



Received on 28 November, 2014; received in revised form, 10 April, 2015; accepted, 21 May, 2015; published 01 July, 2015

METHOD DEVELOPMENT AND VALIDATION OF FOLIC ACID BY UV-VISIBLE SPECTROSCOPY

D. B. Throat^{*}, Kalyani Pawar and Paunekar Ashwini

Department of Pharmaceutical Analysis, SND College of Pharmacy, Babhulgaon, Yeola, Nashik-422301, (M.S.), India (Savitribai Phule Pune University, (M.S.), India)

Keywords:

Method validation, water soluble vitamin, Folic Acid, UV-Visible spectrophotometer.

Correspondence to Author:

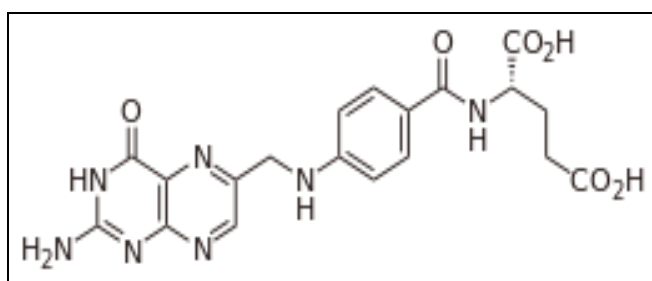
Thorat.D.B.

Department of Pharmaceutical Analysis Snd College of Pharmacy, Yeola, Nashik, S. P. Pune university.

E-mail: dattatraya_thorat@rediffmail.com

ABSTRACT: The present study a simple, accurate, precise and cost effective UV-Visible spectrophotometric method for development and validation of folic acid as vitamin. folic acid is a water soluble vitamin, so solvent used throughout the experiment was chloroform, butanol, 0.1N NaOH, water. the absorption maxima of drug was found at 250nm. Beer's law was obeyed in the range of 5ppm-30ppm. The developed method was successfully validated with respect to linearity, accuracy and precision. The method was validated and shown linearity in mentioned concentration. The percentage relative standard deviation of inter-day and intra-day precision range 45.15%. Hence proposed method was precise, accurate and cost effective, simple and rapid. This validated method can be applicable for quantitative determination of the titled drug with respect to assay for solid dosage form.

INTRODUCTION: The Vitamin (B₆) folic acid is water soluble Vitamin.



FOLIC ACID

IUPAC Name:

(2S)-2-[(4-[[2-amino-4-hydroxypteridin-6-yl)methyl]amino]phenyl)formamido]pentanedioic acid.

<p>QUICK RESPONSE CODE</p>	<p>DOI: 10.13040/IJPSR.0975-8232.6(7).3088-90</p>
<p>Article can be accessed online on: www.ijpsr.com</p>	
<p>DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.6(7).3088-90</p>	

Molecular Formula: C₁₉H₁₉O₆

Molecular Weight: 441.4

Method Development:

Solubility:

Soluble in water, chloroform, Butanol, 0.1N NaOH. And practically insoluble in NaOH, methanol, ether.

Preparation of Stock Solution:

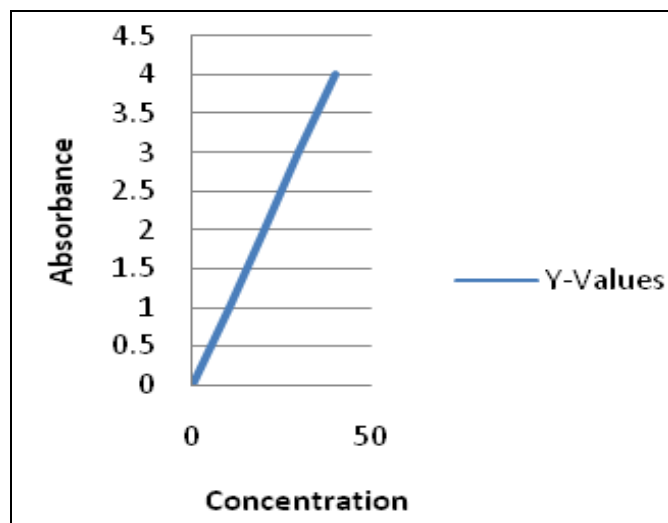
Standard stock solution of folic acid was prepared by dissolving 1.6gm of folic acid in 100ml water which gives 100ppm concentration.

Preparation of Working Standard:

From the above stock solution 1ml pipetted in to 10ml volumetric flask and the volume was made up with water to produce concentration of 10ppm. The solution was scanned in UV-Visible spectrophotometer in the range 600-400nm using water as a blank. The wavelength corresponding to maximum absorbance (λ_{max}) was found as a 250nm.

Method Validation:

Linearity: Various aliquots were prepared from the secondary stock solution (100ppm) ranging from 10ppm-50ppm. The samples were scanned in UV-Visible Spectrophotometer against water as blank. It was found that the selected drug shows linearity between the ranges of 10ppm in **Fig.1**.

**FIG. 1: LINEARITY****Accuracy:**

Solutions were prepared in triplicate at levels 80%, 100% and 120% of test concentration using folic acid working standard as per the test method and taken absorbance of each solution in triplicate. The recovery results showed that the proposed method has an acceptable level of accuracy for

folic acid which is from 80%-120% of test concentration is 99.51% -100.01% in **Table 1**.

Precision:

Precision of the method was demonstrated by intra-day and inter-day variation studies. In intra-day variation study nine different solutions of same concentration 10ppm, 20ppm, 30ppm, were analyzed three times in a day i.e. morning, afternoon and evening and the absorbance is noted. From the absorbance result mean, standard deviation and %RSD was calculated and given in following table. In the inter-day variation studies, solution of same concentration 10ppm, 20ppm, 30ppm, 40ppm, 50ppm.were analyzed three times for the three consecutive days and the absorbance result mean, standard deviation and %RSD was calculated and given in following **Table 2**.

Ruggedness:

Ruggedness of the method was determined by carrying out the analysis by different analyst and the respective absorbance of 20ppm was noted. The result was indicated as %RSD and given in **Table 3**.

RESULT AND DISCUSSION:

The performed experimental work it showed that the result obtained are satisfactory. The Accuracy; Linearity, ruggedness and Precision test of vitamin folic acid are 99% accurate result.

Table 1: ACCURACY

Concentration (%)	Formulation (ppm)	Pure Drug	%Recovery	Mean	SD	%RSD
80	10	8	0.347			
80	10	8	0.043	0.442	0.135	0.67
80	10	8	0.553			
100	10	10	0.428			
100	10	10	0.335	0.626	0.255	1.27
100	10	10	1.115			
120	10	12	0.507			
120	10	12	0.810	0.915	0.388	1.94
120	10	12	1.430			

TABLE 2: PRECISION

Concentration (ppm)	Absorbance	%C.V
10	0.188	274.34
20	0.423	74.12
30	0.720	45.15

**TABLE 3: RUGGEDNESS
ANALYST 1: CHEMITO**

Concentration (ppm)	Absorbance	Stastical Analysis
10	0.333	Mean 0.333
10	0.334	%RSD 0.99
10	0.332	

ANALYST: 2(SHIMADZU)

TABLE 4: SUMMARY OF VALIDATION PARAMETERS OF SIMPLE UV SPECTROSCOPY

Concentration (ppm)	Absorbance	Statistical Analysis
10	0.294	Mean 0.293
10	0.293	%RSD 1.00
10	0.292	

Sr.No	Parameter	Result
1	λ_{max}	250nm
2	Accuracy	1.27%
3	Precision	45.15%
4	Ruggedness	0.33%

CONCLUSION: The method reported above is simple, fast, and suitable for analysis of water-soluble vitamins. Unlike the gas chromatographic and HPLC procedures, the instrument is simple and affordable. The importance lies in the chemical reactions upon which the procedures are based rather than upon the sophistication of the instrument. This aspect of spectrophotometric analysis is of major interest in analytical pharmacy since it offers distinct possibility in the assay of a particular component. The reagents utilized in the proposed methods are cheap, readily available and the procedure does not involve any critical reaction conditions or tedious sample preparation. The method is unaffected by slight variations in experimental conditions such as reagent concentration, temperature. The wide applicability of the new procedure for routine quality control is well established by the assay of

vitamin B₆ (Folic acid). Thus, the proposed validated method can be used for quality control of title material as well as its formulation.

ACKNOWLEDGEMENTS: On the occasion of presenting this work, it is my privilege to express my sincere thanks to SND college of pharmacy Yeola, and my project guide Prof Throat D.B. M.Pharm, Department of Pharmaceutical Analysis, S.N.D College of Pharmacy Yeola, Nasik.

REFERENCES:

1. Indian Pharmacopoeia. Ministry of health and family welfare, Government of India, New Delhi, Vol. 2, 2011, 1012-1013, 1510-1511.
2. British Pharmacopoeia. Her Majesty's Stationery Office, London, UK, Vol.1, 2011:416-417.
3. Beckett AH, Stenlake JB, Practical Pharmaceutical Chemistry, 4th Edition, CBS Publishers, 2002, 276-285.
4. ICH, Q2 (R1) validation of analytical procedures: text and methodology. International conference on harmonization Nov.1996.
5. ICH, Q1A (R2) stability testing of new drug substances and products. International conference on harmonization: Nov.1996.
6. The pharmacokinetics and relative bioavailability of cefadroxil capsules. American Chemical Society, Chemical Abstracts Service Science 2002.
7. British Pharmacopoeia, Vol. 1, the Department of Health, British Pharmacopoeia Commission, London; 2009. (1), 219-222.
8. United States Pharmacopoeia, 26th Edition, (Pharmacopoeia Convention Inc., Rockville, MD, 2007) 2439.
9. Indian Pharmacopoeia, Vol. 2, Govt. Of India, Ministry of Health and Family Welfare, The Indian Pharmacopoeia Commission, Ghaziabad; 2010, pg. 1008.

How to cite this article:

Throat DB, Pawar K and Ashwini P: Method Development and Validation of Folic Acid by UV-Visible Spectroscopy. Int J Pharm Sci Res 2015; 6(7): 3088-90. doi: 10.13040/IJPSR.0975-8232.6(7).3088-90.

All © 2013 are reserved by International Journal of Pharmaceutical Sciences and Research. This Journal licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

This article can be downloaded to **ANDROID OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)