

**Physico-chemical studies for the  
determination of some drugs containing  
tertiary amines**

A Thesis Presented

To

**Faculty of Science**

**Cairo University**

By

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**B.Sc. (2005)**

**In Partial Fulfillment for the degree of**

**Master of Science**

**Chemistry**

**2009**

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# Abstract

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**Title of thesis:** Physicochemical Studies for the Determination of Some Drug  
Containing Tertiary Amines

**Degree:** M.Sc., Faculty of Science, Cairo University, 2009

This work has been carried out to investigate the spectrophotometric and potentiometric studies on the determination of lamivudine, dothiepin and aripiprazole in bulk drug and in commercial dosage forms.

This thesis comprises four main parts for physicochemical studies on determination of the above drugs. The first part is based on kinetic investigation of the oxidation reaction of lamivudine with alkaline  $\text{KMnO}_4$  at room temperature for a fixed time of 20 min. The second part involves the direct titration of lamivudine and dothiepin with NBS and NBP and the end point is determined potentiometrically.

A proposal of the oxidation reaction pathway is postulated. The third part includes a simple and sensitive spectrophotometric method for the determination of aripiprazole through charge-transfer complexation reaction using 2,3-dichloro-5,6-dicyano-p-benzoquinone (DDQ) or iodine reagent. The fourth part was concerned with ion-associate formations with bromocresol green (BCG) and bromocresol purple (BCP) for the determination of aripiprazole and dothiepin. A more detailed investigation of the complex was made with respect to its composition, association constant and free energy change. Besides, spectral characteristic of the ion-associate complexes was calculated as: oscillator strength ( $f$ ), transition dipole moment ( $\mu_{\text{EN}}$ ), resonance energy of the complex and ionization potential of the drug.

The described methods were utilized for assaying the investigated drugs in pharmaceutical preparations and the results obtained were compared statistically at 95 % confidence level.

Keywords: Lamivudine; dothiepin; aripiprazole; spectrophotometry; potentiometry.

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## STATEMENT

This thesis is submitted in partial fulfillment of the requirements of M. Sc Degree. In addition to the work carried out in this thesis, the candidate has accomplished with success the post graduate studies during the academic year 2007-2008, in the following topics:

- 1- Molten salts and Metallurgy
- 2- Adsorption
- 3- Nuclear Chemistry
- 4- Inorganic Reaction Mechanism
- 5- Molecular Structure Elucidation
- 6- Advanced Analytical Chemistry
- 7- Quantum Chemistry
- 8- Physical Polymer
- 9- Solar Energy
- 10- X- Ray and Thermal Analysis
- 11- Colloids and Catalysis
- 12- Chelatimetry
- 13- Electrode Kinetics
- 14- Group Theory
- 15- Thermodynamics
- 16- Modern Electrochemistry
- 17- Statistical Thermodynamics
- 18- Cyclic Voltammetry
- 19- Advanced Inorganic Chemistry
- 20- German Language

## ***Acknowledgment***

*I wish to express my sincere gratitude to Prof. Dr. **Ahmed Galal** Professor of Physical Chemistry and Dean of Faculty of Science, Cairo University, Giza, Egypt and Prof. Dr. **Fatma M. Abdel Gawad**, Professor of Analytical Chemistry, National Organization for Drug Control and Research, Giza, Egypt, who guided this work and helped whenever I was in need.*

*I am much indebted to them for the follow-up and revision of the thesis.*

*I am also grateful to the group members in Cairo university laboratory for their support and their comradeship; especially to Ass. Prof. Dr. **Nada Farouk Ahmed**, associate professor of physical chemistry, Chemistry Department, Faculty of Science, Cairo university, for her continuous encouragement and discussion*

*My thanks are also due to Dr. Mona Abdel- Moaty, Magda M. Ibrahim and shereen Musa Researchers of Analytical Chemistry, National Organization for Drug Control and Research, Giza, Egypt, for kind guidance, valuable advices and sincere help.*

*I acknowledge the financial support by the national organization for drug control and research which support what I needed in my work*

*Finally, I would like to express my deepest gratitude for the constant support, understanding and love that I received from my dear father, mother and my fiancé during the past years.*

***Eman Fathy Mohamed***

## LIST OF ABBREVIATIONS

**UV-vis:** Ultra-violet and visible

**NBS:** N-bromosuccinimide

**NBP:** N-bromophthalimide

**CT:** Charge transfer

**DDQ:** 2,3-dichloro-5,6-dicyano-p-benzoquinone

**BCG:** Bromocresol green

**BCP:** Bromocresol purple

**KMnO<sub>4</sub>:** Potassium permanganate

**H<sub>2</sub>SO<sub>4</sub>:** Sulphuric acid

**HCl:** Hydrochloric acid

**CH<sub>3</sub>COOH:** Acetic acid

**NaOH:** Sodium hydroxide

**I<sub>2</sub>:** Iodine

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