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NOTE

Spectrophotometric Determination of Citalopram in Pharmaceutical Formulations

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A simple UV spectrophotometric method for the analysis of citalopram either in pure form or in pharmaceutical formulations has been developed. The drug was dissolved in methanol to get a clear solution having λ_{max} 240 nm. The method obeys Beer's law in the concentration range 4–40 μg/mL.

Key Words: Spectrophotometric determination, Citalopram, Pharmaceutical formulations.

Citalopram (CTM) is an antidepressant belonging to a new class of drugs which enhance serotoninergic neurotransmission through potent and selective inhibition of serotonin reuptake. CTM has a molecular formula $C_{20}H_{21}FN_2O$ and chemically it is 1-[3-(dimethyl amino) propyl]-1-(4-fluorophenyl)-1,3-dihydro-5-isobenzofuran-carbonitrile. Literature survey revealed the presence of HPLC[1] method and gas chromatographic[2] method for its estimation. Hence a simple and accurate UV spectrophotometric method was developed for routine analysis of CTM formulations. CTM was dissolved in methanol to get a clear solution having maximum absorbance at 240 nm.

Elico UV-Visible spectrophotometer SL 159 was used for all the measurements. Methanol (AR grade) (E. Merck, Mumbai) was used for the estimation.

About 50 mg of pure CTM was weighed accurately and dissolved in 50 mL methanol to obtain a stock solution of 1 mg/mL. From this stock solution, 5 mL was pipetted into a 50 mL volumetric flask and the volume was made up with methanol to obtain a solution having a concentration of 100 μg/mL. From this solution 1 mL was transferred into a 10 mL volumetric flask and volume made up to the mark with methanol (10 μg/mL). The absorbance of the solution was scanned over the range of 220–370 nm against the reagent blank. The λ_{max} of the spectrum was found at 240 nm.

Calibration of standard Curve

CTM in methanol having concentrations of 4, 8, 12, 16, 20, 24, 28, 32, 36 and 40 μg/mL were prepared and their absorbances were measured at 240 nm.

Estimation of CTM in Pharmaceutical Formulations

Four different brands of CTM tablets labelled A and B (40 mg) were taken for estimation purpose. 20 Tablets of each brand were accurately weighed and powdered. Powder equivalent to 100 mg of the drug was extracted with 25 mL portions of chloroform three times successively and filtered. The filtrate was evaporated on a boiling water bath at 90°C for 20 min . The residue was dissolved in 100 mL methanol to get a concentration of 1 mg/mL. From this stock solution, sequential dilutions as described in the above procedure were performed to get a final solution having a concentration of 10 μg/mL. The absorbances were measured at 240 nm. The results obtained are summarized in Table-2.

Since commercial tablets used were coated, it is necessary to remove the excipients. Hence the formulations were extracted with chloroform before estimation. The optical characteristics and absorption parameters together with the regression equation for calibration plot are given in Table-1.

TABLE-1
OPTICAL CHARACTERISTICS AND PRECISION OF THE PROPOSED METHOD

Parameters	Method
λ_{max}	240
Beer's law limit (μg/mL)	4–40
Molar absorptivity (L mol^{-1} cm^{-1})	1.04×10^2
Correlation coefficient	0.9998
Slope	1.01×10^{-2}
Intercept	1.08×10^{-2}
Regression equation*	Y = 0.0102 + 0.0102 (X)
% Relative standard deviation†	0.312
Sandell's sensitivity (μg/cm^2/0.001 absorbance unit	0.023

*where X is the concentration of CTM in μg/L and Y is the absorbance at 240 nm.
†Average of six determinations.

TABLE-2
DETERMINATION OF CTM IN PHARMACEUTICAL FORMULATIONS

Dosage form	Label claim in mg/tablet	Drug content by proposed[a] method (mg)	Drug content by reported[a] method	Standard deviation	Percentage recovery[b] (± S.D.)
Tablet A	40	40.01	40.02	0.0379	100.52 ± 0.8714
Tablet B	40	40.02	40.04	0.0454	100.37 ± 0.0523

[a]Average of five determinations.
[b]Recovery of 5 mg added to previously analyzed pharmaceutical dosage forms.

The proposed method is simple, inexpensive, accurate and reproducible and can be used for the routine determination of CTM in bulk drug and in dosage form

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