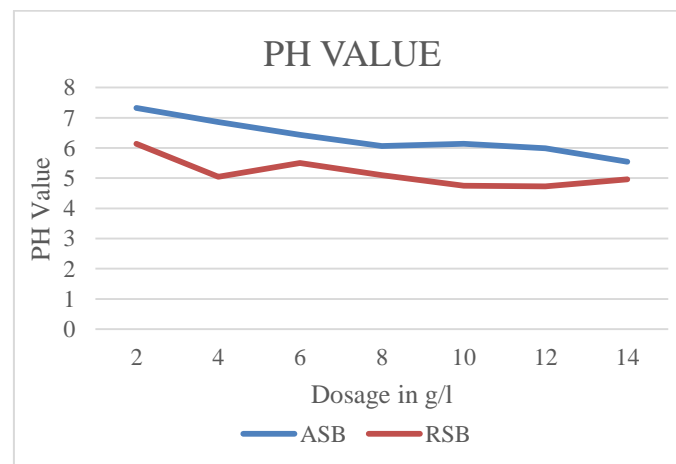


Fig3-PH graph

4.3 Effect on Turbidity

Dosage g/l	ASB Removal (In %)	RSB Removal (In %)
2	65.5	47.36
4	36.98	55.35
6	57.64	57.16
8	68.19	53.81
10	70.3	49.18
12	66.67	52.8
14	68.21	51.04

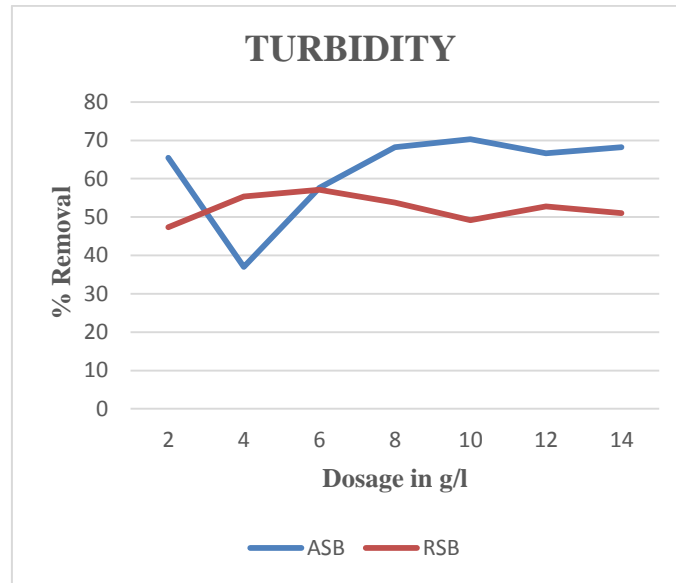


Fig4-Turbidity graph

4.3 Effects on BOD

Dosage (g/l)	ASB (in %)	RSB (in %)
2	51.5	41.35
4	55.26	18.42
6	77.82	17.5
8	69.92	17.5
10	66.16	17.5
12	70.3	8.64
14	14.66	25.93

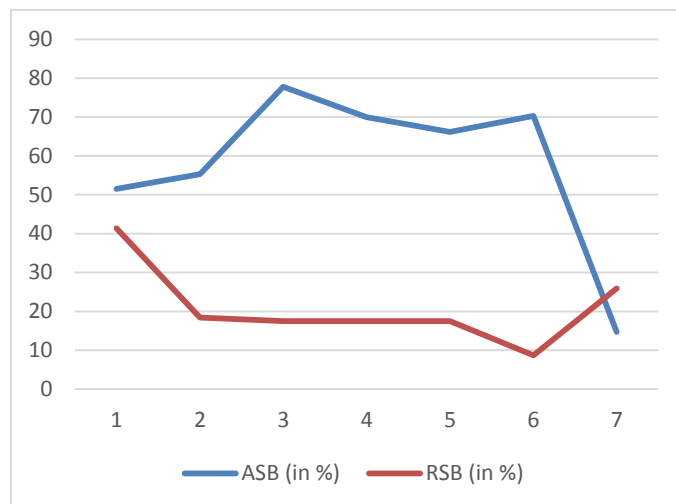


Fig5-BOD Graph

4.4 Effects on COD

Dosage (g/l)	ASB (in %)	RSB (in %)
2	0	34.02
4	0	14.25
6	0	10.63
8	64.8	19.14
10	44.68	31.91
12	42.55	23.4
14	42.55	24.46

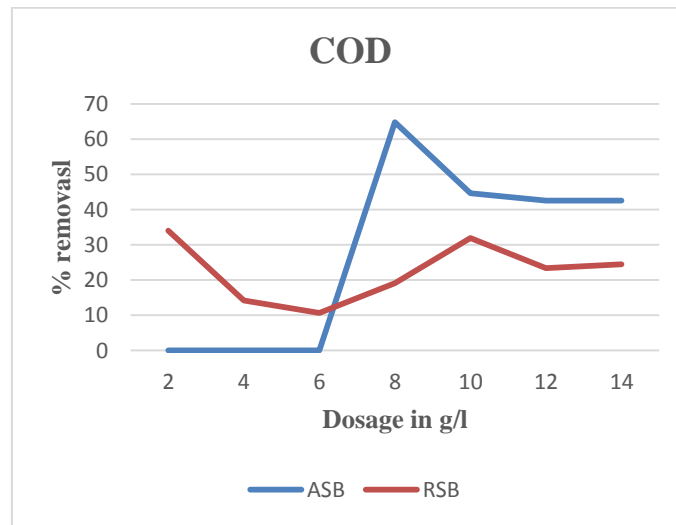


Fig6-COD Graph

4. CONCLUSIONS

It has been observed that the sugarcane bagasse is effective in removal of turbidity upto 70.30% by activated sugarcane bagasse at the dosage of 10g/l and raw sugarcane bagasse removes maximum 57.16% at 6g/l. The BOD and COD is effectively removed in activated sugarcane bagasse as compare to raw sugar bagasse 77.82% & 64.84% respectively in activated sugarcane bagasse but in raw sugarcane bagasse is 41.35% & 34.02% respectively. Thus it is proved that activated sugarcane bagasse can be effectively used as low cost adsorbent which was chemically treated.

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