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Chemical Studies on Waste Flowers of Temple Site of In and Around Sidhi District

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Abstract:- *This research work undertaken for complete chemical studies to make the waste flowersusefull for industrial purpose. During the chemical studies the temple waste flowers were collected and analyzed based on certain characteristics study which includes PH. Conductivity, moisture content,ash content, volatile content, matter soluble in water and in acid, bulk density specific gravity, porosity Methylene blue no, iodine no and surface area SBET, etc. and preparation of activated carbon by pyrolysis process. A part from this the activated carbon were softened and verified by FESEM (field emission scanning electron microscopy), the element and percentage of activated carbon in waste flowers were also detected by EDS (Energy Dispersive x-ray spectroscopy) from the analysis it is concluded that the waste flowers are very useful for producing the activated carbon which are further useful for the industrial purpose.*

Keywords:-*Temple waste flowers, activated carbon Pyrolysis , EDS, FESEM and SBET.*

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I. Introduction

Waste flowers are a part of agricultural waste and it is also known as aroma waste organic waste etc. waste flowers are generated from a numberof sources among which temples are the one of the key source. Where people confer a variety of offering to the divinities which primarily consist of camphor, oil.flowers, fruits, coconuts, clothes etc of which floral offering are found in huge quantity. After use these flowers are considered as a waste and dumped into waste land because there in no appropriate method of disposal and hence waste flowers continuing to accumulate throughout the world today. The floral waste takes much time for decaying and during decaying process. They release bad odour and toxic gases thereby pollutes the environment and causes several health hazards to inhabitants.

The present work is a new approach to produce an activated carbon from temple waste flowers by direct pyrolysis process therefore the volume of waste flowers can we minimized to some extent. Moreover for conforming the quality of activated carbon the various physico-chemical parameters, SEM along with EDX were also studied.

II. Materials and methods

The waste flowers were collected from the various temples in and around sidhi district (such as temples of BADHUDA, Amha, lauaamandir,mauhar, Karkachaha, Sonakhad, kotha, Gopal Das, saiMandir, Ganesh mandirNaudhiyaDemha, etc.) The waste flowers includes hibiscus Rosa Sinesis, jasminumPolyanthum, jaisminumauriculatum, chrysanthenummorifolium, Nerium oleander, Tabernaemontanadivaricate, Rosa, Nelumbonucifere, IxoraCoccinea, Leucasaspera, micholiachampaca, Merigold, saracaindica, and jaisminumangustifolium were washed with distilled water and then sun dried, the dried and dehydrated material was grinded with a mixer and used as a starting material for further direct pyrolysis process.

Procedure used forPreparation of activated carbon:-

The starting material obtained by washing dehydrating grinding the waste flowers.Now carefully took 10.00 gram of this starting material (sample)kept it in a clean crucible of known weight and then heated it in a muffle furnace at 550^0c for two hours (02 hrs) for carbonizing.

Now the product was cooled to room temperature then it was washed with distilled water (PH=7) to remove color and impurities and then dried in the oven at 110^0c for 2 hours. Now the dried product was crushed to fine powder using mortar and pestle and it was put though sieves to get sample named (WF-1) with uniform particle size 110 µm which was stored in an air tight container and further taken for present study.

Now the sample WF-1 was taken for PH and conductivity measurement with the help of PH meter and conductivity meter respectively thereafter, moisture content (%) by mass, ash content (%) by mass Bulk destiny

(g/L) specific gravity, water solubility iodine number (mg/g), methylene blue number, BET surface area, total pore volume and pore diameter of carbon was analyzed as per standard procedure.

The structure, morphology and composition of activated carbon have been determined using field emission scanning electron microscope and energy Dispersive x-ray spectroscopy respectively.

III. Result with discussion

The various Physico-chemical parameter and their value for WF-1 recorded has been shown in **Table -1**

SN0.	Parameter	Sample WF-1	Specified range of activated carbon by ASTM and AWWA
1	PH	7.55	6-8
2	Conductivity	0.3	-
3	Moisture content %	5.3	5-8
4	Ash content %	4.2	5-15
5	Volatile matter %	17.6	37.5±0.03
6	Matter soluble in water %	0.89	<1
7	Matter soluble in 0.25m Hcl %	0.99	<3
8	Bulk density gml^{-1}	0.51	0.25
9	Specific gravity	0.83	≈ 1.8
10	Porosity %	68.0	40-85
11	Methylene blue number mgg^{-1}	513.2	≈ 450
12	Fixed carbon %	74.3	-
13	Yield %	64.2	-
14	BET surface area (m^2/g)	675.4	600-1200
15	Iodine number mg g^{-1}	640.3	600-1100

Determination of PH is important factor mainly for water purification process. According to Ahmedna and Okieimen the carbon PH (6-8) is acceptable for most application therefore in the present work thePH of activated carbon WF-1 is determined to 7.55. The moisture, ash and volatile content values are found to be low which is suggesting that the particle density is comparatively small but mechanical strength, adsorption power and effectiveness of reactivation of carbon will be high.

Other parameters such as solubility, porosity, bulk density, specific gravity methylene blue member, iodine number, fixed. carbon and yield of carbon has been compared with standard values and the result are shown in the **Table -1**

The BET surface area is crucial parameter because they are closely related to the adsorptive capacities of adsorbent.In the present study the BET value of the resulting activated carbon was calculated to be 675.4 m^2/g the value determined is within the limit set by ASTM (600-1200 m^2/g) indicating that the temple waste flowers are a suitable carbonaceous material for the present investigation.

The scanning electron micrographs were also taken at two different magnifications (2 µm and 10µm) to study the surface morphology of activated carbon. In the sample (WF-1) it has been seen that it has morepores, caves type opening and good surface area. As it is known that the pores and cavities will increase the adsorptive power of the adsorbent, moreover the rough surface and bigger holes are also observed on the surface of carbon through SEM images.

The data generated by EDS consist of spectra showing peakes which confers the idea about the presence of various elements and percentage of carbon in the sample as shown in the **Table -2**

As shown in table -2 the carbon in WF-1 sample has rich amount of carbon 99.85 therefore it is suitable for adsorption studies.

Table -2

Composition and relative proportion of activated carbon by EDS

Activated carbon	Element present	Percentage %
Sample WF-1	C	99.85
	Na	0.15
	Mg	0.26
	Ca	0.17
	O	0.00
	Total	100.00

IV. Conclusion

The outcomes of this research paper clearly indicate that temple waste flowers are a suitable carbonaceous precursor for the production of activated carbon.

The entire chemical studies based on Physico-chemical parameter, BET surface area, SEM and EDS of the activated carbon (WF-1) obtained by the direct pyrolysis process can satisfy the recommended value by ASTM (American society for testing material) and AWWA (American water work association)

This work provides a simple method to obtain carbonaceous adsorbent from low cost and freely existing material for the treatment of dyes. Such as methylene blue methyl violet methyl red, methyl orange, and textile dying industrial effluents.

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