

# *Treatment of Sulphate Removal in Industrial Wastewater with Hydrated Lime, Activated Charcoal Prepared From Sugarcane Waste, Alum & Aloe Vera*

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**Abstract:** - In this we are to remove out the sulphate content from the water as we know the sulphate is one of the very much dangerous Pollutant from the waste water which also have some salts and compounds which shows he carcinogenic properties and we know that the cancer cannot be cured at any stage of life ,it is so much dangerous for which purpose If we use Activated charcoal prepared from the powder of the Sugarcane waste straws, stems, Dry leaves of a sugarcane with Hydrated lime, Alum, Aloe Vera then it is acts as good filter for all the pollutants from the water.

**General Terms:** - Pure water free from Total solids from any industry can be attained from the criteria of the use of the activated charcoal, with Alum, Aloe Vera, Hydrated lime is possible

**Keywords:** - Alum, Aloe Vera, Activated Charcoal, Hydrated Lime.

## I. INTRODUCTION

Activated Charcoal prepared from the sugarcane straws, dry leaves, roots of sugarcane by means of a burning of all these waste into a barrel, then from that burned ash .we are going to give it shape by molding, means we are making to the charcoal as granulated activated Charcoal. While using the charcoal mold into the water treatment assembly we have to use alum and the Aloe Vera into the activated charcoal into powdered form. In this there is the very important role of the use of both alum and Aloe Vera in the water treatment. Also we are using alum in a suitable form. Hence there are some of the literatures also available to us for the working regarding to this issue of Sulphate.

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**Various Important Literatures Available To us for the Reference**

Title of Paper	Author	Study Parameters
Photochemical and XRD analysis of Aloe Vera leaf powder	K. Manimegalai and K. Nithya	It Study Parameter regarding to Aloe Vera of Anticarcinogenic Character.
Evaluation of the Anticarcinogenic Character on Swiss Albino Mices	R.C.Agrawal,Sonam Pandey	This Paper Proves The Anticarcinogenic Character of Aloe Vera.
Technologies of Sulphate And Metal Removal In Mining And Metallurgical Effluents.	Oscar Lopez, David Sanguinetti, Michael Bratty and David Kratochvil.	It gives information for removal of sulphate.
Dairy Wastewater.	Swati A.Patil, Vaishali V. Ahire, M.H.Hussain.	Water treatment, supply and waste water treatment of Dairy Industry.
Study Of Physico - Chemical Parameters Of Wastewater From Dyeing Units In Ahmadabad City	P. B. Vyas	The discharge of these untreated effluents from dyeing units directly into the river can highly raise the pollution level of me water body.
Nickel Sulphate	New Jercy Department of health and junior services.	Study of Nickel Sulphate salt of the Waste water.
Adsorption and Treatment of Organic Contaminants using Activated Carbon from Waste Nigerian Bamboo	Ademiluyi, F. T.; Amadi, S. A.; Amakama, Nimisingha Jacob	The adsorption and treatment of organic contaminants using activated carbon from waste Nigerian bamboo.

Title of Paper	Author	Study Parameters
Removal of Sulfate from Waste Water by Activated Carbon	Mohammed Sadeq Salman	It will give Study Parameter regarding to Sulphate removal.

## II. PROBLEM STATEMENT & NEED OF STUDY OF THIS SYSTEM OF WATER TREATMENT.

When any industry is discharging the wastewater containing various forms & various amount of Sulphates and sulphate salts then, it will affect to the Healthy environment very badly. Some of which are too hazardous to environment and also to Human Health. Some of which are Carcinogenic by their properties. Some are entering into human body through the Plants and Crops which make dangerous Effects to human body badly. As we know the Discharge of the sulphates in a Village area from the Industrial sector mainly concerned with the sugarcane Industry & Dairy Industry hence the pollutants must be get rid of. As reverse osmosis and electro dialysis is costly.

## III. OBJECTIVES AND SCOPE:

- (1) To remove out the sulphate from the wastewater by means of Hydrated Lime & Activated Charcoal with Aloe Vera and Alum..
- (2) To remove out the carcinogenic compounds of sulphate.
- (3) To check the performance of the Aloe Vera for a anticarcinogenicity properties.
- (4) To check the activated Charcoal to remove out Organic matter and Odorous matter, which may create Sulphate.

## IV. METHODOLOGY:

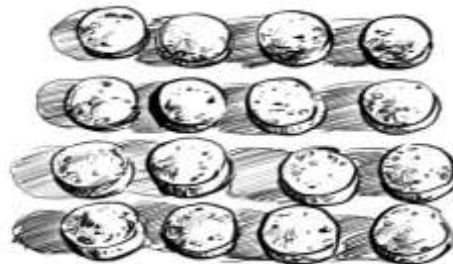
Methodology Includes the first testing the some Physiochemical Properties of the wastewater, with the Help of some of the Important tests, as like pH, Total suspended Solids, Total Dissolved Solids, Total Solids, Hardness of Water, Sulphate Detection Experiment of then we can go for the Next Step of Checking the same Properties for the Irrigable Water from any reservoir or lake. Which can use by us, for Growing various crops and use for the Gardening purpose. Then after that we are making the experiment set up of all the apparatus of the Our Project Designed Topic. By making the all Alternate layers of the sand and the Granulated Activated Charcoal with appropriate Proportion of Alum & Aloe Vera Juice into that of the Mould of Granulated activated Charcoal. then at the face make it leak proof from the Cotton Cloth. Pour the waste water into that assembly this is set serially means water have to pass through the all series one by one. After that we are going to consider about the Treated water from that assembly for the same Physiochemical Experiment Performed before for samples. Then we are Going to compare all the results about the all these Three samples, then we are able to get correct results about the all samples. then we can make any correct conclusion on that about the same.

## V. MATERIALS & MOULD PREPARATION:

### ACTIVATED CHARCOAL MOULD PREPARATION

Activated Charcoal prepared from the sugarcane straws, dry leaves, roots of sugarcane by means of a burning of all these waste into a barrel, then from that burned ash. I will sieve that all the prepared crushed material from the sieve of size 1.5mm. During that I am experiencing that if we use sieve of

size less than 1.5mm then during that sieving all the powdered charcoal spread into that concerned air. use the then we are going to give it shape by molding, means we are making to the charcoal as granulated activated Charcoal. While using the charcoal mold into the water treatment assembly we have to use alum and the Aloe Vera into the activated charcoal into powdered form. In this there is the very important role of the use of both alum and Aloe Vera in the water treatment.



### Aloe Vera Juice & Alum Powder:

Alum has a negative charge and tends to disperse in water very fast and very well. This causes it to join up with all of the offending particles and neutralize them. Now that the particles don't have any repelling charges, they tend to clump together into flocks. The increased size as well as the lack of repelling charges causes the alum particles to settle down at the bottom or rise up and float in the water. After the particles are neutralized, they clump together because of something called the London Dispersion Force which are part of the Van der Waals forces. As we consider about the Aloe Vera then we can say that it can be plays role of binder & also the Anticarcinogenic agent, since sufficient research isn't available. But some papers that available tells us that It is one of the Good anticarcinogen, hence we can say that it can resists to Hydrazine sulfate, Sodium dodecyl sulfate, Cobalt (II) sulfate.

### Hydrated Lime:

Calcium hydroxides an inorganic compound with the chemical formula  $\text{Ca}(\text{OH})_2$ . It is a colorless crystal or white powder and is obtained when Calcium oxide is mixed, or Slaked with water. It has many names including hydrated lime, caustic lime, Calcium hydroxide is relatively insoluble in water One significant application of calcium hydroxide is as a flocculent, in water and sewage treatment. It forms a fluffy charged solid that aids in the removal of smaller particles from water, resulting in a clearer product. This application is enabled by the low cost and low toxicity of calcium hydroxide. It is also used in fresh water treatment for raising the pH of the water so that pipes will not corrode where the base water is acidic, because it is self-regulating and does not raise the pH too much. It can also help to us for the double precipitation of the Magnesium Hydroxide; it can also remove the Toxic Impurities from the wastewater sample as Manganese, Arsenic, Iron, and Radium.

### Activated Charcoal, Aloe Vera Juice & Alum Powder Proportioning:

Hydrate d lime (gm)	Aloe Vera (lit)	Alu m (gm)	Activate d Charcoa l (gm)	p H	TSS (mg/ lit)	TDS (mg/ lit)	Hadr nesso fwate r (mg/l it)
WELL WATER				7. 5	110	250	110
UNTREATED WATER				3. 7	800	1900	900
700	1	65	2000	8. 0	213	452	250
800	1.5	60	2500	7. 6	213	450	255
800	2.0	60	3000	7. 7	210	451	255
800	2.5	60	3500	7. 7	210	446	251
800	2.5	70	4000	8. 4	208	440	250
800	3.0	70	4500	8. 3	205	436	248

During this Proportioning I was using the 1.5mm sieve for the charcoal sieving and for the sieving of Alum I was using the sieve of 1mm. and then take gel of the aloe Vera and diluted it to small amount with water this amount is in the range of 30ml water for the 250ml of Aloe Vera Gel. This Proportion I was decided from the experimentation by taking the various samples for molding, hence I thought that this proportion is suitable for Proceeding towards my Project.

#### Total Suspended Solids:

Suspended impurities are not in the dissolved form are in suspension, means we can remove out them by the process of filtering. These are in the form of stain. we are going to measure TSS by the membrane filtration technique apparatus are goose crucible assembly, or a membrane filter assemblyman goose crucible assembly comprise of a goose crucible having a glass fiber filter at base with 2.1-5.5 cm diameter. having capacity 40-50ml, the pore size of crucible is 1.2 micrometer, conical flask, funnel, glass base with tabulated cap, which has two tubes, one may use for the suction pump and second to draw water for the filtration. with a glass base which having an ground glass seal of 3000ml capacity, we need also suction pump and Clamp to hold the glass assembly, porclein, electronic balance, accuracy of

0.00take glass base placed it on the flask, then filter paper out first it make dry in oven for 20 minutes, means it should be dry before use, measure initial weight and record value. Take filter and sit on filter base. Place funnel at top and hold them together. Connect silicon tube to suction pump. Then measure 1 liter sample .pour sample accordance with ease of reading. Then under action of gravity the process starts 1gm, filter paper of pore size of 1.12 micron, drying oven.

#### Total Dissolved Solids:

Measure the total dissolved solid ,take a dish of porcelain which has oven dried at temperature of about 180°C for 1 hour, then weight the empty evaporating dish in analytical balance, then denote the whatever the weight may be as "W<sub>1</sub>"mix the sample well & pour it into the funnel with filter paper. Filter approximately 80-100ml sample. Using the Pipette transfer the 75 ml of the sample into the porcelain dish, then start the oven up to reach at the 105°C, then make dry to sample to get the constant mass. dry for an 1-2 hour. cool the container into the desiccator. Desiccator is provided to maintain the standard dryness. Then after cooling of dish measure the weight as "W<sub>2</sub>" of dish .observe the difference between the two weights measured.

#### pH OF WATER

While performing he experiment of the pH measurement. I am found that pH of Sugar Industry wastewater is 5.1 and that of from the well water is at an 8.8 level. During the performance of the Experiment the pH of the water gets increased. Then after that we can use Neutralizing agent as Acids. In those aids Acetic acid, Citric Acid, hydrochloric acid these are mainly used. As these acids are with less corrosive Properties.

#### Sulphate Detection & Removal Techniques:

The removal of sulfate by addition of lime or limestone occurs through saturation of CaSO<sub>4</sub>. The precipitation of insoluble gypsum usually occurs as a by-product of lime addition.

Then the procedure for the measurement of the sulphate is then started into it. Then according to the requirement we use the UV visible spectrophotometer. Whose specialty is that it uses the ultraviolet range (185- 400nm) and visible range (400-700 nm) of electromagnetic spectrum? Then for the experiment we require some materials are described follows as Take 6 flasks of 50ml with glass stopper. then preparing a reagent for which take 25ml glycerol and pour it to a dry clean beaker and then take 15ml of the concentrated HCL and pour to the same beaker and into the same beaker add 95% of isopropyl alcohol and mix well. 37.5g of sodium chloride and dissolved it into the distilled water ten mix all the content and make it is of total 250ml volume using the distilled water. then about the preparation of the standard solution of the sulphate take 1.479g of Anhydrous sodium sulphate and dissolve it into the distilled water. then take standard flask of 1000ml and make it up to the 1000 ml Take 6 flasks of 50ml with glass stoppered. four for standard one for the blank and one for the sample add 10mo of the standard solution in the flask 1. Take 20ml into the flask 2 ,then 30ml into the flask

3, then 40ml into the flask 4, then one is kept blank and then in one take 20ml sample then add the 5ml of the standard conditioning reagent to each of the flask, then make the volume to 100 ml of the flask using the distilled water, then the UV visible spectrometer is used to measure the content of the our sample given this spectrometer is connected with the computer system installed with the software spectra manager provision. this is going to take the signal into the form of the absorbance into that sample, it also follows the criteria's of the color relating to that sample

All conducting experiments readings are as follows

1) **According to before & after Treatment with sulphate removal assembly of Spectrophotometer:** Sample Location: Someshvarnagar, baramati Sample Description: Sugarcane Industry before the Treatment.

Sample Number	Volume of Sample	Absorbance
Blank	0	0.0192
Standard 1	10	0.2886
Standard 2	20	0.7606
Standard 3	30	1.4732
Standard 4	40	1.9763
Standard 5	50	2.5676
Sample 1	20	2.5036
Sample 2	20	2.3363

**After The Treatment Concentration of Sulphate:**

Sample Number	Volume of Sample	Absorbance
Blank	0	0.0195
Standard 1	10	0.1154
Standard 2	20	0.3042
Standard 3	30	0.5892
Standard 4	40	0.7905
Standard 5	50	1.0270
Sample 1	20	1.0014
Sample 2	20	0.9345

## VI. CONCLUSION:

We can give simple path treatment to wastewater for sulfate and related salts expulsion by methods for a Hydrated Lime, Sodium Alum, Aloe Vera, and Activated Charcoal Prepared from sugarcane squander accurately. thus according to the our Objectives of the Project are ends up noticeably Proved Experimentally that is This get together Set up Unit of the Treatment can Remove out the Sulphates, Can Prevent anticarcinogenic Character, Can be Precipitated into types of Calcium Sulfate, Barium Sulfate, and Gypsum and it will Control the TDS, TSS, Hardness of Water in a minimal effort.

## AFFIRMATION:

My Project Name is Industrial wastewater treatment to expel out the Sulfate Salts from the Water. as we probably am aware the sulfate will builds the TSS, TDS, Hardness of water, gravely influence to human and condition, amid the my venture, Mr. Gawande sir guided me everywhere throughout the working time of Project, APCOER school Provides Their Labs Tome, Malegaon Engineering College Also Helps To Me, Then The Department Of Soil Survey at the Someshwar Sugarcane Factory Also Helps me parcel, there is likewise the Valuable direction of Dr. S.B. Thakare sir to me too. I am so appreciative to every one of these people groups and Institutes genuinely.

## REFERENCES:

- [1] Dhanya, D., Tamarasi, S., Subashkumar, R. likewise, Lakshman-aperumaisamy, P. 2005. Impact of shading present day spouting on the ground water quality and soil microorganisms in Tirupur. Indian J. Env. Prot. 25 (6): 495.
- [2] Dutta, P. K. 1994. An outline of material pollution and its cure. Indian J. Env. Prot. 14 (6) : 443-446.
- [3] Forstner, V. moreover, Wittmann, G.T.W. 1983. Metal Pollution in the Aquatic Environment. Springer Verlag. New York city.
- [4] Goyal, Mamta, Dhar, D.N. moreover, Rupainwar, D.C. 2006. An assessment of ground water sullyng and its blend quality in a couple segments of Unnu Dist. Indian]. Env. Prot. 26.
- [5] Jhingran, V.J. 1988. Fish and Fisheries of India. Hindustan Appropriating Company (I) Delhi, pp 270.
- [6] Banes D. Forster, Hrudey S.E. Outline Industrial Waste Water Treatment, Vol. 1: Food and Allied Industries.
- [7] Course manual Industrial waste treatment proposed by NEERI and CPHEEO, 1975.
- [8] I.E. 2490-1982 Indian Standards for Industrial and Sewage 9) Nemerow Nelson J. Present day Water Pollutions Origins Characteristics and Treatments Addison Wesley Publishing Company.
- [9] Standard systems for the examination of water and wastewater seventeenth Edition APHA New York, 1984.
- [10] Ahmad S, Mahmoud TA (1982) Wastewater from a sugar refining industry. Water Res 16:345-355
- [11] Amathussalam MN, Abubaker, Jayabai N (2002) Impact of sugar-plant spouting on ground water: a relevant investigation. J Ind Poll 18 (2):119-124
- [12] American Public Health Association (1995) Standard Methods for Estimation of Water and Wastewater, nineteenth

ed. American Water Works Association, Water condition Federation, Washington,

[13] Ataei A, Yoo CK (2010) Simultaneous imperativeness and water streamlining in various contaminant systems with flowrate changes thought. *Int J Environ Res* 4(1):11–26.

[14] Ataei A, Panjeshahi MH, Gharaie M, Tahouni N (2009) New system for laying out a perfect spread cooling structure for profluent warm treatment. *Int J Environ Res* 3(2):155–166

[15] Avasan M, Rao SR (2001) Effect of sugar plant spouting on normal resources of fish. *Overview Res* 20(2):167–171

[16] Baskaran L, Sundaramoorthy P, Chidambaram ALA, Ganesh KS (2009) Growth and physiological activity of greengram (*Vigna radiata* L.) under exuding stress. *Biol Res Int* 2(2):107–114

[17] Botha T, Blottnitz HV (2006) An examination of the biological favorable circumstances of bagasse decided power and fuel ethanol on a lifecycle preface. *Essentialness Policy* 34:2654–2661

[18] Darker E, Skougstad MW, and Fishman MJ (1970) Methods for aggregation moreover, examination of dilute tests for broke minerals and gasses.

[19] Buvaneshwaril S, Damodarkumar S, Murugesan S (2013) Bioremediation analyzes on sugar-handle spouting by picked infectious species.

[20] *Int J Curr Microbiol Appl Sci* 2(1):50–58 Chaudhari PK, Mishra IM, Chand S (2005) Catalytic warm treatment (reactant thermolysis) of a biodigester radiating of an alcohol refinery plant. *Ind Eng Chem Res* 44:5518–5525

[21] Contreras AM, Elena R, Maylier P, Lange hove HV, Dewulf J (2009) Similar life cycle evaluation of four alternatives for using by-aftereffects of characteristic sweetener era. *J Clean Prod* 17:772–779

[22] Devi A (1980) Ecological examinations of limon minute fish of three new water body, Hyderabad. Ph.D. hypothesis Osmania University, Hyderabad.