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

A Thesis Presented

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By
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Approval Sheet for Submission

Title of M.SC. Thesis: "Physico-chemical studies for the determination of some drugs containing tertiary amines".

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Abstract

Name: Eman Fathy Mohamed

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 $KMnO_4$ 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 (μ_{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.

Supervisors: **Signature:**

1-Prof. Dr**. Ahmed Galal Helmy**

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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

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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$_4$: Potassium permanganate

H$_2$SO$_4$: Sulphuric acid

HCl: Hydrochloric acid

CH$_3$COOH: Acetic acid

NaOH: Sodium hydroxide

I$_2$: Iodine

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