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NOTE

Colour Removal of Synthetic Wastewater by Using Biomaterials

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A carbonaceous sorbent prepared from an indigenous agricultural waste *Operculina turpethum* (Convolvulaceae), *Trianthema pentandra* (Asclepiadaceae) and *Hemidesmus indicus* (Aizoaceae) by acid treatment, was tested for the colour removal of industrial wastewater. In the present study, the roots of the above mentioned biomaterials were used to remove the colour of synthetic wastewater prepared by using analytical grade potassium permanganate, potassium dichromate and chromium sulphate chemicals. The results indicate that biomaterials are highly useful ones.

Key Words: Pollution, Wastewater treatment, Biomaterials.

Owing to the high cost of conventional adsorbents, in recent years numerous low cost alternative materials have been evaluated, as documented in the series of reviews[1,2], for the removal of heavy metals and dyes from water and wastewater[3,4].

Waste agricultural materials have been used for many years as a source of carbon. Normally, the feed material is heated to high temperature (700–1200°C) to remove the volatile matter and the resulting carbon is then activated either physically or chemically. Carbonization of agricultural materials can also be performed by dehydration with sulphuric acid and phosphoric acid. Such carbons have been reported to have the capability of decolourising dyes and possess ion exchange properties related to the presence of surface functional groups on the carbon[5].

Preparation of Carbon[6]

Operculina turpethum (OTC), *Trianthema pentandra* (TPC) and *Hemidesmus indicus* (HIC) root were collected from Thanjavur District and chopped into small

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pieces. Carbon was prepared from roots by treating the chopped pieces with concentrated sulphuric acid (sp. gr. 1.84) in a weight ratio of 1 : 1.8 (root : acid). The resulting black product was kept in an air-oven maintained at 160 ± 5°C for 6 h followed by washing with distilled water until free of excess acid and dried at 105 ± 5°C. The carbon products obtained from pine cones were ground and the portion retained between 44 and 89 μm sieves was used for colour removal experiments.

In the present study, double distilled water was used as reagent blank. All the chemicals used wre of analytical grade. The synthetic wastewater samples were prepared by using potassium permanganate, potassium dichromate and chromium sulphate. The concentration of all the samples is 0.1 M. Potassium permanganate is neutral; potassium dichromate and potassium sulphate are acidified with conc. sulphuric acid. The pH of the solution is 2.5. The colour of the samples is pink, reddish yellow and green respectively.

2 g of each adsorbent from the root was used in seven conical flasks containing 100 mL of the synthetic wastewater samples separately. All samples were mechanically agitated at low speed (170 rpm). The decolorization experiments were carried out in batch process at room temperature. The absorption values of the samples were recorded at 635 nm. The decolorization activity was calculated by using the formula[7]

$$D = \frac{(A_{ini} - A_{fin})}{A_{ini}} \times 100$$

where D is decolorization in percentage

A_{ini} is initial absorbance,

A_{fin} is final absorbance.

A graph is drawn between time *vs.* percentage removal and the result is given in Table-1.

TABLE-1
COLOUR REMOVAL FROM INDUSTRIAL WASTEWATER

Bio material	Colour removal (%)		
	Potassium permanganate	Potassium dichromate	Chromium sulphate
OTC	62	40	46
TPC	77	41	45
HIC	51	42	48

As seen from Table-1, the colour removal efficiency of the roots of the biomaterials is highly significant. *Trianthema pentadia* root removes the colour of permanganate ions more efficiently than *Operculina turpetum* and *Hemidesmus indicus* roots, while in the case of potassium dichromate and chromium sulphate, these three biomaterials are equally effective in removing the colour.

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ERRATUM

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Simultaneous HPTLC Estimation of Cinnanizine and Domperidone in their Combined Dose Tablets

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The unit 'microlitre (μL)' has been printed as 'litre (L)' throughout the paper.

Please read μL instead of L.