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Case Study on Removal of Ambazari lake Water impurities By using Corn Cob and Neem Leaves As Bio – Adsorbents.

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ABSTRACT
This study was carried out for the utilization of Corn Cobs and Neem leaves as adsorbent for the removal of Surface water impurities . From the above observation it was concluded that Corn cobs were found suitable adsorbents because of their high mechanical strength, rigidity and porosity. Hence, contaminants like oxides of salts, detergents, suspended particles, coloured dyes, oil and grease get adsorbed in the surface of the corn cobs. It is a cheap and low cost method using one the less utilized agricultural bio-wastes of the globe.
Keywords *- Activated carbon, adsorption, adsorbent, agricultural waste, bio-adsorbent*

I. INTRODUCTION

Rapid developments in technology and lifestyle have accelerated the addition of contaminants into air, water and land rendering it unsafe for organisms. Release of pollutants from various sources like domestic, agricultural and industrial sectors has dramatically modified the quality of water thereby causing harm to aquatic organisms. Agricultural activities add excessive fertilizers, pesticides and herbicides into the nearby water bodies. Effluents released from industries release toxic chemicals like heavy metals, chemicals (organic or synthetic) to the aquatic ecosystems. The best solution to water pollution is to prevent it from happening. In addition, the rapid modernization of society has also led to the generation of huge amount of materials of little value that have no fruitful use. Such materials are generally considered as waste, and their disposal is a problem. Also, there are some materials that are available in nature that have little or no use. The utilization of all

Such materials as low-cost adsorbents for the treatment of wastewater may make them of some value. An effort has been made to give a brief idea of an approach to wastewater treatment, particularly discussing and highlighting in brief the low-cost alternative Adsorbents with a view to utilizing these waste/low-cost materials.

The only solution to diffuse sources of pollution is to integrate land use with water management. Activated carbon remains the most widely studied adsorbent, and it has been found to adsorb a variety of materials such as metals, dyes, phenols, and a Host of other organic compounds and bio-organisms, and is therefore used for the removal of pollutants from wastewaters by adsorption.

Corn is India's third most important cereal crop after wheat and rice. However, corn cobs are one of the most plentiful and important agricultural wastes in maize cultivation. As they are porous, they can be used as water filtrates.

There are many advantages of using corn cobs and Neem leaves they are eco-friendly, cheap, easily available, easy to handle and thus can be used by all.

II. ADSORPTION

Adsorption is a mass transfer process which involves the accumulation of substances at the interface of two phases, such as liquid - liquid, gas - liquid, gas - solid, or liquid - solid interface. The substance being adsorbed is the "adsorbate" and the adsorbing material is termed the "adsorbent". The driving forces for adsorption process are surface affinity, chemical reactivity, pH, surface area for adsorption per unit volume and reduction in surface tension.

III. MATERIAL AND METHODOLOGY

The corncobs and neem leaves were collected from local Areas of Nagpur City and sun dried for one month cut into long and small pieces, ground to powder and burnt in suitable conditions to form activated charcoal. A cob was taken whose pith was removed carefully from the top to make a hole at the centre of the cob without piercing the other end for the pilot experiment. Corn cobs are taken in five separate used bottles of 2 litre capacity each containing 400 gm of dried longitudinal sections, 400 gm of dried small pieces, 400 gm of powdered corn

cobs, 400 gm of activated charcoal of corncobs and Neem leaves and 500 g fine sand(Last layer) each. Then, raw water from Ambazari Lake is collected and was allowed to pass slowly allowed to pass through different layers through the central hole of the cob and the filtrate was collected. The filtrate was subjected to several qualitative tests like the presence and absence of oxides of salts, detergents, oils, coloured dyes, suspended particles etc . The following parameters like Total Suspended Solids, Alkalinity , E- Coli , BOD,Etc were studied for the pre and post treatment of Ambazari Lake water to find out the rate of absorption by corn cob and Neem Leaves .

IV. RESULTS

SR NO.	Parameter	Before Treatment (Ambazari lake Water)	After Treatment (Ambazari lake Water)
1.	COLOUR	1HAZEN UNIT	2HAZEN UNIT
2.	P^h	4.82	7.48
3.	Mg & Ca	Present	Absent
4.	DO	5.6Mg/l	6.8Mg/l
5.	DS	180Mg/l	100Mg/l
6.	SS	180Mg/l	90Mg/l
7.	ALKALINITY	144Mg/l	380Mg/l
8.	CHLORINE	600PPM	180PPM
9.	E-COLI	17MPN	ABSENT
10	TURBIDITY	6.2NTU	4.6NTU
11	BOD	HIGH	LOW
12	COD	HIGH	LOW

Table 1. showing parameters present in Ambazari Lake water Before and after Sample.

V. CONCLUSION

From the above observation it was concluded that Corn cobs and Neem Leaves were found suitable adsorbents because of their high mechanical strength, rigidity and porosity. Hence, contaminants like oxides of salts, suspended particles, coloured dyes, oil and grease get adsorbed in the surface of the corn cobs and neem leaves . Some of the heavy metals are also adsorbed by corn cobs. If the drain pipe of the household is connected to a chamber having different layers of corn cobs in partition layers or to an S-trap pipe having corn cobs, it will separate about more than 70-80 % of contaminants including suspended particles from the waste water. Similarly the factory out let pipes carrying effluents must be opened to five inter-connected chambers having long slices of corn cobs, pieces of corn cobs, powder of corn cobs, activated charcoal of corn cobs and Neem leaves and fine sand for the easy adsorption of TSS and chemical toxicants both organic and inorganic. Corn cobs fitted to bamboos buried on the ground floor of the ponds and allowed two to three weeks to stand can be useful for cleaning of water in ponds, tanks and rivers. This is also useful to clean overhead water tanks of individual households and community tanks.

Thus, Corn cobs and Neem leaves adsorb contaminants from surface water and prevent their entry into groundwater. Indirectly corncobs help to decrease the temperature of water by adsorbing the suspended particles which store heat and raise water temperature. These also help in preventing shock loading from hard surfaced parking lots. It is a cheap and low cost method using one the less utilized agricultural bio-wastes of the globe. This will open a new market value of the corn cobs which are considered as bio-waste till date. However, further chemical and physical examinations are necessary to make a marketable product out of corn cobs and neem leaves to adsorb contaminants from the domestic and industrial effluents.

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