



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكرو فيلم



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شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



MONA MAGHRABY



Faculty of Science
Chemistry Department

Synthesis, characterization, biological approach and various applications of some novel transition metal complexes

A Thesis

**Submitted in Partial Fulfilment of the
Requirements of PhD degree in Chemistry**

Presented by

Suad Ahmed Mohammed Moubteen

M. Sc. (2008)

Chemistry department, Faculty of Science, Sebha University

Supervised by

Prof. Dr. Mohamed Fathy El-Shahat.

Professor of Inorganic Chemistry, Faculty of science, Ain Shams University

Prof. Dr. Ayman Ahmed Abdel Aziz

Professor of Inorganic Chemistry, Faculty of science, Ain Shams University

Prof. Dr. Attia S. Attia

Professor of Inorganic Chemistry, Faculty of science, Ain Shams University

2021



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To

Chemistry Department

Faculty of Science

Ain Shams University



Faculty of Science
Chemistry Department

Synthesis, characterization, biological approach and various applications of some novel transition metal complexes

Thesis Advisors

Thesis Approval

Prof. Dr. Mohamed Fathy El-Shahat.

Professor of Inorganic Chemistry
Faculty of science, Ain Shams University

Prof. Dr. Ayman Ahmed Abdel Aziz

Professor of Inorganic Chemistry
Faculty of science, Ain Shams University

Prof. Dr. Attia S. Attia

Professor of Inorganic Chemistry
Faculty of science, Ain Shams University

Head of Chemistry department

Prof. Dr. Ayman Ayoub Abdel-Shafi

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبِّحْكَ لَا إِلَهَ إِلَّا
أَنْتَ عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدقة الله العظيم

سورة البقرة الآية: ٣٢



Abstract



Abstract

In the first part, new Schiff base complexes of mononuclear Mn(II), Ru(III), Co(II), Ni(II), Cu(II), and Zn(II) were synthesized by template condensation of 2,5-thiophene-dicarboxaldehyde and 2-aminobenzimidazole., and the metal complexes were structurally characterized by elemental analysis, FT-IR spectroscopy, ^1H NMR spectra, electronic spectra, ESI-MS spectra, EPR spectra, conductance measurements and magnetic susceptibility measurements. The molar conductance measurements of the complexes showed non-electrolytic nature. In all the complexes, the Schiff base coordinates through azomethine nitrogen. The physicochemical and spectroscopic measurements reveal octahedral environment for all metal complexes. The antibacterial activity, antioxidant activity and DNA interaction of the Schiff base ligand and its metal chelates were investigated to find their role in drug design.

In second part, a new series of mononuclear octahedral Ru(III) complexes of general formula $[\text{RuL}^{1-3}\text{Cl}]\text{Cl}_2$ (**1-3**) where L = dianion of Schiff bases namely: 2,2'-(((1E,1'E)-thiophene-2,5-diylbis(methane-lylidene))bis-(azaneylylidene))diphenol (H_2L^1), 2,2'-(((1E,1'E)-thiophene-2,5-diylbis-(methaneylylidene))bis(azaneylylidene))dibenzenethiol (H_2L^2) and 2,2'-(((1E,1'E)-thiophene-2,5-diylbis(methaneylyli-dene))bis(azaneylyli-dene))-dibenzoic acid (H_2L^3), respectively are synthesized and characterized by different physico-chemical techniques. The interaction of complexes with CT-DNA studied by different techniques. Further, the antiproliferative activity of the complexes on Human cervical cancer cells (HeLa) and breast cancer cells (MCF-7) were evaluated by MTT assay, which revealed that, all the complexes showed more intense inhibition against HeLa and MCF-7 cell lines.

Dedication to

The one who honored me by bearing his name ,my father, may God Almighty have mercy on him ...who taught us that we have to spend the most precious and precious in order to reach a high academic degree...and he left before seeing its planted fruit... to the spring of tenderness and the light of my mother, may God Almighty have mercy on her... whoever her invitations was the best companion to excellence...to the support, the arm and the forearm, my brothers and sisters, I would like to give you a gift of love, elevation and dignity... to everyone who taught me a letter... to everyone who supported me, even with a smile (my brother Omar and his daughter Laila) to everyone who helped me in this message, they all have much respect and appreciation from me,and may Allah reward them with good from me.

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Suad Ahmed Mohammed Moubteen



Contents



List of Abbreviation

DMSO	Dimethyl Sulfoxide
MeOH	Methanol
DMF	Dimethylformamide
DPPH	2,2-Diphenyl-1-picrylhydrazyl
EtBr	Ethidium Bromide
Tris-HCl	Tris(hydroxymethyl)aminomethane hydrochloride
MTT	3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide
HMBATSC	2-Hydroxy 3-Methoxy Benzaldehyde Thiosemicarbazone
AA	Ascorbic acid
CT-DNA	Calf thymus DNA
PUC19 DNA	Plasmid DNA PUC19
SC	Supercoiled DNA
NC	Nicked circular DNA

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