

ANTIBACTERIAL ACTIVITY OF A SYNTHESIZED COMPLEX VIA GREEN ROUTE

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Introduction & Objectives:

Over the past decade there has been an increased emphasis on the topic of “green” chemistry and chemical processes in the design of a synthetic route, chemical analysis, or chemical process which present a totally green approach toward the synthesis of materials, This made the necessity of moving from classic methods of synthesis materials which depended on harsh experimental conditions such as high temperatures, to the soft chemistry. This method allows the synthesis of new materials, such as organic–inorganic hybrid materials, which have been evaluated against several pathogenic fungi and bacteria with promising results, This is what makes them become new antimicrobial agents because of the resistance acquired by several pathogenic microorganisms, which cause damage to human health.

That is why we seek to synthesize this kind of materials based on soft chemistry using a green method, and study their antimicrobial activity.

Methodology (Material and methods):

Preparation of the materials: The complexes were synthesized by adding stoichiometric quantities of metal salts ($\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$, K_2CrO_4) with equimolar of ligands (tartaric acid and ammonium acetate), where the pH of the mixture was measured .

Physical and elemental measurements: The complexes have been characterized by IR spectroscopy analyse was by using Cary 600 Series FTIR Spectrometer and SEM-EDX Analysis were by ZEISS EVO 15 Scanning Electron Microscope with ZEISS smart EDX .

Results and Discussion:

The IR spectrum of the complex shows the presence of all of the expected functional groups. The broad absorption band of dimeric OH stretch of (Tartaric acid) is observed at $3212.7951633 \text{ cm}^{-1}$. IR spectra of the complex exhibit a strong intensity band of carbonyl group at $1604.333194900 \text{ cm}^{-1}$, where the medium band at $1373.8405994 \text{ cm}^{-1}$ can be attributed to Ammonium ion. The three close bands in the $400- 800 \text{ cm}^{-1}$ region are indicated the presence of metal.

The investigate the general morphologie and the composition of the synthesizing complex are examined by SEM/ EDX are demonstrated in fig (1 and 2), the EDX result indicated that the complex were composed of C, O, Cd and Cr only, and one other peak detected in the EDX



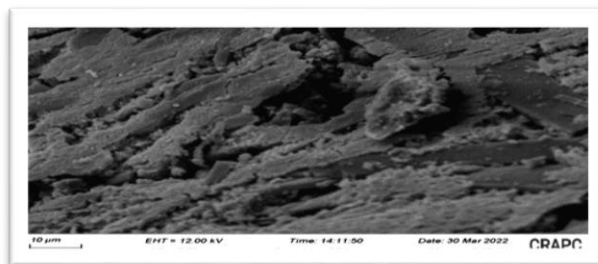


Fig.1: SEM image of synthesized complex

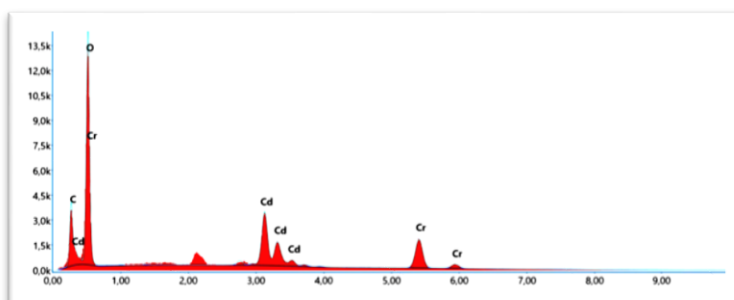


Fig.2: EDX analysis of the complex

Spectrum is related to the metallization metal. The EDX result confirms that the complex is pure.

Conclusion:

Through this work, we seek to synthesize organic-inorganic hybrid materials and study their antibacterial activity, as this type of material has become of interest to researchers due to its many advantages. By using the co-precipitation method, we succeeded in synthesizing some of them and we are about to characterize them, where we were able to perform analysis using scanning electron microscopy and infrared spectroscopy, and these results will be enhanced by other techniques such as X-ray diffraction spectroscopy to determine the crystal structure of the synthesized materials. Then we move to studying the antibacterial activity of these substances against several bacteria in order to evaluate their biological effectiveness, as we expect them to have a high activity against bacteria.

Keywords: Synthesis, Coordination chemistry, hybrid materials, antibacterial activity

References

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