



Ain Shams University

Faculty of Science

Chemistry Department

**Utility of Variable Analytical Methods for Micro
Determination of Some Antidepressant**

ATHESIS

Submitted

By

Emam Ahmed Ali Mohammad

M.Sc. Chemistry (2011)

Submit for the degree of doctor of philosophy in science
(Analytical Chemistry)

Chemistry Department

Faculty of Science

Ain Shams University

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This Thesis has been approved for submission by the supervisors

Prof. Dr. Mohamed .F. El-Shahat

Prof. of Analytical and Inorganic Chemistry

Faculty of Science, Ain Shams University

Prof. Dr. Alaa .S. Amin

Prof. of Analytical Chemistry

Faculty of Science, Benha University

Dr. Ahmed.M. Adawi

Expert of Toxicology and Drugs

Director of Beni-Suef lab- Forensic Medical Authority-

Ministry of justice

Head of Chemistry Department

Faculty of Science Ain Shams University

Prof. Dr. Ibrahim.H.A.Badr

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Emam Ahmed Ali

Abstract

This thesis contains three main parts. The first part includes a simple and sensitive spectrophotometric method for determination of Tramadol hydrochloride, Mianserin hydrochloride, Fluoxetine hydrochloride, Clomipramine hydrochloride and Dothiepin (Dosulepin) hydrochloride through ion-associates formation with phenol red (PhR), cresol red (CR), bromocresol green (BCG), metanil yellow (MY), methyl orange (MO) and bromothymol blue (BTB). The absorbance of each ion-associate was measured at maximum wavelength. Different factors were studied as pH, temperature and interfering ions to establish the best conditions for the determination. Comparison of the results of the proposed methods with those of official ones and complete validation study were also performed. The second part is based on thin layer chromatography methods for the detection of the above drugs. This method is analytical technique for the separation and identification of drugs due to its simplicity (it requires a less sophisticated apparatus), low cost, and need for minimal sample cleanup.

The third part is spectrophotometric method based on second order derivative for simultaneous determination of Tramadol

hydrochloride (TD) and Clomipramine hydrochloride (CLO) in combined dosage form and in some biological samples.

The proposed method was found to be simple and sensitive for the routine quality control application of TD and CLO in biological samples.

The fourth part is spectrophotometric methods for detection of ultra-traces of some toxic metal ions such as Cu (II), Pb (II), Hg (II) and Cd (II) in post-mortem biological samples. The procedure depends on single-step detection and removal for metal ions based on dithizone (Dz) anchored on mesoporous TiO₂ with rapid colorimetric response and high selectivity for the first time. Statistical comparison of the results with the reference method shows excellent agreement and indicates no significant difference in accuracy and precision.

Key words: Tramadol, Mianserin, Fluoxetine, Clomipramine and Dothiepin (Dosulepin) hydrochloride spectrophotometry, ion-associates complexes, thin layer chromatography, Copper, Mercury, Lead, Cadmium and Mesoporous.

Abbreviation	Full name
BTB	Bromothymol blue
BCG	Bromocresol green
CLO	Clomipramine hydrochloride
CR	Cresol red
DAD	Diode-array detector
DO	Dothiepin (Dosulepin) hydrochloride
DZ	Dithizone-probe
FESEM	Field Emission Scanning Electron Microscopy
FLU	Fluoxetine hydrochloride
GC	Gas chromatography
HPLC	High performance liquid chromatography
HR-TEM	High resolution transmission electron microscope
LOD	Limit of detection
LOQ	Limit of quantification
MY	Metanil yellow
MO	Methyl orange
MIN	Mianserin hydrochloride
PhR	Phenol red
RSD	Relative standard deviation
TLC	Thin layer chromatography
TD	Tramadol hydrochloride

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