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Research Article

# Spectrophotometric estimation of Nifidipine by using various solvents

**Alagar Raja M*[1], Selva Kumar D[3], Muthu Kumar S[1], Purnima Tripathi[1], Amuthadevi C[2]**

[1]Department of Pharmaceutical Analysis, Kamla Nehru Institute of Management & Technology, Faculty of Pharmacy, Faridipur, Sultanpur, Uttar Pradesh, India
[2]Ultra college of Pharmacy, Madurai, Tamil Nadu, India
[3]Arya Vaidhya Nilayam, Madurai, Tamil Nadu, India

**ABSTRACT**

A Simple and sensitive spectrophotometric method has been developed for the estimation of nifedipine in bulk and tablet formulation. The drug was determined by using various solvents like aqueous, organic and inorganic, which is determined spectrophotometrically at 281nm. The percentage recovery study of the drug for the proposed method range from 98-102% indicating no interference of the tablet excipients by using various solvents. The result obtained for percentage purity of nifidipine was dimethyl formamide and glacial acetic acid was only the solvents indicating the limit of recovery studies.

**Keywords:** Nifidipine, Dimethyl Formamide, Glacial Acetic Acid.

## INTRODUCTION

Nifidipine,(Indian pharmacopoeia,2007,British pharmacopoeia, 2005,)chemically ,3,5,dimethyl 2,6-dimethyl-4-2 (nitro phenyl) -1,4 dihydro pyridine -3,5-dicarboxylate is an long term treatment of hyper tension (high blood pressure) and angina pectoris. It is mainly used in the treatment of diuretics and ACE (Tripathi K. D,) inhibitors although calcium channels antagonists are still favored as primary treatment for older black patients- sub lingual. Nifidipine has previously been used in hypertensive emergencies. Literature survey reveled

(Nafisur Rahman et al, 2005, Ragno G.et al, 2002, Klinkenberg R et al 2003) that the stability indicating liquid chromatographic methods is available for the quantitative estimation of nifidipine in bulk drugs. The spectral characteristic of nifidipine drug in various Solvents (organic, inorganic aqueous) has been also reported .however no UV spectrophotometer method using various solvents is available for the estimation of nifidipine in its pharmaceutical dosage forms. (Augustyniak Wlodzimierz et al 2001, Chatwal Gurdeep R., Saraf M. N et al , 2006, Manglani U.,Khan et al , , 2006, Glombitza Bernard W et al 1994, )

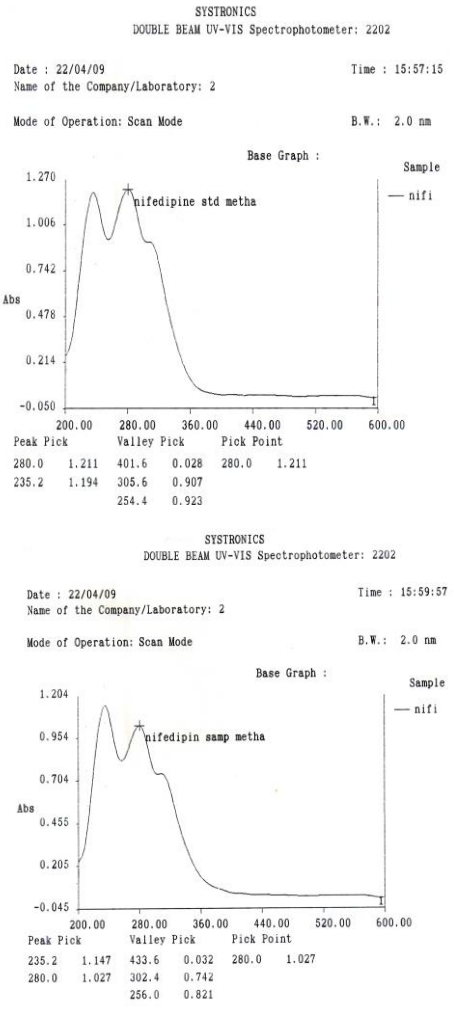


**Figure. 1 Std. & sample drug using methanol**

* Corresponding Author
Email: rajampharman_1982@yahoo.co.in
Contact: +91-9839122006
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**Table. 1 Report for individual solvents**

| S.No | Name of solvent | Drug Name | Amount to be taken | λ max | Absorbance | Percentage Recovery w/v |
|---|---|---|---|---|---|---|
| 1 | Methanol | Nifedipine | 0.269gm | 280nm | 1.027 | 84.81% |
| 2 | Acetone | Nifedipine | 0.269gm | 337.6nm | 0.308 | 71.63% |
| 3 | Glacial Acetic Acid | Nifedipine | 0.269gm | 276.8nm | 0.948 | 100.1% |
| 4 | Dimethyl formamide | Nifedipine | 0.269gm | 276.8nm | 1.103 | 106.77% |
| 5 | Chloroform | Nifedipine | 0.269gm | 281.6nm | 1.261 | 119.3% |

## MATERIAL AND METHODS

Nifidipine was obtained as a gift sample from madras pharmaceuticals Pvt.Ltd. Pondicherry, India.nifidipine tablets were procured from local pharmacy, all the chemicals and reagents were of analytical grade. Double distilled water was used throught the experiment. A systronics UV double beam spectrophotometer (2202) with 1 cm matched quartz cells were used for the estimation.

**Table. 3**

| | |
|---|---|
| Dimethyl formamide | 106.77% w/v, result is in limit. |
| Acetone | 71.63% w/v, result is not in limit. |
| Glacial acetic acid | 100.1% w/v, result is in limit |
| Methanol | 84.81% w/v, result is not in limit |
| Chloroform | 119.3% w/v, result is not in limit |

An accurately weighed 5mg of nifidipine was dissolved in various solvents (like methanol, acetone, glacial acetic acid, DMF, chloroform) in a 100ml volumetric flask and the volume was adjusted to their respective solvents up to the volumetric flask. from this solution pipette out 20ml and make up to 100ml of the same solvent. Finally measure the absorbance of the particular resultant solution by scanning range between 200-400nm.the absorbance of solution was measured at 280nm, 337.6nm, 276.8nm, 281.6nm for their respective solvents. The optical characters are presented in table 1 and figure 1, 2, 3, 4 and 5.

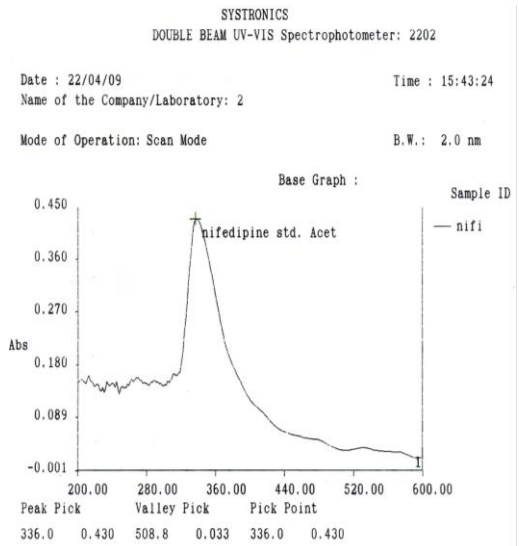
**Table. 2**

| Parameters | Accepted Criteria | Result for Nifedipine | |
|---|---|---|---|
| Solubility Profile | Solvents in which Nifedipine is Soluble or Freely Soluble | Acetone : Freely Soluble<br>DMF : Freely Soluble<br>Glacial acetic acid : Soluble<br>Chloroform : Soluble<br>Methanol : Soluble | |
| Qualitative Analysis (TLC) | Rf Value < 1 for Sample As well as standard. | (Std) Rf = 0.96667<br>(Sample) Rf = 0.94910 | |
| Assay of Nifedipine Sample | 90% to 110% w/v | % Recovery w/v : | |
| | | Methanol | 84.81% |
| | | Dimethyl Form amide | 106.77% |
| | | Chloroform | 119.3% |
| | | Acetone | 71.63 % |
| | | Glacial Acetic Acid | 100.1% |

Twenty tablets of nifidipine were weighed and powdered in glass mortar. The amount equivalent to 25mg was transferred to 100ml volumetric flask and dissolved in methanol and (various solvents) up to 100ml.the solution was filtered through what man filter paper no 41,and filtrate was dilute to obtain concentration in between linearity range. The absorbance of sample solution was measured and amount of nifidipine was determined by using various solvents and their solubility with spectrophotometrically.

## RESULTS AND DISCUSSION

UV spectroscopic determination of Nifedipine by using various solvents was carried out .Solubility profile of the drug was determined in different solvent i.e. Aqueous, Organic, & inorganic. For qualitative analysis of Nifedipine Thin Layer Chromatography (TLC) was carried out. For Quantitative analysis of Reference Standard ( Nifedipine RS ), was performed & for estimation of drug in Sample ( Nifedipine Sustained Release Tablet ) assay was carried out in different solvents i.e. methanol, glacial acetic acid, chloroform,



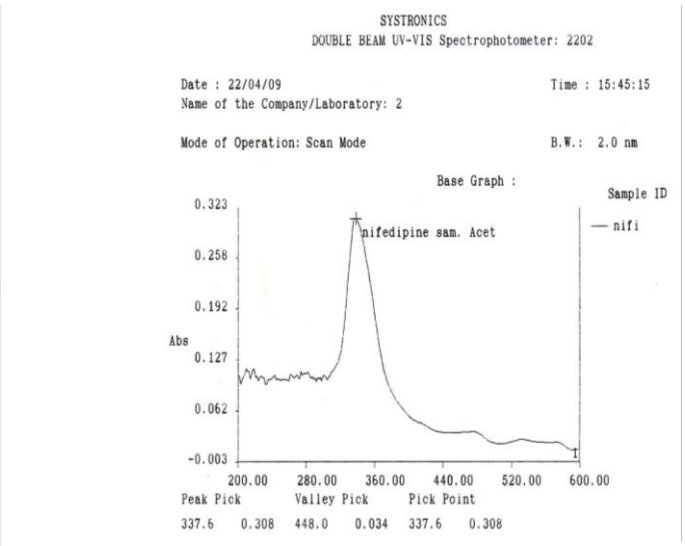
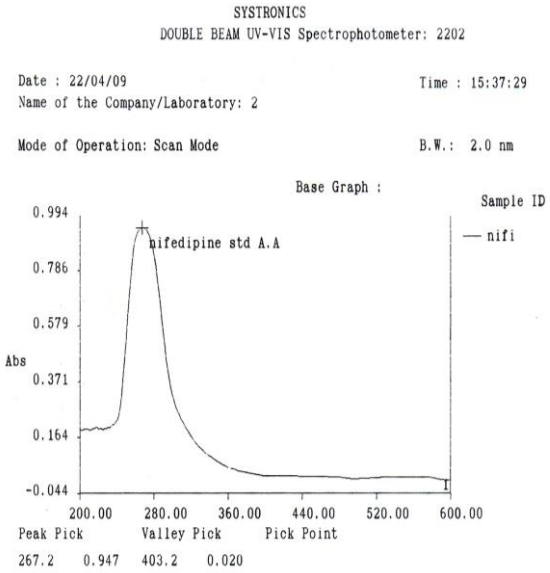




**Figure. 2 Std. & drug using acetone**



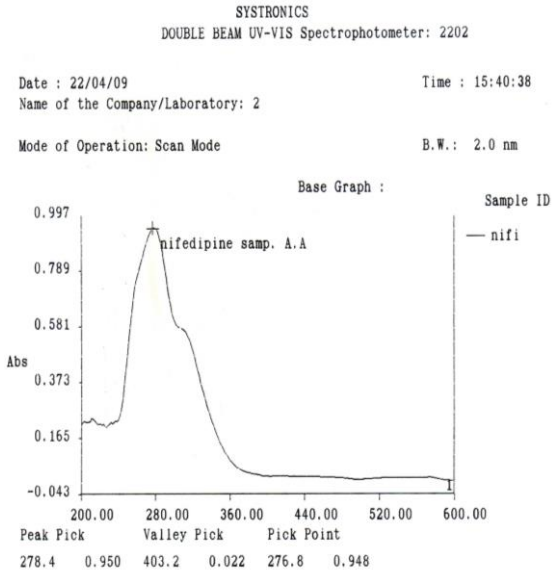
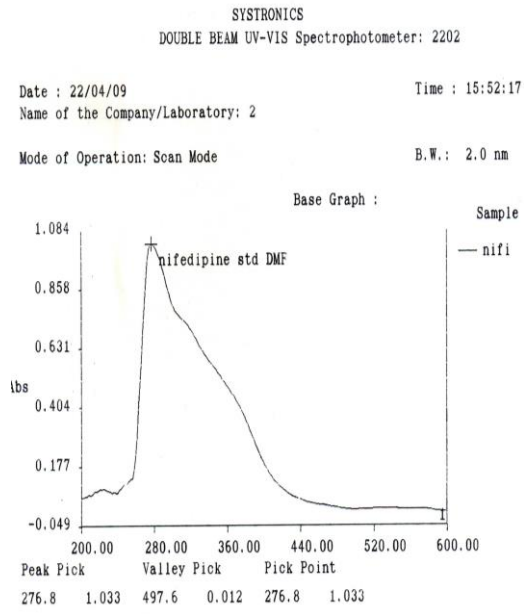




**Figure. 3 Std. & drug using acetic acid**



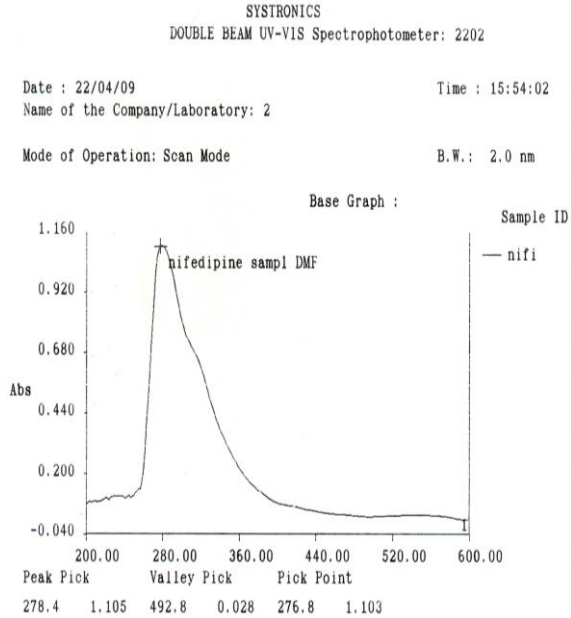




**Figure. 4 Std. & drug using DMF**

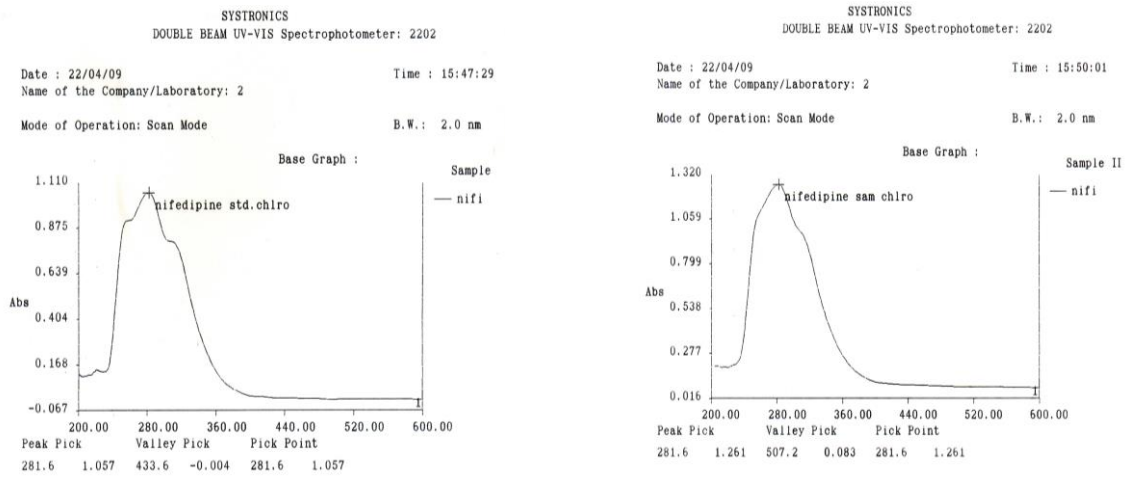



**Figure. 5 Std. & drug using chloroform**

Dimethyl form amide, and acetone. The standard and sample solutions were prepared and U.V Spectrums were recorded and it's presented table 2 and 3

U.V Spectrophotometric determination of Nifedipine, the solubility profile of Nifedipine RS was determined in various solvents. It was observed that-Nifedipine RS was freely soluble in acetone and Dimethyl form amide & soluble in methanol, glacial acetic acid, and chloroform. So these solvents were used further for carrying out estimation of Nifedipine sustained release tablets (sample).

For Thin Layer Chromatography (T.L.C) the RF value should be less than 1 for standard as well as sample solution. It was observed that- RF value for Nifedipine RS was 0.9667 and RF value for Nifedipine sustained release tablets (sample solution) was 0.94910. So, both the results for standard as well as sample were in limit.

The assay of Nifedipine sample (Nifedipine sustained release tablets) the accepted limit is 90% to 110% w/w. Percentage recovery obtained in different solvents.

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