

Removal of Impurity, Colour and odor smell in sanitary waste water using Sugarcane Bagasse as a low cost adsorbent

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Abstract: In 2016 India Prime Minister Shri Narendra Modi more focused on clean and green India. On this many toilet were opened in rural as well as in urban areas. The major problem arises in toilet is insufficiency of water or flushing problem. For this an effective Sugarcane waste adsorbent was developed from near pinto park street Gwalior (M.P) India. This Juice center generated sugarcane waste 1000 kg per month. In Aug 2016 it generated Sugarcane waste about 1900kg which create tremendous problem in environment. Characterization of the adsorbents showed a clear change between physico-chemical properties of activated sugarcane waste adsorbent. Activated carbon is used as a good adsorbent but its cost is very high so we used Sugarcane waste as a low cost adsorbent. Sugarcane Waste collected near pinto park restaurants its Insoluble cell wall of sugarcane is made up of cellulose and hemicelluloses, lignin, condensed tannins and structural protein.

Thus experiment result showed that passing toilet waste water on Sugarcane bagasses adsorbent it removed 90% Impurity, colour and odor smell.

Key Words: Sugarcane bagasse, Adsorption, toilet waste water, Activated Carbon.

1. INTRODUCTION:

Our prime minister shri narendra modi dream india will be developed country in 2018.for this he announced many yojana and schemes they are as clean and green Indian, smart city, manufacturing toilet in rural areas. the above main point illustrate above is construction of toilet in rural areas however construction of toilet in village areas is going on but main problem arises flushing of water. Our data on sithouli m.p small town near Gwalior is proved that one person while peeing our toilet used 1 liter of water for flushing. Data illustrated 30 people while peeing used 30 liter of water for flushing .for this we made bio-toilet which not only removed odor smell in urine water but also it recycle that water which further used in flushing.

Sugarcane is a species used for production of sugar. Sugarcane is of species saccharum , tribe andropogoneae. Sugarcane is 2 to 6 m tall. Sugarcane is a world largaeast crop by production quantity. Brazil was a largest producer of sugarcane in the world. sugarcane accounts for 80% of sugar produced. Sugarcane grows in tropical & sub-tropical region. sugarcane composed of 11 to 16% fibre 12 to 16% solublesugar 2 to 3% non sugar 63 to 73% water. Sugarcane can be grown on many soils ranging from highly fertile well drained mollisols, through heavy cracking vertisols in fertile acids oxisols, peaty histosols to rocky andisols .sugarcane is harvested by hand and mechanically .sugarcane is also capable of fixing atmospheric nitrogen. Sugarcane processing also produces sucrose, bagasse, molasses and filter cake. India is the second largest producer with 341,200 TMT and total production in world with 1,877,105 TMT.

Activated carbon is also called activated charcoal. Our activated carbon products are also used as colourants, catalysts in industrial process & also pore size distribution is important in purification of water & other things. Activated carbon is a form of carbon that has been processed to create of millions of tiny pores b/w the carbon atoms. Activated carbon surface area is suitable for adsorption. It is also used for removing impurities. Activated carbon is odourless. Activated carbon is used in gas purification, decaffeination, gold purification, metal

extraction, water purification, medicine , sewage treatment , air filters in gas masks & respirators. Activated carbon finds extensive use as an adsorbent for the removal of wide range of contaminants from liquid and gases.

Table1.1 The main physic-chemical characteristics of sugarcane bagasse as adsorbent

PARAMETER	VALUE SUGARCANE BAGASSES
Surface area(m ² /g)	495.54
Particular size(μm)	100-250
Elemental analysis(%)	
C	61.3
H	7.48
N	0.39
O	30.34
S	0.49
Ash content (%)	4.43
Moisture content (%)	5.29

Heavy metal are that which have relatively high densities, atomic weights or atomic numbers. Some heavy metals are either essential nutrients or relatively harmless .Mercury , cadium, arsenic , chromium , thallium, lead etc are some heavy metals. Heavy metals are natural component of earth crust. They cannot be destroyed.

Some heavy metals like copper, selenium, zinc are essential to maintain the metabolism of the body . Heavy metal tend to bioaccumulate. heavy metals Antinomy can cause nausea, vomiting & diarrhea. Heavy metal have high density, they are quite hard, have lower thermal expansivity, low to very high melting point , high tensile strength.

2. MATERIAL AND METHODS:

2.1. Preparation of the Sugarcane Waste adsorbent

Sugarcane waste was collected near pinto park street Gwalior. The wet sample was sun dried for five days. The dried sample was rushed, ground with a mortar to convert into powder form. This powder sample was screened to size 100μm. Then dried sample was chemically activated with 1.0M sulphuric acid. This activated sample is washed with deionised water until pH 7 was attained. The sample was dried in oven 70°C for 24 hr and the dried powder was stored in polythene bags.



Fig 2.1 Pictorial view of sugarcane waste



Fig 2.2 Pictorial View of Sieve Shaker Experiment

Table 2.1 list of equipment used in experiment

S.No.	Instrument	Make
1.	pH meter	Systronics(pH system 361)
3.	Digital Weight Balance	K.Roy Instruments Pvt. Ltd.
4.	What man filter paper no.1	-
5.	UV-Visible Spectrophotometer	Shimadzu (Model UV-1700)

2.4. Analysis of Adsorbate by UV-Visible Spectrophotometer

The functioning of this instrument is relatively straightforward. A beam of light from a visible and/or UV light source is separated into its component wavelengths by a prism or diffraction grating. Each monochromatic (single wavelength) beam in turn is split into two equal intensity beams by a half-mirrored device. One beam, the sample beam, passes through a small transparent container (cuvette) containing a solution of the compound being studied in a transparent solvent. The other beam, the reference (coloured blue), passes through an identical cuvette containing only the solvent. The intensities of these light beams are then measured by electronic detectors and compared. The intensity of the reference beam, which should have suffered little or no light absorption, is defined as I_0 . The intensity of the sample beam is defined as I . Over a short period of time, the spectrophotometer automatically scans all the component wavelengths in the manner described. The ultraviolet (UV) region scanned is normally from 200 to 400 nm, and the visible portion is from 400 to 800 nm. Different compounds may have very different absorption maxima and absorbance.

In my present work, I have used Shimadzu UV 3600 UV-Vis Spectrophotometer using water as base compound to determine the optical properties of toilet waste water.



Fig 2.3 UV-Visible Spectrophotometrically

3. RESULT AND DISCUSSION:

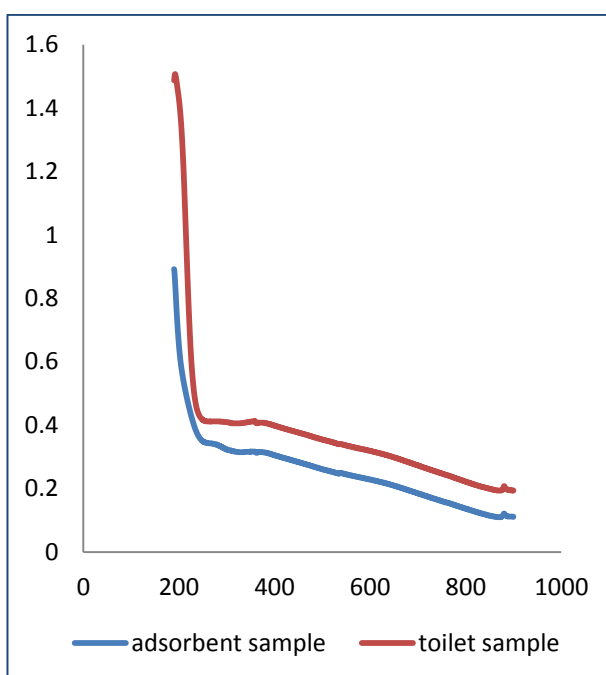
In our experiment setup the toilet waste water is passed through sugarcane waste adsorbent after this sample were tested to UV-visible spectrophotometer in wavelength 200-900nm and purified solution is determined following formula which is given below.

$$Y(\%) = \frac{C_i - C_f}{C_i} \times 100$$

Where C_0 is the initial metal ion concentration of test solution, mg/l and C_e is the final equilibrium concentration of test solution, mg/l.

Table3.1 Data between toilet sample and sugarcane adsorbent sample in different wavelength

Wavelength nm.	Toilet sample	sugarcane waste adsorbent sample
200	1.423	0.654
300	0.41	0.324
400	0.400	0.305
500	0.355	0.261
600	0.319	.229
700	0.274	0.185
800	0.222	0.137
900	0.194	.111



Graph 3.1 Graphical representation data of toilet sample and adsorbent sample.

The above graph and table illustrate above shows that toilet sample and adsorbent sample were examine in different wavelength (200-9000nm) in 200nm wavelength the toilet sample ads. was 1.425 while as adsorbent sample abs. was 0.654 while as 500nm wavelength the toilet sample abs. was 0.355 while as adsorbent sample abs. was 0.261. So it proved that absorbance varies while passing sugarcane waste adsorbent if absorbance varies then there is change in concentration and there density in a sample.

4. CONCLUSION:

Experimental result show approx 90% of odor, colour and impurity were removed on passing sugarcane bagasses adsorbent.

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