

TABLE OF CONTENTS

Acknowledgments	I
Table of contents.....	II
List of figures.....	V
List of tables.....	VII
List of schemes	VIII
List of abbreviations	IX
Abstract.....	XI
المُلخَص بالعربية (Arabic abstract).....	XII
1 INTRODUCTION	1
1.1. General introduction.....	1
1.2. General copper chemistry.....	2
1.2.1. Oxidation states of copper	3
1.3. Coordination chemistry of copper.....	4
1.3.1. Metal carboxylates.....	5
1.3.2. Copper carboxylate complexes.....	7
1.3.3. Copper complexes with non-steroidal anti-inflammatory drugs (NSAIDs)	8
1.4. Copper complexes with nitrogen donor heterocyclic ligand.....	10
1.5. Copper containing metalloproteins	11
1.5.1. Types of copper enzymes	13
1.6. Catalytic activities of copper complexes.....	15
1.6.1. Catechol oxidase (CO).....	15

1.6.2. Phenoxazinone synthase	16
1.6.3. Oxidation of <i>o</i> -phenylenediamine	17
1.7. The aim of the present work.....	18
2. EXPERIMENTAL SECTION	19
2.1. Reagents and materials	19
2.2. Physical measurements	19
2.3. Synthesis of copper(II) complexes.....	20
2.3.1. Synthesis of [Cu(sal) ₂ (pz) ₂] (1).....	20
2.3.2. Synthesis of [Cu(nap) ₂ (pz) ₄] (2)	21
2.3.3. Synthesis of [Cu ₂ (nap) ₄ (mtd) ₂] (3).....	21
2.4. X-ray crystallography.....	22
2.5. Biological activity studies	25
2.5.1. Catechol oxidase activity	25
2.5.2. Solvent-dependent catecholase activity	26
2.5.3. Phenoxazinone synthase activity	26
2.5.4. Oxidation of <i>o</i> -phenylenediamine activity.....	27
3. RESULTS AND DISCUSSIONS.....	28
3.1. Synthesis of complexes	28
3.2. Magnetic and spectroscopic results.....	31
3.3. Crystal structure of complexes	35
3.3.1. Crystal structure of complex 1	35

3.3.2. Crystal structure of complex 2	37
3.4. Biological activity studies	39
3.4.1. Catechol oxidase activity	39
3.4.2. Solvent-dependent catecholase activity	45
3.4.3. Phenoxazinone synthase activity.....	47
3.4.4. Oxidation of <i>o</i> -phenylenediamine (OPD) to 2,3-diaminophenazine (DAP)	52
4. REFERENCES	57
5. APPENDICES	61
APPENDIX A: Structure of [Cu(sal) ₂ (pz) ₂] (1).	61
APPENDIX B: Structure of [Cu(nap) ₂ (pz) ₄] (2).	68