Analysis of Tablets for Gatifloxacin Content Using Spectrophotometry

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ABSTRACT

Now a simple, rapid, precise, and exact spectrophotometric method may be used to assess the concentration of gatifloxacin in various dose forms. An orange-colored chromogen is generated when gatifloxacin reacts with a ferric nitrate reagent solution, with a maximum absorption wavelength of 470 nm compared to blank. There was linearity between 20 and 200 g/ml, and the chromogen was stable for up to an hour at room temperature.

INTRODUCTION

It is a fluoroquinolone antibacterial drug, gatifloxacin (1-cyclopropyl-6-fluoro-1,4-dihydro-8• methoxyl-7-(3-methyl-1-piperazinyl)-4-oxo-3• uinolinecarboxylic acid)1. UTI, acute bacterial sinusitis, community acquired pneumonia, and acute bacterial aggravation of bronchitis2 are some of the conditions for which it is often prescribed. To combat Streptococcus pneumoniae and penicillin-resistant Pneumococci, the antibacterial drug Gatifloxacin has been developed. Anaerobic pathogen Bacteriodes fragilis and oral anaerobes3 may also be treated with it. It's a tablet that isn't listed in any Pharmacopoeia. It's accessible. Spectrophotometric methods4 and HPLC, HPTLC, and LC-MS have been used to analyse the drug's formulation and biological fluids, respectively, in the literature.

A spectrophotometric approach based on the generation of orange chromogen as a result of ferric nitrate-reagent reduction by gatifloxacin is described in this study. This method is simple, fast, accurate, and exact. Its maximal absorption wavelength is 470 nm. Colorimetric estimate has been effectively performed using ferric nitrate reagent, according to a review of the literature8.

Estimation was performed using a Shimadzu 1700 UV spectrophotometer and matching 1 cm couvettes. The medication was dissolved in distilled water to make a standard solution (1000 g/ml). In order to manufacture the reagent, 5 percent nitric acid was used. A mortar and pestle were used to grind up twenty gatifloxacin pills. Transferred to a volumetric flask, dissolved in 100 ml of 100 mg distilled water was used as a sample solution after it was sonicated for 30 minutes. Corning test tubes were used for the transfer of standard solution aliquots ranging in volume from 0.2 to 2.0 ml; the addition of 0.50 mg of ferric nitrate reagent. Each test tube was filled with 10 ml of distilled water once the reaction had completed for 2 minutes. Calibration curves were constructed by comparing the absorbance of the solutions to that of a reagent blank. Sample solution absorbance was measured, and the quantity of gatifloxacin was estimated by comparing it to the calibration curve, as was done for the corresponding solution. The suggested approach was used to conduct recovery tests, which included adding a known amount of pure medication to the pre-analyzed formulation. It was determined how much of the substance had been recovered based on how much was detected.

Ferric nitrate oxidises gatifloxacin in the method's proposed redox reaction. It was discovered that the molar absorptivity of gatifloxacin was 1.8910103 l/mol.cm and the Sandell sensitivity was 0.1878 g/cm2/

Absorbance of 0.001 units. The equation y = 0.0154+0.0053x, which has a correlation coefficient of 0.9995, was obtained using a linear regression of absorbance on concentration. Analysis of six duplicate samples revealed a relative standard deviation of 0.0016, showing accuracy and repeatability. In accordance with Beer's law,

gatifloxacin has an absorption maximum of 470 nm and a concentration range of 20-200 g/ml. Table 1 displays the findings of the analysis and recovery studies. Having a recovery percentage of 99-99.5 percent implies that the excipients in the formulation have no effect. Gatifloxacin in bulk and formulations may now be routinely tested for quality control using the newly established technology, which has been shown to be sensitive, accurate, precise, and repeatable.

TABLE 1: RESULTS OF ANALYSIS AND RECOVERY STUDIES

Formulations	Label claim (mg)	Amount found[a] (mg)				% Rec
		Proposed method	C.O.V.	S.E.	Reference method[b]	
Gatilox (Sun Pharma)	400	399.24±0.49 t = 2.02 F = 1.21	0.49	0.24	398.60±0.54	99.
Gatispan (Lupin)	200	199.48±0.46 t = 1.75 F = 1.18	0.46	0.23	198.95±0.50	99.

[a]Average ± SD of four determinations. SE: Standard Error. COV: Coefficient of Variation. The t- and F- values refer to comparison of the propose with the reference method. Theoretical values at 95% confidence limits, t = 2.31, F = 10.29, [b]Spectrophotometric method (λ_{max}: 455 nm in 1% v ammonium sulphate)

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