# JINNAH UNIVERSITY FOR WOMEN
# 3RD INTERNATIONAL CONFERENCE ON BIOLOGICAL RESEACH AND APPLIED SCIENCE

## KINETICS OF ADSORPTION PROCESS OF REACTIVE ORANGE DYE ON MODIFIED MAGNETIC CHARCOAL

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**Abstract:**

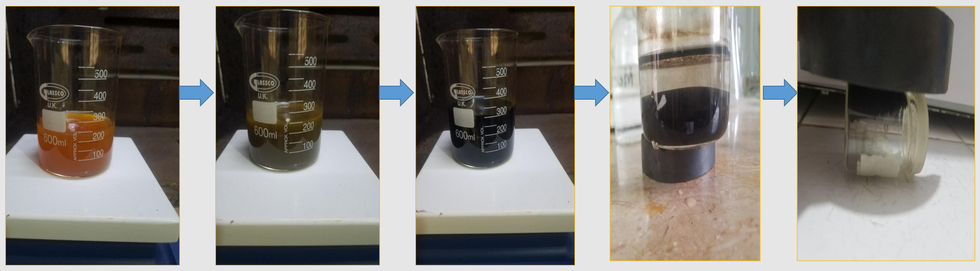
A modified composite adsorbent was prepared by the combination of magnetic iron particles with activated charcoal by co-precipitation method for the removal of Reactive Orange 16 dye from the aqueous system. Different factors affecting the adsorption of dye included pH, adsorbent quantity, temperature, contact time and concentration of dye are optimized by batch experiments. The modified adsorbent effectively adsorbed the dye and due to magnetic nature, the used adsorbent can easily be removed from aqueous system. Efficiency of removal of dye enhanced by increasing the adsorbent dosage. The magnetic iron particles also serves as catalyst for degradation of dye. The prepared adsorbent was found to be effective for adsorption of Reactive Orange 16 dye.

## Introduction:

The adsorption process for the removal of coloured dye contamination is widely used due to its simplicity, affordability and effectiveness. Many synthetic and bio adsorbents are reported to be effective for removal of dye from water [5]. Synthesis of modified magnetic iron and activated carbon particles is used as adsorbent for the expulsion of reactive orange 16 dye from waste solutions [6]. Reactive orange 16 (R.O 16) is an azo dye and have a low biodegradability, therefore, it has potential hazard for aquatic life [4].

## Objectives:

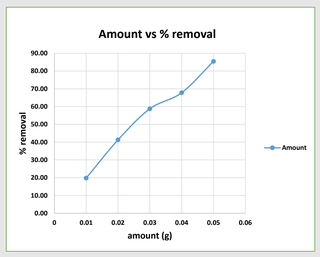
The objective of current research was to prepare an adsorbent that not only adsorb the dyes but also capable to catalytic degrade the dyes and effectively remove adsorbent from the water effluent.

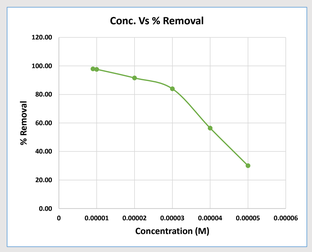


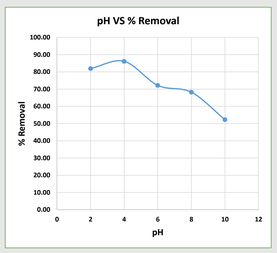
## Methodology:

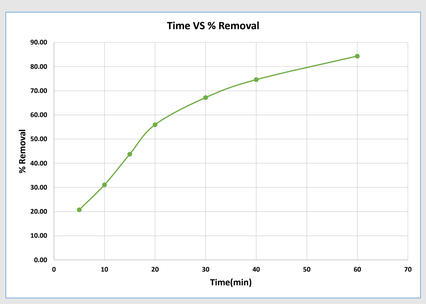
A modified adsorbent was prepared by combination of magnetic iron particles along with activated charcoal. Magnetic particles were prepared by precipitation method using iron salts.

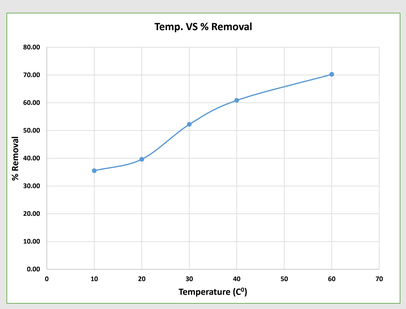
The batch experiments were performed by varying different parameters such as adsorption time, pH, Temperature, adsorbent dosage, and concentration of R.O. 16 dye. The effects of these parameters are monitored using a spectrophotometer. Percent removal and adsorption capacity is determined.




## Results And Discussion:

Increasing dosage increases the percent removal of the dye. A small adsorbent dosage of 0.05g effectively remove 84.44% of the $3.75x10^{-5}$ M reactive orange 16 dye solution while higher adsorbent dosage complete de-coloration is observed.

The effect of initial dye concentration depends upon the active reaction between the concentration of dye and adsorbent surface. With the increase of reactive orange concentration i.e.$0.9x10^{-5}$ to $5x10^{-5}$ M removal efficiency decreases from 97.91% to 30.05% due to occupation of active adsorbent sites. The optimized pH of dye was found to be 6. The kinetic study was performed by varying contact time of adsorbent with dye. With the increase of contact time removal percentage of dye increases as reaction move towards completion. The increase of temperature cause increases the removal capacity of dye.

## Conclusion:

In this research modified magnetic charcoal was prepared and subjected for kinetic study for removal of the Reactive Orange 16 dye from water. The adsorbent not only adsorb the dye but also kinetically decolorize the dye which is very efficient for waste water treatment. The main advantage of this magnetic adsorbent is that it is recover from waste water after adsorption.

## REFERENCES:

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