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Production and experimental efficiency of activated carbon using the fruit shell of gulmohar (Delonix Regia): A review

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Abstract
Activated carbon materials are traditional chemical adsorbents because of their very high specific surface area and high micropore volume. Recent industrial attention has been drawn to activated carbon fiber and textiles. Conversion of textile materials into active carbon products is a cutting-edge technology overlapped by fiber/textile manufacturing and polymer thermo chemical processes. As an introduction, this chapter begins with an overview of the evolution of uses and production of activated carbon materials from activated carbon particles to activated carbon fiber. Following this is a discussion about scientific and engineering features of activated carbon materials relevant to textile processes, thermo chemical processes, and material structure and properties. To give a sense of production cost effectiveness, a comparison of production cost between activated carbon fiber and granular activated carbon is exhibited. Finally, the chapter provides an outlook on the present market and further development of activated carbon materials, including current market shares, end-use applications, and future trends.

Keywords: chromium, gulmohar, biosorption, spectrophotometer, adsorption isotherm, adsorption kinetics

1. Introduction
Water of high quality is essential for human existence and agricultural, industrial, domestic and commercial use and all these activities are also responsible for polluting the water. Majority of the industries are water based and a considerable volume of wastewater originated from these is generally discharged into water sources either untreated or inadequately treated resulting in water pollution. A study conducted by the Centre for Science and Environment, New Delhi, India, has suggested that over 70% of available water in India is polluted (C.S.E. Survey, 1982).The contamination of water due to toxic heavy metals through the discharge of industrial wastewater is a global environmental problem.

The heavy metals reach the water bodies through many industrial activities. From the heavy metals chromium is such metal which is to be found in aqueous system as both ionic forms i.e. Trivalent and Hexavalent chromium.

Recently much importance has been given on removal techniques and developments of new process for heavy removal from waste water. There are large number of industries which discharge chromium containing waste, namely tanning, electroplating, textile cement and asbestos, refractories, cooling towers of thermal power stations and many other industries.

Adsorption has been advocated as most promising among the currently known methods for waste water treatment, especially for removal of heavy metals. The adsorption process can be carried out using abundantly available low cost adsorbent.

In the present study Delonixregia pods (Gulmohar)are selected for preparation of activated carbon for removal of Cr (VI) from waste water.

2. Guidelines
The Seeds of Gulmohar(Royal Poinancios), broken into pieces, and churned into powder form, washed in distilled water for 2 to 3 time. The powder was then oven dried at 105±5ºC for 24 hours. The oven dried powder was filled in a small container in three layers, by compacting each layer without any air space to avoid the loss in weight of the powder otherwise it would result in burning of the material directly, leaving behind only the ash. The small container was then placed into a bigger container, such that, sand surrounded the small container completely. The lid of the bigger container was tightly fitted. Then the set-up was kept in muffle furnace at the temperature of 650ºC. After attaining the required temperature, the furnace was allowed to cool for about 10 hours. Before the container was taken out. The sketch furnished in figure 3.1 below was the set up of the containers. The activated carbon thus obtained was sieved to 300µ (sieve) size and packed in a polythene cover and stored in dessicator.

Table 1: Botanical Description of Gulmohar (DelonixRegia)

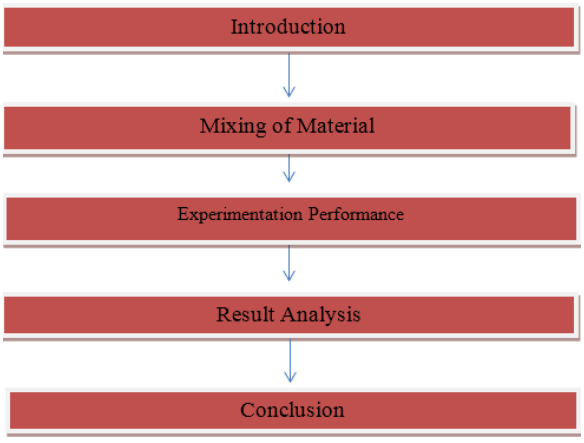
Plant type		Medium- sized , evergreen , perennial and deciduous trees Height – 35-40 ft
Growing requirements		Soil tolerance: - clay; loam; sandy; slightly alkaline; acidic; well – drained.
(a)	Leaf	have a feathery appearance and are a characteristic light, bright green and are doubly pinnate each leaf is 30–50 cm long
(b)	Flower	scarlet or orange-red petals up to 8 cm long
(c)	Pods	They can be up to 60 cm long and 5 cm wide
(d)	Seed	are small, weighing around 0.4 g on average

3. Figures of Gulmohar (*Delonixregia)*

Fig 1: Gulmohar (*Denolixregia)* flower

Fig 2: Pods / Fruit Shell

Methodology:



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