



INCETIM

# Application of nanocomposites based on CNT-COOH as adsorbents for the removal of tartrazine from aqueous solutions



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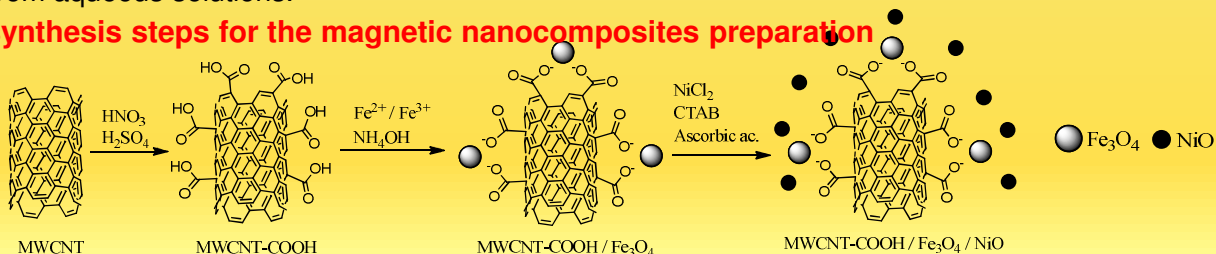
## Introduction

The synthetic chemical dyes are non-degradable and causes bioaccumulation in living organism. Approximately 50% of synthetic dyes annually produced, are azo dyes very resistant to light, temperature and oxidizers. For this reason, a great attention has been focused on the elimination of the dyes from effluents, due to their potential toxicity. The magnetic nanocomposites based on carbon nanotubes (CNT) are among the adsorbent materials with promising properties.

## Purpose:

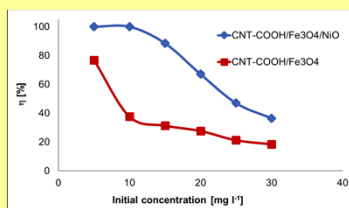
- the preparation and characterization of the magnetic nanocomposites CNT-COOH/Fe<sub>3</sub>O<sub>4</sub> and CNT-COOH/Fe<sub>3</sub>O<sub>4</sub>/NiO;
- the application of these magnetic nanocomposites as adsorbents for the removal of tartrazine, a hazardous dye, from aqueous solutions.

## The synthesis steps for the magnetic nanocomposites preparation

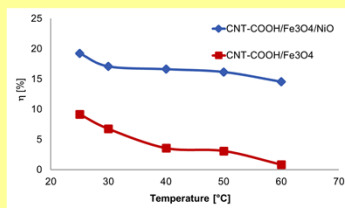


Characterized by microscopic/spectroscopic techniques, namely: XRD, BET, TEM, SEM, EDS

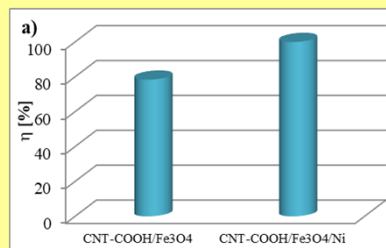
## Influence of the physico-chemical parameters on the degree of removal of tartrazine



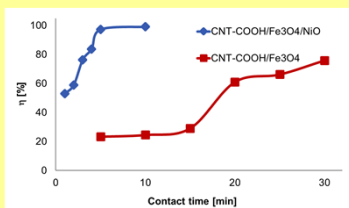
Influence of the concentration



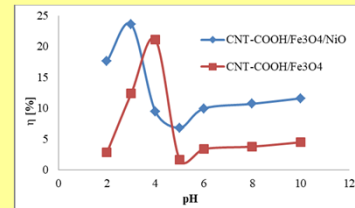
Influence of the temperature



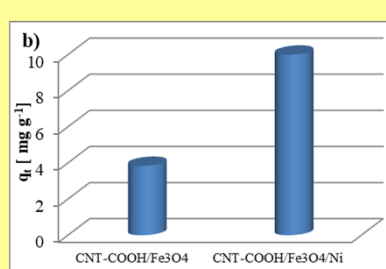
The removal of the tartrazine from aqueous solutions



Influence of the contact time



Influence of the pH



The adsorption capacity of the tartrazine in the presence of nanocomposites

## Conclusions:

- ✓ Various methods of treatment for dye removal are adopted (e.g. adsorption, coagulation, photo-catalytic decolonization, wet air oxidation, etc). The adsorption has been reported to be the most effective method that provides promising relevant results.
- ✓ In order to establish the conditions for optimal retention of tartrazine, the influence of some physico-chemical parameters on the adsorption process was evaluated, such as: initial pH of the dye solution, temperature, adsorbent dose, contact time and the initial concentration of dye.
- ✓ The best degree of the removal of tartrazine was obtained with CNT-COOH/Fe<sub>3</sub>O<sub>4</sub>/NiO nanocomposite (10mg tartrazine/L, pH=3, 10 min, room temperature).

## Acknowledgements:

This work was carried out through the Romanian Ministry of Research, Innovation and Digitization within the Core Program, PN19-35-0203 (36N/13.02.2019).