

QUANTITATIVE ESTIMATION OF LEVOFLOXACIN IN DIFFERENT DOSAGE FORM: A REVIEW

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ABSTRACT

Levofloxacin is a broad-spectrum antibiotic that is active against both Gram-positive and Gram-negative bacteria. Levofloxacin is a fluoroquinolone anti-infective. This article reviews the quantitative determination of Levofloxacin in different dosage forms. The most commonly adopted methods for the determination of Levofloxacin are HPLC, Spectrofluorimetric and spectrophotometric methods. A Simple, rapid, selective and sensitive HPLC method was developed and validated for the determination of levofloxacin. The main advantage of the method is less expensive and time required for the quantification is reduced. A spectrofluorimetric method to determine levofloxacin is proposed and applied to determine the substance in tablets and spiked human urine and serum. A simple uv spectrophotometric method was developed by using a solvent system of acetonitrile, water and methanol.

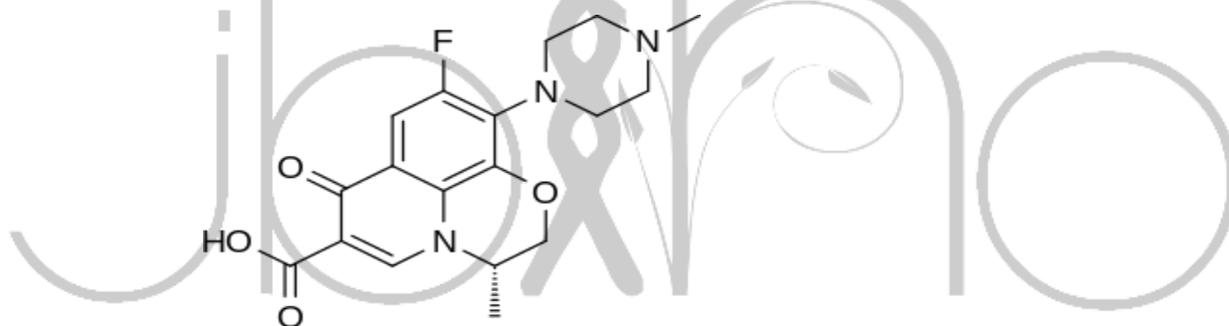
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INTRODUCTION

Levofloxacin is a broad-spectrum antibiotic that is active against both Gram positive bacteria and Gram negative. It is the L-isomer of the racemate, ofloxacin, a quinolone antimicrobial agent. It functions by inhibiting DNA gyrase a type II topoisomerase, and topoisomerase IV, which is an enzyme necessary to separate replicated DNA, thereby inhibiting cell division.^[1] It is Light yellowish-white to yellow white crystal and soluble in water and methanol. It is used to treat various infectious diseases such as community acquired and

nosocomial pneumonia, skin structure infection, urinary tract infections or sepsis.^[2] Several analytical techniques have been used for the determination of levofloxacin in different matrices, including adsorptive square wave anodic stripping voltammetry, flow injection analysis with absorption photometric, potentiometry and conductometry detection.^[3] However, these methods do not present selective signals to discriminate a single analyte in mixtures, so separation procedures or multivariate calibration algorithms are needed.



levofloxacin

Methods used for determination of levofloxacin include

- Spectrofluorimetric method
- HPLC method
- UV- photometric method^[4]

In this article, quantitative estimation of levofloxacin are compared over the data available for last 10 years studies.

SPECTROFLUORIMETRY

Used for recording fluorescence emission and absorption spectra. All spectral excitation-emission matrices (EEM) were

obtained in the excitation range from 240 to 370 nm and in the emission range from 380 to 550 nm.^[5] Two spectrofluorimetric methods are proposed to determine levofloxacin in pharmaceutical tablets and spiked human urine. The first method allowed the determination of levofloxacin in aqueous solution using univariate (zero order) calibration. The second method used parallel factor analysis with standard additions for the determination of levofloxacin in urine. The scores, related to levofloxacin, were used to quantify

levofloxacin in human urine, using linear regression and the standard additions method.^[6] The use of spectrofluorimetric methods for determining drugs in biological fluids is difficult due to the presence of natural fluorescent interferences. In the last years, different strategies to circumvent this problem have been proposed, by combining spectrofluorimetric data and three way chemometric tools, mainly parallel factor analysis (PARAFAC). Therefore, in some cases, tedious preliminary steps can be avoided, replacing the physical separation of interferences by a mathematical separation of their signals. This approach aimed at a minimal sample manipulation. For the determination of LEVO in pharmaceutical tablets, a traditional univariate (zero order) calibration was used. (PARAFAC) is a commonly used method for modeling fluorescence excitation-emission data (EEM). The mathematical model behind PARAFAC agrees with the physicochemical model that generates spectrofluorimetric data. It decomposes the fluorescence signals into trilinear components according to the number of fluorophores present in the samples.

HPLC METHOD

HPLC is a chromatographic system that can separate a mixture of mixes and is utilized as a part of natural chemistry and scientific science to distinguish measure and refine the individual segments of the mixture^[7]. It depends on pumps to pass a pressurized liquid dissolvable containing the example mixture through a segment

loaded with a strong adsorbent material. Reversed phase HPLC (RP-HPLC) has a non-polar stationary phase and a watery, tolerably polar mobile phase. One basic stationary phase is silica which has been surface-adjusted with RMe₂SiCl.^[8] .C18 column is usually used. Detection was performed at 220 nm in the case of levofloxacin with Ambroxol were as in assay methods use determination of levofloxacin by HPLC at 294 nm.^[9] RP-HPLC method with UV detection for determination of levofloxacin has been developed. The main purpose of this study was to develop a simple, reliable and economical method to determine levofloxacin in a relatively short time with high linearity and low cost in bulk drug, pharmaceutical formulations and in serum.^[10] Shimadzu 2010 C integrated high performance liquid chromatographic system was used for this experiment.^[11] RP-HPLC method with metal interaction studies was applied to study the In vitro availability of levofloxacin in presence of various elements essential to the human body, like magnesium, calcium, chromium, copper Zinc and iron.^[12]

UV- SPECTROPHOTOMETRY

UV-Visible spectrophotometry refers to absorption spectroscopy or reflectance spectroscopy in the ultraviolet-visible spectral region. It includes measuring the measure of bright or obvious radiation consumed by a substance in arrangement.^[13] UV spectrophotometric analysis was performed spectrophotometrically at 280-290 nm. The method was validated for linearity,

accuracy, precision, reproducibility, and specificity as per International Conference on Harmonization (ICH) guidelines.^[14] Generally quartz cells in uv. Most spectrophotometric methods in the literature for analysis of levofloxacin is based on the formation of ion-complexes, which use dye as Eriochrome black, bromophenol blue, bromocresolgreen, eosin, merbromin and chromogenic reagent such as Folin-Ciocalteu. Recently an UVS method was proposed with acetonitrile as solvent for the quantitative determination of levofloxacin in tablets and solution.¹³ This solvent is more toxic and more expensive.^[15]

CONCLUSION

Presented systematic review discusses about various methods for the quantitative determination of levofloxacin in different dosage forms. The most commonly adopted methods for the determination of Levofloxacin are HPLC, Spectrofluorimetric and spectrophotometric methods. A Simple, rapid, selective and sensitive HPLC method was developed and validated for the determination of levofloxacin. The main advantage of the method is less expensive and time required for the quantification is reduced. The simplified methodology consisted of distilled water in case of UV and it is fast, simple, cost-effective with high precision, and accuracy. In case of fluorimetry the application of the univariate (zero order) calibration method gave good results for levofloxacin determination in pharmaceutical samples.

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