METHOD DEVELOPMENT AND VALIDATION OF GRISEOFULVIN IN ITS BULK AND PHARMACEUTICAL DOSAGE FORM BY USING UV-VISIBLE SPECTROSCOPY

[1]M.Suneetha, [2]B.Siva sai kiran, [3]A.Sandhya, [4]M.Mahesh, [5]S.Muneer

[1,3]Students, [2,4,5]Assistant Professor
Department of Pharmaceutical analysis,
JNTUA - Oil Technological and Pharmaceutical Research Institute,
Ananthapuramu - 515001, A.P, India.

***Abstract*: The goal of the present study is to develop and validate an analytical method forthe estimation of Griseofulvinin bulk and tablet dosage form by using UV-Visible spectroscopic technique. The selection of the solventwas carried out on the basis of solubility and stability factors upon which drug was fully solubilised and stable for sufficient time. Ethanol is used as solvent. Beer Lambert's law obeyed over a concentration range1-6 µg/ml. Griseofulvinshowedabsorption maxima (λmax) at 295 nm. The LOD and LOQ were calculated as0.03, 0.10µg/ml. respectively. The result analysis was validated statistically and recovery studiesconfirmed the accuracy and precision of the proposed method. The developed method can be effectively applied for the qualitycontrolanalysis of Griseofulvin bulk and in tablet dosage form.**

***Keywords*: Griseofulvin, Ethanol, ICH guidelines.**

I. INTRODUCTION:

Griseofulvin is an antifungal antibiotic and derived from the mold Penicillium Griseofulvum. Griseofulvin is used in the treatment of ringworm infections of the skin, hair, and nails. namely: tinea corporis, tinea pedis, tinea cruris, tinea barbae, cradle cap or other conditions caused by Trichophyton or Microsporum fungi[1-2].The drug binds to tubulin, interfering with microtubule function, thus inhibiting mitosis. It binds to keratin in keratin precursor cells and makes them resistant to fungal infections. The drug reaches its site of action only when hair or skin is replaced by the keratin-griseofulvin complex[3]. From the extensive literature survey no methods for estimation of griseofulvin were reported.[4-10].The developed method to be validated in accordance to ICH Q2 (R1) guidelines[11-12].

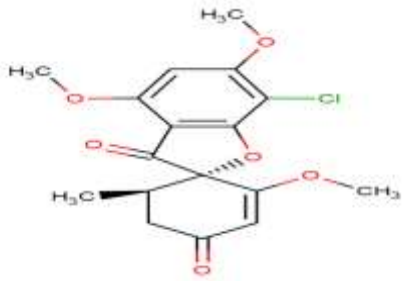

Fig. No.1:Chemical structure of Griseofulvin

II. MATERIALS AND METHODS:

An analytically pure sample of Griseofulvin was procured as gift sample fromGlaxosmithkline pharma limited, Bangalore, India. Dosage formulation [Grisovin FP-250 mg],Pro laboratories Formulation Pvt. Ltd. India] was procured from a local pharmacy with labelled amount250mg per tablet. Ehanol was used as solvent for estimation of Griseofulvin and Distilled water is used as diluent.

Instrument used:

For the current study UV/VIS double beam spectrophotometer Shimadzu 1800 incorporated with UV probe software, enabled with deuterium lamp.

METHODOLOGY

Preparation of standard stock soluti0n:

Griseofulvin.Pure 100 mg was weighed and transferred to a 100 ml volumetric flask and dissolved in ethanol. It was dissolved properly and diluted up to the mark with diluent to obtain final concentration of 1000 µg/ml. 5µg/ml solution was prepared from the stock solution was prepared using diluent, which was used as working standard.

Preparation of sample solution:

Weightablet dosage form accurately drug equivalent to 25 mg of drug Griseofulvin. and transfer into 25 ml volumetric flask and dissolve in ethanol, the contents were sonicated for 5 min to enhance solubility of the drug and then finally made up to the volume. From this aliquot of 20 µg mL-1 was prepared and used.

III. RESULTS AND DISCUSSION:

Griseofulvin exhibits maximum absorbanceat 295nm. Beer's law was obeyed in the concentration range of 1 to 6µg/ml. Interday and intraday studies showed high degree of repeatability of an analytical method under normal operating conditions. The accuracy of the method was determined by investigating the recovery of the drugs using spiked concentrations of the standard drug. The results were tabulated in the following tables.

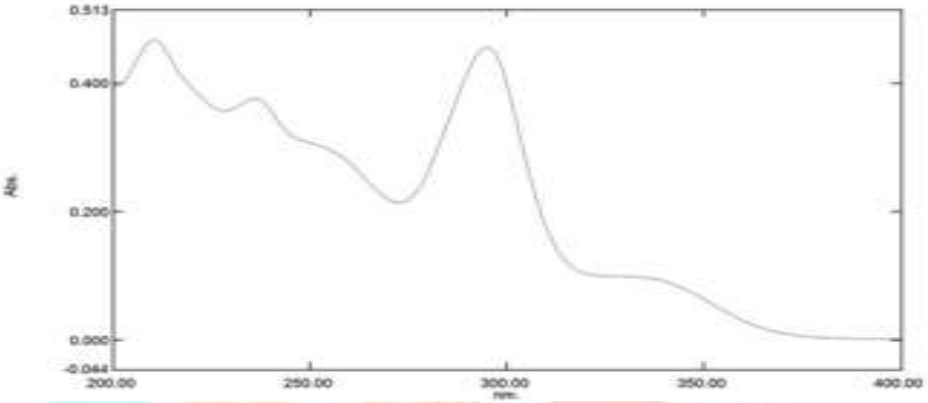

Fig. No.2: UV spectra of Griseofulvin showing absorbance at 295 nm

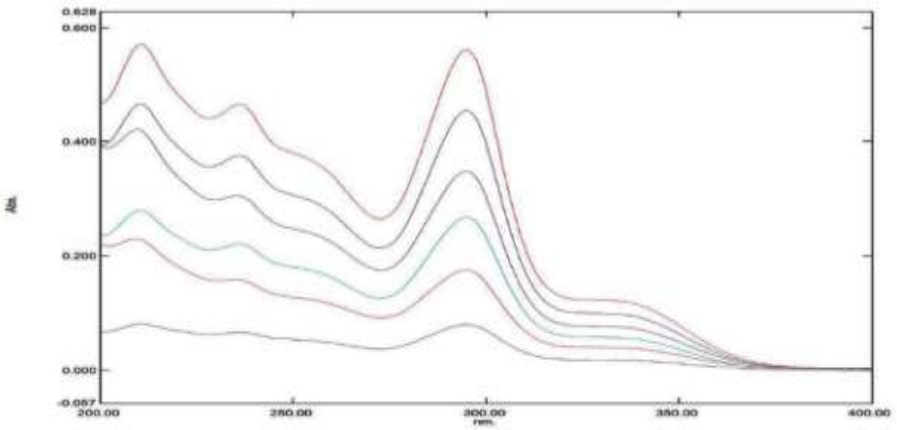

Fig No.3: Overlay spectra of Griseofulvin

Table No.1: Results of Calibration curve at 295 nm for Griseofulvin

S.No	Concentration (µg/ml)	Absorbance
1	1	0.080
2	2	0.176
3	3	0.268
4	4	0.349
5	5	0.455
6	6	0.540

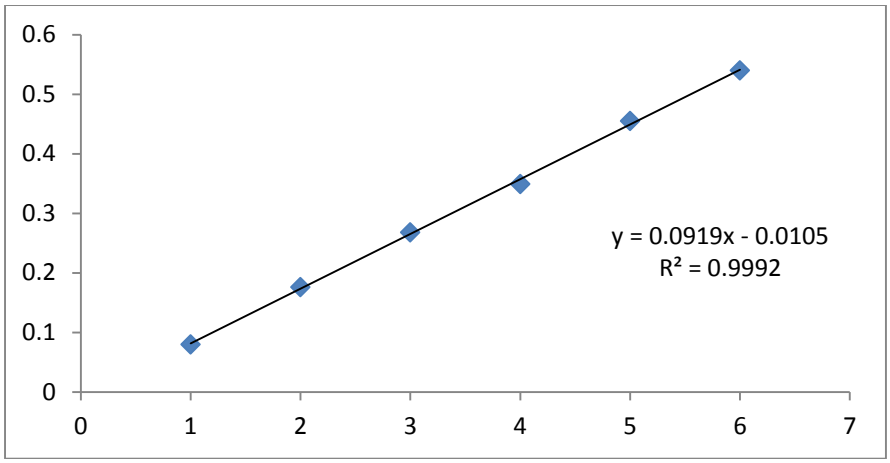

Fig. No.3:Calibration curve for Griseofulvin

Table No.2:Precision results of Griseofulvin

S.No	Precision	
	INTRA DAY	INTER DAY
1.	0.456	0.456
2.	0.457	0.457
3.	0.456	0.457
4.	0.456	0.456
5.	0.455	0.458
6.	0.458	0.456
Mean	0.456	0.456
Std Dev	0.00094	0.00075
% RSD	0.20661	0.16322

Table No. 3: Determination of Accuracy results for Griseofulvin

S. No	Spike Level	Absorbance	µg/ml Added	µg/ml Found	% Recovery
1	80 %	0.348	7.933	7.648	96.40
2	100 %	0.455	9.934	10	100.88
3	120 %	0.541	11.865	11.89	100.20

Table No.4: Results for Detection and Quantification limits

S. No	Validation parameter	Result
1	Limit of detection (LOD)	0.03 µg/ml
2	Limit of Quantification (LOQ)	0.10µg/ml

Table No. 5: Results of Robustness studies

S. No	Robust condition	Parameter	Absorbance	% RSD
1	Wave length ± 2 nm	293nm	0.453	0.10
2		295 nm	0.455	0.17
3		297nm	0.458	0.10

Table No.6: The Total Summary of Method development and validation Parameters

S No.	PARAMETERS	RESULTS
1.	Absorption Maxima (nm)	295 nm
2.	Beer's-Lambert's range (µg/ml)	1-6
3.	Regression equation (y)	Y = 0.091x + 0.010
4.	Slope (b)	0.091
5.	Intercept (a)	0.010
6.	Correlation coefficient (r^2)	0.999
7.	Intraday precision (% RSD)	0.20
8.	Interday precision (% RSD)	0.16
9.	Accuracy (% mean recovery)	99.16
10.	Limit of detection (µg / ml)	0.03
11.	Limit of quantification (µg / ml)	0.10
12.	Assay of tablets (%Purity)	99.34

Y = bx + a where x is the concentration of Griseofulvin in mcg / ml and Y is the absorbance at the respective λmax.

IV. CONCLUSION:

A novel, simple and cost effective spectrophotometric method for the quantitative estimation of Griseofulvin in bulk drug and pharmaceutical formulations have been developed. From the recovery studies non interference of excipients was observed. Hence the method was found to be precise, robust and accurate. The developed method can be successfully used for routine analysis of Griseofulvin in its pure and pharmaceutical formulation.

AKNOWLEDGEMENT

I thank Glaxosmithkline pharma limited, Bangalore, India,for providing a gift sample of Griseofulvin. I acknowledge Prof. K.B. ChandraSekhar, Director, JNTUA-OTPRIfor providing necessary facilities to carry outthis research work.

REFERENCES:

1..Arun Kumar Dash and Debananda Mishra, 2012. Method Development, validation and stability study of Griseofulvin in bulk and pharmaceutical dosage form by uv spectrometric

Method..Asian J. Pharm. Res, 2(1): 66-69.

2.Griseofulvin,www.wiki.ency.in…

3..Griseofulvin,www.drug bank .in.

4.Praddep mishra,Shilpi pathak,G.P.Agarwal, 2016. Development and validation of stability indicating assay for Griseofulvin by rp-hplc in tablet dosage form. Int J Pharm Pharm Sci,8(3):131-134.

5.Shachi A. Mehta, Komal Trivedi, Mandev B. Patel, 2015. Development and Validation of Stability Indicating Analytical Method for Estimation of Griseofulvin in Tablet Dosage Form. J Pharm Sci Bioscientific Res, 5(4):399-403.

6.Selvadurai Muralidharan,Vijayan Venugopal, Jayaraja Kumar, 2015. Bio analytical method development and validation of Griseofulvin nano particles using RP-HPLC.Journal of Young Pharmacists, 7 (4):384-398.

7. Mayank Bapna, Jigisha Patel, 2014. Development and validation of analytical method for estimation of Griseofulvin and preservatives in oral suspension.The Pharmaceutical and Chemical Journal, 1(1):15-22.

8. Bo Wei, Dong Liang and Theodore R. Bates, 2008.Development and Validation of a HPLC Method to Determine Griseofulvin in Rat Plasma: Application to Pharmacokinetic Studies. Analytical Chemistry Insights, :3 103–109.

9. Edward townley, Paul roden, 1980. High-performance liquid chromatographic analysis of griseofulvin in drug substance and solid dosage forms: Separation of impurities and metabolites. Journal of pharmaceutical sciences, 69(5): 523-526.

10.Vincent P. Sica, Evan R. Rees, Edem Tchegnon, Robert H. Bardsley, Huzefa A. Raja, and Nicholas H. Oberlies, 2016.Spatial and Temporal Profiling of Griseofulvin Production in Xylaria cubensis Using Mass Spectrometry Mapping. Frontiers in microbiology, 7: 544.

11. ICH: 12.Q2A, Text on validation of analytical procedure; 1994.

12. ICH: Q2(R1), Validation of analytical procedures: text and methodology; 2005