Analytical studies on clomipramine and paroxetine hydrochloride drugs

Presented by

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ABSTRACT

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This work has been carried out to investigate the spectrophotometric determination of Paroxetine (PRX) and clomipramine (CLO) antidepressant drugs in pure and pharmaceutical preparation so the spectrophotometric methods involve the reaction of these drugs through ion pair reaction with Mo(V)-thiocyanate binary complex and inorganic complexes like iron(III)-thiocyanate followed by their extraction in the organic phase (1,2–dichloroethane or methylene chloride) and determination by absorption spectrometry. The sensitivity of these procedures for the spectrophotometric determination of these drugs has been improved and the optimum practical conditions for the analysis of these antidepressant drugs are selected. In additions the second part of this research is the formation of ion selective electrode for PRX and CLO drugs. Ion selective electrodes are a technology that gives direct measurement of these drugs. Time consuming steps such as filtrations, weightings and distillation are not required in most cases. Concentrations can be read out directly on a pH/MV/ION meter, or can be read from a constructed calibration curve. Electrochemical methods save time, and since electrodes are portable.

Keywords: Paroxetine, Clomipramine, Mo(V)-thiocyanate binary complex, iron thiocyanate, ion-pair formation reaction, ion selective electrodes.

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Mohamed Abdel-Razik Mohamed

Abbreviation

PRX	Paroxetine
CLO	Clomipramine
SSRIs	Selective serotonin-reuptake inhibitors
5-HT	5-Hydroxytryptamine
PVC	Polyvinylchloride
TCAs	Tricyclic antidepressants
SNRIs	Serotonin-norepinephrine reuptake inhibitors
HPLC	High performance chromatography
UV	Ultra violet
LC-MS/MS	Liquid chromatographic – tandem mass spectrometric method
QC	Quality control
BDD	Boron-doped diamond
TLC	Thin layer chromatographic method
ESI	Electrospray ionization
SBSE/LC	Stir bar sorptive extraction and liquid chromatography
NSAIDs	Non-steroidal anti-inflammatories
LOD	Limit of detection
LOQ	Limit of quantification
CV	Coefficient of variation
WW	Waste waters
PPY	Poly (pyrrole)
SWAdSV	Square-wave adsorptive-stripping voltammetry
FIA-SWAdSV	Flow-injection analysis with SWAdSV detection.
HMDE	Hanging mercury drop electrode
FIA	Flow-injection analysis-
OCD	Obsessive-compulsive disorder
Rf	Retardation factor
TCNQ	Tetra-cyanoquinodimethane
cvm	Continuous variation method
mrm	Molar ratio method
MRM	Multiple Reactions Monitoring

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Aim of the present work

In the recent years, many scientists have interested on account of the rapid valuation in the field of drug research industry. These include research work applying modern techniques and new methodologies of analysis. They tried to develop more selective and sensitive methods for antidepressant drug analysis. It is important in this field of research to develop new analytical techniques, and / or modify the already existing procedures, in order to follow up the test of purity of pharmaceutical compounds. Studying the properties of pharmaceutical compounds, via interaction with organic compounds, leads to results actually of analytical importance. Paroxetine (PRX) and clomipramine (CLO) antidepressants are the active ingredients of many pharmaceutical preparations concerned with the treatment of the obsessive compulsive perturbation states of phobia and panic as well as in depression and other emotional disturbances and major depressive, obsessive compulsive, generalized anxiety, social anxiety, post traumatic stress disorders. The medical importance of the antidepressant drugs under investigation, encourage us to suggest new methodology for the determination of these drugs. In the present work, a search for new spectrophotometric procedures is carried out on the various reactions of those drugs with Mo(V)-thiocyanate binary complex and inorganic complex $Fe(SCN)_6^{3-}$ to improve the sensitivity of these procedures for the spectrophotometric determination of these drugs. Many factors such as time, temperature and reagent concentrations were thoroughly investigated. The effect of these factors on the above mentioned reactions was studied, and the principal underlying the determination of PRX and CLO were investigated carefully in order to select the optimum practical conditions for the analysis of these antidepressant drugs.

The other part involves fabrication of ion selective electrode for PRX and CLO drugs determination. Ion selective electrodes are a technology that gives direct measurement of these drugs. These electrodes are rigid, inexpensive and characterized by its small size. ISEs presented here are based on polyvinylchloride (PVC) membrane supported with electro-active ion pair complexes. Time consuming steps such as filtrations, weightings and distillation are not required in most cases. Electrode methods save time, and since electrodes are portable, measurements can be made on a laboratory bench, the bank of a river or pond, the floor of a manufacturing plant, or the tray of a truck.