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Degradation Study of Different Brands of Moxifloxacin by UV-Spectroscopy

H. Kavya Reddy², A.Venkatesh³, A. Raja Reddy^{1*}

Pharmaceutical Analysis, CMR College of Pharmacy, JNTUH, Hyderabad-501401, Telangana, India

Corresponding Author: A. Raja Reddy

ABSTRACT

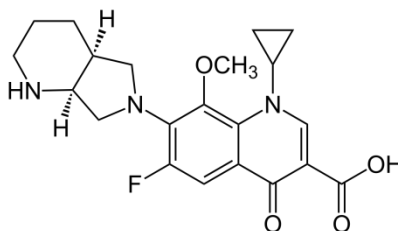
Moxifloxacin is the wide range antibiotic effective against the (-ve) bacteria and (+ve) bacteria. The drug Shows maximum absorption at 293nm and obeys Beer-Lambert's law. The forced degradation studies Conducted for the determination of degradation of drug product. According to ICH guide line moxifloxacin exposed to different Condition. Degradation amount of the drug product can be calculated with the help of UV Spectrophotometer. According to USP /BP the official test limits should not less then (%) and should not more then (%). On exposure to acidic and basic medium of Avelox, Izilone and Moxiget the forced degradation Studies Conducted. Observed negligible difference in availability on exposure to UV and heat during the forced degradation Studies of the drug substance. This method is simple, less time consuming and Cost effective. For the simultaneous quantitative analysis of the Avelox, Izilone and Moxiget this method also can be successfully employed.

Keywords: Moxifloxacin, UV Spectroscopy, forced degradation.

INTRODUCTION

Moxifloxacin Hydrochloride (MOX) is a fourth generation fluoroquinolone broad spectrum antibiotic agent used in conjunctivitis [4, 5]. Moxifloxacin (1-cyclopropyl-7-[(1S, 6S)-2,8-diazabicyclonon-8-yl]-6-fluoro-8-methoxy-4-oxoquinoline-3-carboxylic acid, monohydrochloride) is a fourth generation Synthetic fluoroquinolone Chemotherapeutic agent (1). Chemical formula of

moxifloxacin is $C_{21}H_{24}F.N_3O_4.HCl$ and have molecular weight of moxifloxacin is 437.9. It possesses excellent activities against a variety of different types of Gram negative (*Streptococcus pneumoniae* and *Staphylococcus aureus*), Gram-positive (*Enterobacteriaceae* family, and *Pseudomonas aeruginosa*) and anaerobic bacteria (*Bacteroides* and *Clostridium*)⁹. Its activity against atypical bacteria of *Chlamydia* spp., *Mycoplasma* spp., and *Legionella* spp. genera and bacilli of genus *Mycobacterium* is of high value³.



Structure of Moxifloxacin

MATERIALS AND METHODS

Reagents

Analytical grade reagents were used 1N sodium hydroxide, 1N hydrochloric acid and ethanol was used.

Glasswares

Volumetric flask, funnel, beakers, Measuring Cylinder, Pipette, used were of Pyrex type and were washed with chromic acid followed by thorough washing with water and finally rinsed with double distilled or deionized water which was freshly prepared in the laboratory.

Instruments

- Spectrophotometer: PG Instrument (T80 UV/vi's Spectrometer) along with a pair of 5 cm quartz
- Corvettes
- Weighing Balance: Pioneer OHAIUS (Item PA214C)
- Water Bath: DT; Digital constant temperature tank HH-4
- UV Lamp: Power: 8N, LF-204.LS ,Serial N 045571, 4W254 nm, 4W-365 nm. UV, Visible 1601 Shimadzu double beam spectrophotometer was used for measurement of spectra. The Solvent, which is used for the assay was distilled water.

Wavelength Selection

About 250 ppm of Moxifloxacin was accurately prepared in distilled water. The wavelength maxima (λ_{max}) was observed at 238 nm and this wavelength was adopted for absorbance measurement.

Preparation of Standard Stock solution

The Standard stock solutions of MOX were prepared by dissolving 25mg of drug in 100mL of ethanol in 100mL volumetric flask, final volume was adjusted with ethanol to get 250 μ g/mL. The drug shows maximum absorption at 293nm.

Preparation of Sample Solution

The five different brands were purchased from a different Public medical store located in Hyderabad. 5 Tablets were crushed into fine powder and 43.75 mg of fine powder was transferred to a 100 ml volumetric flask by making up the solution with ethanol to get 250 μ g/mL.

Preparation of 1N Sodium hydroxide

Weigh 40 gm of NaOH, dissolve in small quantity of water taken in a 1000 ml volumetric flask and make up the volume upto mark with de ionized water.

Preparation Of 1N Hydrochloric Acid

Take 8.36 ml analytical grade hydrochloric acid (37%, 12N) in a 100 ml volumetric flask and add de-ionized water to make up the volume.

Standard Stock Solution

The five different brands were purchased from a different Public medical store located in Hyderabad.

EFFECT OF ACID

To Study the effect of acid, take 5 ml of 250 ppm solution of each brand in five Separated test tubes then 5ml of 1N HCl is added in each test tube. They were then left for a period of 30 minutes. Upon completion of time period, solutions were transferred to a cuvette Separately and then absorbance of the solutions was recorded .

EFFECT OF BASE

To study the effect of acid, 5 ml of 250 ppm solution of each brand in five Separated test tubes then 5 ml of 1N NaOH is added in each test tube. The samples were then left for a Period of 30 minutes. Upon completion of time period, solutions were transferred to a cuvette separately and then absorbance of the solutions was recorded⁵.

EFFECT OF UV LIGHT

To Study the effect of UV light, take 5 ml of 250 ppm solution of each brand in five separated test tubes then 5 ml water is added in each test tube and place these solutions in UV light of 365 nm for 30 min and absorbance of the solutions was recorded .

EFFECT OF HEAT

To Study the effect of heat, take 5 ml of 250 ppm Solution of each brand in six Separated test tubes each containing 5 ml of water, then place these solutions in water bath for 30 min and absorbance of the Solutions was recorded⁶.

Showing The Effect Of Acid

S.No	Brand Name	Absorbance	% Assay
01	Moxif-400(torrent pharma)	2.502	101.2
02	Mahaflox-400(man kind pharma ltd)	2.515	101.8
03	Moxicip(cipla)	2.523	102.1
04	Moxinow(lupin)	2.542	102.9

Showing the effect of base

S.No	Brand Name	Absorbance	Wavelength
01	Moxif-400(torrent pharma)	2.437	98.6
02	Mahaflox-400(man kind pharma ltd)	2.434	98.5
03	Moxicip(cipla)	2.452	99.2
04	Moxinow(lupin)	2.447	99.0

Showing the effect of UV light

S.No	Brand Name	Absorbance	Wavelength
01	Moxif-400(torrent pharma)	2.535	102.6
02	Mahaflox-400(man kind pharma ltd)	2.541	102.8
03	Moxicip(cipla)	2.544	102.9
04	Moxinow(lupin)	2.523	102.1

Showing the effect of heat

S.No	Brand Name	Absorbance	Wavelength
01	Moxif-400(torrent pharma)	2.452	99.2
02	Mahaflox-400(man kind pharma ltd)	2.468	99.9
03	Moxicip(cipla)	2.459	99.5
04	Moxinow(lupin)	2.473	100.1

RESULTS AND DISCUSSION

This research was Performed with the Purpose to Compare the degree of degradation in four different brands of moxifloxacin 400 mg. The limit of assay by USP specified that the content should not be less than 95% and not more than 105% of labelled amount⁸.

CONCLUSION

According to USP and BP specification the official limit of the Content should NLT (%) and NMT (%) of the labelled amount. We have Concluded from our studies that 4 Brands of moxifloxacin degrades in acidic and in UV light and where as little degradation also arise with time, while in basic medium and heat.

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