

**REMOVAL OF IRON FROM SYNTHETIC SOLUTION USING SUGARCANE
BAGGAGE AND BARK OF PIPAL****Prof. Neha D. Turai***Asst. Prof. D. G. Tatkare Mahavidyalay, Mangaon, Mangaon - Raigad Maharashtra 402104.***Abstract**

The removal of iron from aqueous solution of different concentration by using Carbonized organic material of sugarcane baggage and bark of pipal. The utility of sugarcane baggage as an adsorbent for metal ions such as iron from acid mine water was assessed. It is found that the adsorption potential varies as a function of iron concentration. Over 99% Fe [3+], 98% of Fe [2+] uptake was achieved from acid mine water, with a concomitant increase in the pH value by two units using sugarcane baggage. Carbonized organic material of sugarcane baggage adsorbent is found to possess 77-95% iron removal efficiency.

Keywords: *Sugarcane baggage, Removal iron, Adsorption, Bark of pipal.*



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INTRODUCTION:

Iron is second most abundant metal in earth's crust after aluminium and is thus likely to be dissolved in ground water. Iron is generally considered not to be a toxic metal, effects but when above 0.3µg/ml in water this may result in an unpleasant taste and formation of an unsightly brown suspension when exposed to oxygen .In water it normally exists as Fe²⁺ and Fe³⁺, the latter is readily removed from water through precipitation. The levels of iron in water can be significantly high due to anthropogenic sources such as acid mine drainage. When iron sulphide containing, rocks or soils from mining activities are weathered in presences of oxygen & moisture they form sulphates, Fe³⁺ & H⁺. The effects are to lower water pH, to increase the solubility of heavy metals in water & the deposition of yellow-orange Fe (OH)₃ on the surface of streams. Such changes in the composition of stream water may affect aquatic life

Carbon derived adsorbents are generally considered to be an ideal low cost method of removing impurities from waste & domestic water. Carbonaceous adsorbent are micro porous by nature & adsorption of non-polar compounds is considered to be through micro pore

volume filling. In contrast polar species interact with specific sites on the surface. Such sites are polar due to presence of heteroatom like oxygen & nitrogen which gives rise to hydroxyl, carboxyl, and amine functional groups. In addition perturbation of the conjugated carbon structure can result in regions of high & low electron density for example the $C\pi$ sites. Adsorption is also said to be a result of interaction between ions & surface complexes of carbon & such interaction is pH dependent. Adsorption is said to depend on electrostatic interaction & specific interaction with C surface complexes. According to the result of their studies with Cu (II) & Zn (II) intraparticle diffusion is the rate-determining step since most sites are found inside carbon pores.

EXPERIMENTAL MATERIAL:

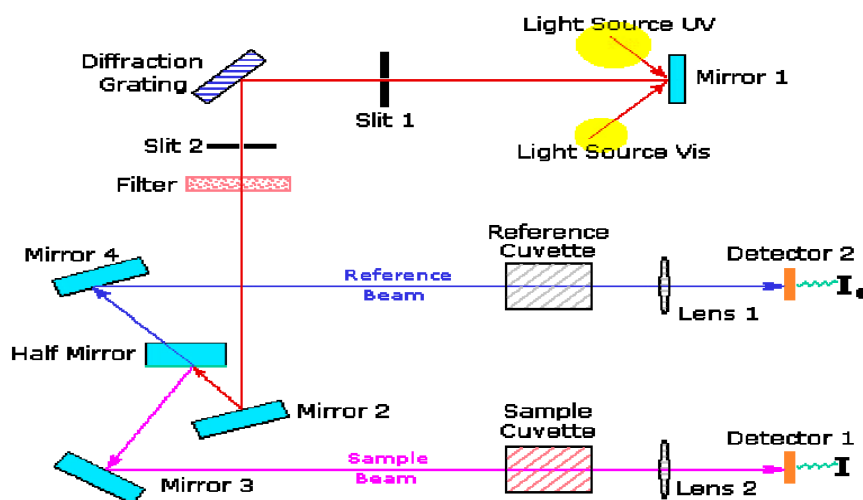
1. Sugar Baggage
2. Bark of pipal

APPARATUS USED:

Muffle Furnace



UV Spectrophotometer



METHOD:-

1 Preparation of organic matter as adsorbent:

The adsorbents were prepared by treating 200g of organic matter such as sugarcane baggage and bark of pipal separately with 150 by weight of concentrated sulphuric acid and keeping it in air oven at 1500c temperature for a period of 2 hours for its carbonisation. This carbonized material was then washed well with distilled water for removal of the free acid and dried at 1100c temperature for 3 hours. Further dried material was subjected to thermal activation in the muffle furnace at 8000c for 30 minutes. Then obtained material was ground in an agate mortar and this powdered material was used as adsorbent for the removal of from water in the present study.

2 Preparation of standard iron solution :

The iron solutions of different concentration were prepared by dissolving 100 mg of ferrous ammonium sulphate in 1 litre distilled water and this became 14.22mg/l of iron solution. From these solution different concentrations of 1.42mg/l, 0.14mg/l solution were prepared.

3. Removal procedure :

In the 100ml of synthetic iron solution 2g carbonized organic matter such as sugarcane baggage and bark of pipal will be separately added to different concentrations of iron solutions 100ppm, 200ppm, 300ppm, 400ppm where stirred with adsorbent for time period of 20, 30,40 min, after organic material used as adsorbent will be filtered and filtrate solution will be used for remaining iron analysis in synthetic solutions. The iron analysis will be done by using UV spectrophotometer.

Result:-

The iron removal efficiency was studied at different time ranging from 20 to 40.

However, it is evident from graphs that maximum removal of iron was observed at different time 40 minute in different concentration of iron solution by all carbonized adsorbents used in present study. The iron removal efficiency was noted that 50 to 89 % by sugarcane baggage and 60 to 96 % by bark of pipal adsorbent at time 40 in different concentration of iron solutions.

In case of iron removal by sugarcane baggage adsorbent it is clear from graph 1 that maximum removal was 89 % at time 40 with 100 ppm of iron solution and the minimum 50% iron removal is noticed with 400 ppm of iron solution at the same time 40. Moreover, by using bark of pipal adsorbent for iron removal as shown in graph 2 it is depicted that the

percentage removal of iron was maximum 89 % from 100 ppm iron solution at time 40 and minimum 50 % from 400 ppm iron solution at same time 40.

CONCLUSION AND DISCUSSION:-

The result obtained from the present experimental investigation after comparing removal efficiency of iron from aqueous solution by using sugarcane baggage and bark of papal adsorbent reveals that bark of papal chemically carbonized adsorbent has slightly higher removal efficiency as compared to sugarcane baggage chemically carbonized adsorbent. From the result it also seen that the better removal efficiency can be achieved at time 40 minutes as compared to other time values. Therefore maximum removal at time 40 minutes is apparently due to enhanced iron exchange the in the solution.

ECONOMICS:

Economics one of the most important factors needed to take to consideration while doing in any type of operation, because of dependency on economics we can decide whether the operation is feasible or not.

The cost requirement for production of activated carbonized adsorbent from sugarcane baggage, bark of pipal or any other agricultural waste is a low cost operation. The cost for the operation only comes from cost of concentrated sulphuric acid and electricity requirement for heating activity. Sugarcane baggage and bark of pipal is available almost free of cost, so preparation of activated carbonized adsorbent from this agricultural waste is cheap and affordable.

The cost for this project was approximately calculated as cost of sulphuric acid which was about 120 rupees and electricity cost of about 50 rupees and total cost of amount is 200 rupees. From above cost calculation we can say that this project is economical and can be use on large scale operation for softing of water.

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