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RP-HPLC and UV-derivative spectrophotometry technique for the simultaneous estimation of ibuprofen and famotidine in pharmaceutical dosage form

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ABSTRACT

A Reversed Phase High Performance Liquid Chromatography and UV – Derivative Spectrophotometric method has been developed for the simultaneous estimation of Famotidine and Ibuprofen in Pharmaceutical dosage forms. For RP – HPLC method, Methanol and 25 mM Heptane Sulfonate Sodium were selected as mobile phase at a flow rate of 1 ml/min using gradient elution. The detection wavelength was set at 267 nm. The responses were linear in the range of 1- 8 µg/ml for Famotidine and 40 – 180 µg/ml for Ibuprofen. The correlation coefficient for both drugs was 0.9991. The percentage recovery of Ibuprofen was 99.72 – 101.8 % and that of Famotidine was 98.2 – 99.33%. The % RSD for the precision studies was below 2%. The UV method was developed in derivative mode setting the detection wavelength for each drug at zero crossing points of the other. Famotidine was analyzed at 226 nm and Ibuprofen at 244 nm. The linearity range for Famotidine is 2- 16 µg/ml with a correlation coefficient of 0.9989 and that of Ibuprofen is 80 – 280 µg/ml with correlation coefficient of 0.9994. The percentage recovery for Ibuprofen was 98.9 – 102.2 and Famotidine was 98.25 – 99.95 % and the % RSD for the precision studies was below 2%.Both methods are reliable, accurate and precise and can be adopted for routine analysis.

Keywords: Ibuprofen, Famotidine, Simultaneous Estimation, High Performance Liquid Chromatography, Derivative Spectrophotometry

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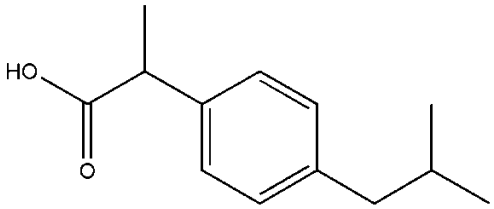
INTRODUCTION

Ibuprofen is chemically (RS) – 2- (4 – isobutyl phenyl)propionic acid and the structure is shown in Figure 1. It is a non steroidal anti inflammatory drug which is used in reducing inflammation and pain associated with many diseases like rheumatoid arthritis, osteoarthritis etc. It acts by inhibiting the cycloxygenase enzyme and thereby reducing the synthesis of prostaglandins.

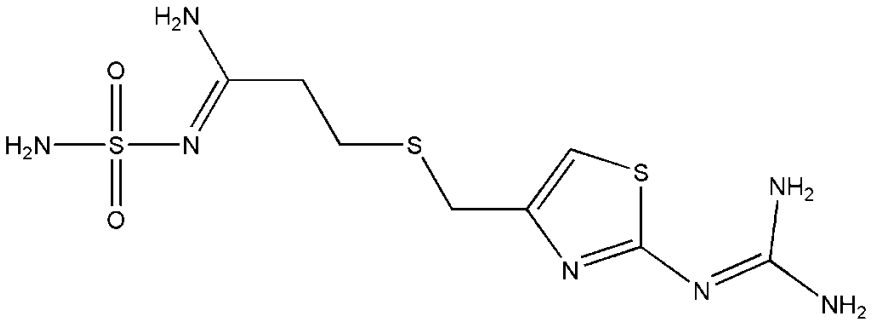
Famotidine is chemically 3-([2-diaminomethyleneamino)thiazol-4-yl]methylthio)-N'-sulfamoylpropinimidamide and the structure is shown in Figure 2. It is an anti histaminic drug which is used in the treatment of gastric ulcers. It is a H_2 – receptor antagonist and reduces the basal and nocturnal gastric acid secretion. A fixed dose combined dosage form of Ibuprofen and Famotidine was indicated for the relief of signs and symptoms of rheumatoid arthritis and osteoarthritis and to decrease the risk of developing upper gastrointestinal ulcers[16]. This combination was

approved for marketing in April 2011.Ibuprofen is helpful in relieving the pain and inflammation associated with arthritis and Famotidine reduces the risk of gastric ulcers which is a side effect in chronic usage of Ibuprofen. There were methods reported for the estimation of Ibuprofen individually or in combination with other drugs, by chromatographic [1,2,3] and spectrophotometric [4,5,6] techniques. Similarly there were chromatographic[7,8,9] and spectrophotometric [10,11] methods for the estimation of Famotidine in combination with other drugs. Very few methods were developed for the simultaneous estimation of Famotidine and Ibuprofen using chromatographic [12,13] and spectrophotometric techniques [14,15]. The peak shapes and system suitability were not complying the standards, so a new method was developed for the simultaneous estimation of both the drugs. The present work concentrates in developing a reverse phase high performance liquid chromatography method and an ultra- violet derivative spectrophotometric method for the simultaneous estimation of Ibuprofen and Famotidine in pharmaceutical dosage form.



2- (4 - isobutyl phenyl)propionic acid

Fig 1 Structure of Ibuprofen



3-([2-(diaminomethyleneamino)thiazol- 4-yl]methylthio)- N'-sulfamoylpropanimidamide

Fig 2 Structure of Famotidine

MATERIALS AND METHODS

2.1 Materials

Pure samples of Ibuprofen (99.92%) and Famotidine (99.95%) were obtained as gift samples from Hetero Laboratories, India and Dr. Reddys' Laboratories, India, respectively. The HPLC instrument used was Agilent LC 1200, Binary pump with a PDA detector. All the solvents required were purchased from Merck, India. For the Derivative Spectrophotometric method, the instrument used was Lab India UV – 3000$^+$ UV/Visible spectrophotometer. The marketed formulation used for analysis is Duexis, Horizon Pharma, containing 800 mg of Ibuprofen and 26.6 mg of Famotidine.

2.2 Analytical method

The present work utilizes two methods for the simultaneous estimation of Ibuprofen and Famotidine.

2.2.1 Method I – Reverse Phase – High Performance Liquid Chromatography

This method utilizes a gradient elution for the analysis of the drugs using a reverse phase mode.

2.2.1.1 Experimental Conditions

The chromatograph system is equipped with a binary pump and PDA detector. The data was obtained through EZ Chrome Elite software. The stationary phase used was a Qualisil Gold C18 column of 250 mm × 4.6 mm I.D. and

particle size of 5 µ. The mobile phase consisted of Methanol and 25mM Heptane sulfonate sodium (pH adjusted to 3.0) and was run in gradient mode at a flow rate of 1 ml/min. In gradient mode of operation, the mobile phase composition was varied from a lower strength to higher strength. The run time was 15 min per run followed by an equilibration of 5 min after every run. The eluate was monitored at 267 nm.

2.2.1.2 Chromatographic method development and Optimization

The detection wavelength was selected by examining the overlain zero order spectra of both drugs. Ibuprofen has a maximum absorbance at 225 nm and Famotidine at 284 nm. Both drugs have shown reliable absorbance at 267 nm. The flow rate was fixed at 1 ml/min and the suitable mobile phase was determined by performing various trials including methanol – water at varying pH and composition, methanol - trifluoroacetic acid, methanol – Heptane sulfonate sodium. A mobile phase composition of Methanol and 25 mM Heptane sulfonate sodium at pH 3.0, run in a gradient mode was found to be suitable. The solvents were filtered and degassed before using. The gradient programme was shown in Table 1.

Table 1: Gradient Programme

Time (min)	%v/v organic phase – Methanol	%v/v aqueous phase –25mM Heptane sulfonate sodium pH 3.0
0	60	40
4.0	60	40
4.5	80	20
15	80	20

2.2.1.3 Preparation of standard solutions

10 mg of Ibuprofen and Famotidine were accurately weighed and were transferred into clean, dry, separate 10 ml volumetric flasks and were dissolved in methanol. The volume was then made up to the mark with methanol. 1 ml from each of the above stock solution was transferred into 10 ml volumetric flask and the volume was made up to the mark with methanol. From these secondary stock solutions, working standards of Ibuprofen and Famotidine were prepared for the optimization of the mobile phase. Individual standard solutions were first injected for the identification of peaks.

2.2.1.4 Method Validation

The method was validated as per ICH guidelines.

Linearity

The linearity of the method was developed by preparing a series of combination dilutions in the concentration range of 40–180 µg/ml for Ibuprofen and 1- 8 µg/ml for Famotidine. The linearity measurement was done in triplicate and the calibration curves were plotted.

Precision

The precision of the method was determined by carrying out six replicate injections at 100 % concentration level. The repeatability and intermediate precision were determined by intra – day and inter – day measurements and the % relative standard deviation (%RSD) was calculated.

Accuracy

The accuracy of the method was determined by the percentage recovery studies. The pre analyzed sample was spiked with pure drug samples at three levels i.e., 80 %, 100 % 120 % in triplicate and the mean percentage recovery and relative standard deviation were calculated.

Detection limit (LOD) and Quantitation limit (LOQ)

The limit of detection and quantitation were determined separately based on the standard deviation of y- intercept of the calibration curve of both drugs. The limit of detection was calculated by formula 3.3sigma/s and limit of quantitation was calculated by the formula 10sigma/s where sigma stands for the standard deviation of y – intercept and ‘s’ is the slope of the calibration curve.

Robustness
The robustness of the method was determined by deliberately modifying the optimized chromatographic conditions and analyzing the drug samples and the effect of modifications was noticed. The slight modifications included – flow rate, mobile phase composition.

Assay of marketed tablets
20 tablets were weighed and powdered. The powder equivalent of one tablet weight that consists of 26.6 mg of Famotidine and 800 mg of Ibuprofen was weighed and transferred into a clean, dry 100 ml flask and extracted with methanol. The working standards were prepared by diluting with the mobile phase such that the concentrations of Famotidine and Ibuprofen were 2.7µg/ml and 80µg/ml respectively. This solution was injected under the optimized chromatographic conditions as in linearity and the amounts of both drugs were calculated.

2.2.2 Method II – UV – Derivative Spectrophotometry
This method utilizes the UV – spectrophotometric technique in derivative mode.

2.2.2.1 Experimental Conditions
The UV – Spectrophotometer operated in scanning and derivative mode with a wavelength accuracy of 1nm. The data was obtained through UV Win software. 1 cm wide cuvettes were used. Ibuprofen was analysed at 244 nm and Famotidine at 226 nm.

2.2.2.2 Selection of Wavelength
The individual zero order spectra of both drugs was recorded using UV – Spectro photometer and the wavelength of maximum absorbance was found to be 225 nm for Ibuprofen and 284 nm for Famotidine. The simultaneous estimation of both drugs in zero order was not reliable as ibuprofen is a weak absorbing species. So derivative spectroscopy was chosen. The zero order spectrum of both drugs was converted into first order (D^1) spectrum and zero crossing points of both drugs were noted.

Both drugs were analyzed at the zero crossing point of the other drug. Ibuprofen was analyzed at 244 nm which is the zero crossing point of Famotidine in its first derivative spectrum and ibuprofen has shown reliable absorbance at that wavelength in first order spectrum. Similarly, Famotidine was analyzed at 226 nm, the zero crossing point of Ibuprofen. Hence the interference of the other drug in analyzing any of the two drugs was minimum.

2.2.2.3 Preparation of standard solutions
20 tablets were weighed and powdered. The powder equivalent of one tablet weight that consists of 26.6 mg of Famotidine and 800 mg of Ibuprofen was weighed and transferred into a clean, dry 100 ml flask and extracted with methanol. The working standards were prepared by diluting with the mobile phase such that the concentrations of Famotidine and Ibuprofen were 2.7µg/ml and 80µg/ml respectively. This solution was injected under the optimized chromatographic conditions as in linearity and the amount of both drugs was calculated.

2.2.2.4 Method Validation
The method was validated as per ICH guidelines.

Linearity
The linearity of calibration curves in pure solutions was checked over a range of 2 - 16 µg/ml and 80 – 280 µg/ml for Famotidine and Ibuprofen, respectively. The working standards were prepared freshly by diluting with water. The mean ± standard deviation, correlation coefficient of the standard curves was calculated.

Accuracy
Accuracy of the method was determined through recovery studies. The pre –analyzed sample was spiked with the reference standards of the drugs at a level of 80%, 100% and 120%. The recovery studies were carried out in three replicates at three different levels and percentage recovery and percentage relative standard deviation were calculated.

Precision
The precision study was carried out by determining the Intra – day and Inter – day measurements of the drugs in three replicates at three concentration levels and the reproducibility and reliability of the results were determined.

Limit of Detection and Limit of Quantitation

The limit of detection and quantitation were determined separately based on the standard deviation of y- intercept of the calibration curve of both drugs. The limit of detection was calculated by formula 3.3sigma/s and limit of quantitation was calculated by the formula 10sigma/s where sigma stands for the standard deviation of y – intercept and 's' is the slope of the calibration curve.

Assay of Tablets

20 tablets were weighed and powdered. The powder equivalent of one tablet weight that consists of 26.6 mg of Famotidine and 800 mg of Ibuprofen was weighed and transferred into a clean, dry 100 ml flask and extracted with methanol. The working standards were prepared by diluting with the water such that the concentrations of Famotidine and Ibuprofen were 4µg/ml and 120 µg/ml respectively. This solution was analyzed at similar conditions as those used for plotting linearity.

RESULTS AND DISCUSSION

3.1 Method I – RP – HPLC

3.1.1 Chromatographic method development and optimization

Preliminary trials were carried out to develop suitable chromatographic condition. The various trials performed were shown in Table 2 and the optimised chromatographic conditions in Table 3. The drugs were analysed under the optimised chromatographic condition and the retention times were found to be 4.204 ±0.114 min for Famotidine and 12.829 ± 0.185 min for Ibuprofen. The blank chromatogram is shown in Figure 3 .The standard and test chromatograms were shown in Figure 4 and 5 respectively.

Table 2 Optimization of Chromatographic Conditions

Trial No.	Column	Mobile phase	Drug	Rt (min)	Asymmetry	Theoretical plates	Remarks
1	C 18 250 × 4.6 mm, 5µ	MeOH : Water – 80 : 20 pH 3.03	Ibu Fam	7.88 2.33	0.94601 1.852	7809 1319	Famotidine eluting at void. Reduced plate number
2	C 18 250 × 4.6 mm, 5µ	MeOH : Water – 80 : 20 pH 6.00	Ibu Fam	4.24 3.19	1.27 1.68	1604 6327	Peak broadened
3	C 18 250 × 4.6 mm, 5µ	MeOH : Water – 60 : 20 pH 3.00	Ibu Fam	- 2.673	- 2.021	- 1185	not eluted for 40 min peak shape was not good, eluting at void
4	C 18 250 × 4.6 mm, 5µ	MeOH : 0.1% TFA 80 : 20 v/v pH 3.26	Ibu Fam	6.52 2.73	1.14 1.42	10402 2029	Famotidine is eluting at void
5	C 8 250 × 4.6 mm, 5µ	MeOH : Water 80 : 20 v/v pH 3.2	Ibu Fam	6.64 2.34	0.94 2.98	7660 4926	Famotidine peak showed tailing
6	C 8 250 × 4.6 mm , 5µ	MeOH : 25mM Heptane sulfonate 80 : 20 v/v pH 3.0	Ibu Fam	6.35 3.28	1.03 2.23	185713 1054	Famotidine peak was distorted
7	C 8 250 × 4.6 mm, 5µ	MeOH : 25mM Heptane sulfonate 60 : 20 v/v pH 3.0	Ibu Fam	- 4.314	- 0.94	- 17786	Not eluted Peak shape was good
8	**C 18 250 × 4.6 mm, 5µ**	**MeOH : 25mM Heptane Sulfonate pH 3.0; 60 :40 – 80 : 20 gradient**	**Ibu Fam**	**13.1 4.4**	**1.04 0.98**	**45005 4364**	**Peak shape and retention Characteristics were good.**

Table 3 Optimized Chromatographic Conditions

Parameter	Condition
Mobile phase	Methanol : 25 mM Heptane Sulphonate sodium
Ratio	60 : 40 – 80 : 20 v/v
Elution mode	Gradient
pH	3.00
Column	C 18, 250 × 4.6 mm, 5 µ
Flow rate	1 ml/min
Injection volume	20 µL
Detector	Photo Diode Array
Detection Wavelength	267 nm
Run time	15 min

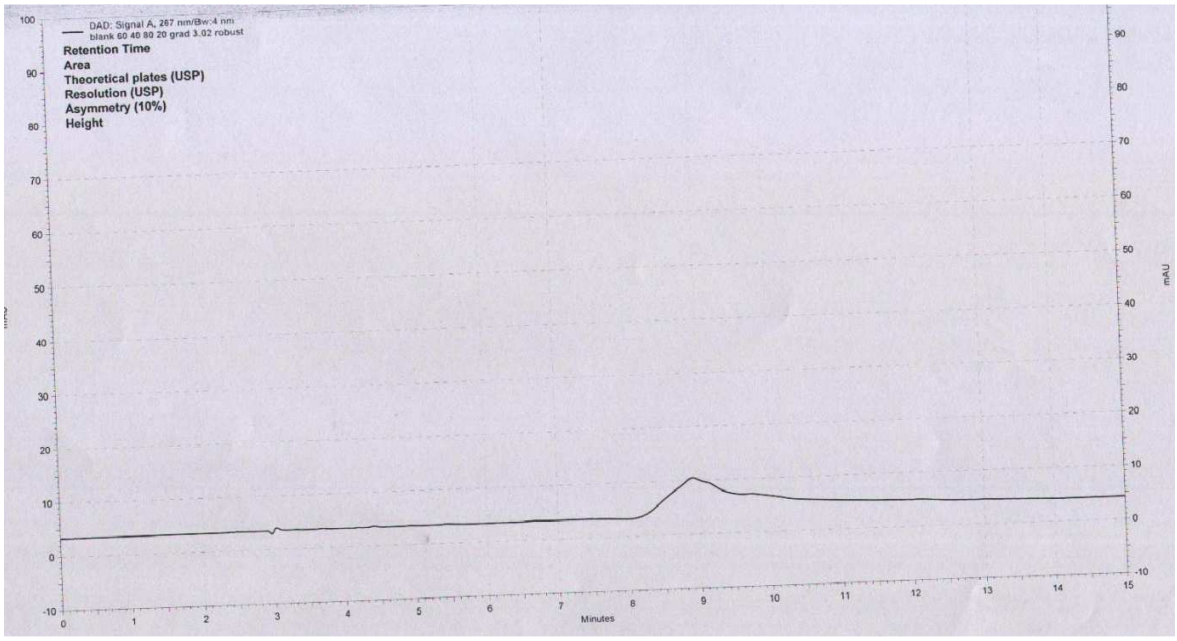


Fig 3 Chromatogram of Blank solution

3.1.2 Method Validation

Linearity

The linearity was determined in the range of 1- 8 µg/ml for Famotidine and 40 – 180 µg/ml for Ibuprofen. The linearity determination was carried out in triplicate. The correlation coefficient for both drugs was found to be 0.999. The regression line equations for these two drugs are:

Famotidine: **$y = 90846x + 15504$ ($n = 3$, $r^2 = 0.9994$)**
Ibuprofen: **$y = 2838.3x + 8092.2$ ($n = 3$, $r^2 = 0.9992$)**

Where y is the peak area and x is the concentration in µg/ml.

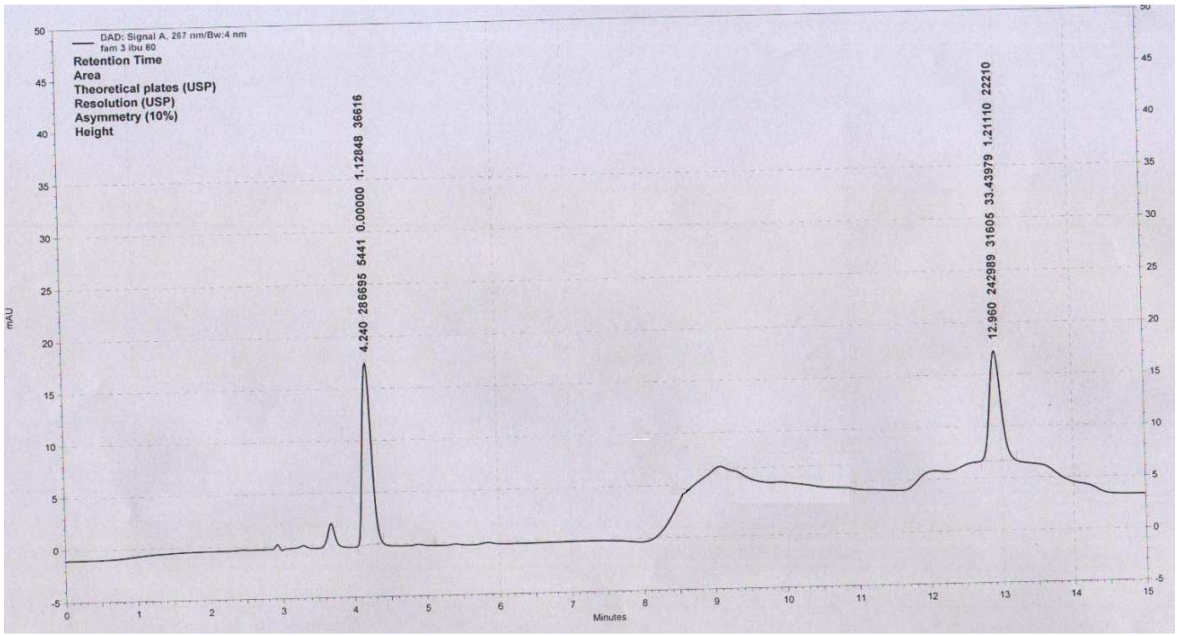


Fig 4 Chromatogram of Standard Solution

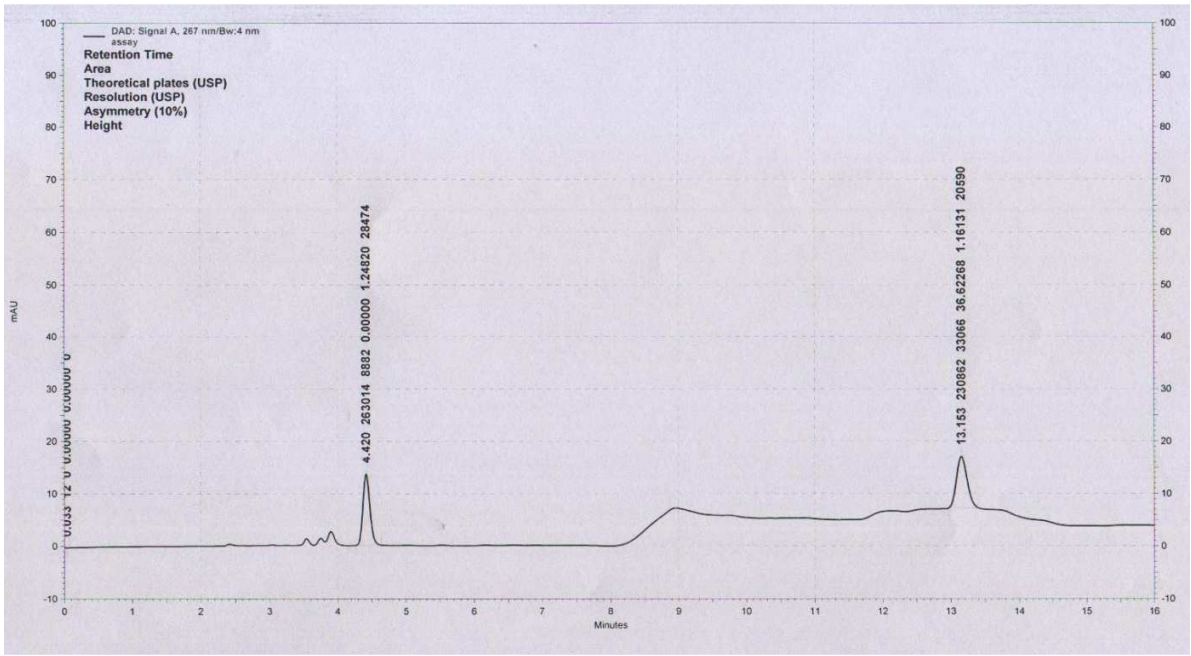


Fig 5 Chromatogram of Test Solution

Accuracy

The accuracy was determined by calculating the percentage recovery at three levels – 80 %, 100 %, 120 % in triplicate. The results obtained showed that the developed method is accurate for the simultaneous estimation of said drugs. The results were recorded in Table 4.

Table 4 Accuracy – Percentage Recover Studies

Drug	Conc. in QC Sample (µg/ml)	Recovery level	Amount spiked (µg/ml)	Peak Area (mean ± S.D)	Total amount found	% recovery	% RSD
Ibuprofen		80 %	64	428840±3160	146.7±1.136	101.8 %	0.7742
	80	100 %	80	468057±7303	162.1±2.558	101.3 %	1.5792
		120 %	96	506298±9261	175.5±3.361	99.72 %	1.9144
Famotidine		80 %	2.16	447920±2571	4.8 ± 0.736	98.8 %	0.7368
	2.7	100 %	2.7	494418±2301	5.3 ± 0.025	98.2 %	0.4772
		120 %	3.24	548755±7758	5.9 ± 0.108	99.33 %	1.8354

Precision

The precision of the method was checked for repeatability and intermediate precision and the results recorded in Table 5 and 6 showed that the method is precise and the results obtained were reliable.

Table 5 Precision – Intra Day

Drug	Concentration (µg/ml)	Peak Area (Mean ± SD) (n = 6)	% RSD
Ibuprofen	80	236151 ± 4553	1.928
Famotidine	3	286644 ± 4790	1.671

Table 6 Precision – Inter Day

Drug	Concentration (µg/ml)	Peak Area (Mean ± S.D) (n = 6)		% RSD
		Day I	Day II	
Ibuprofen	80	236151±4553	242167±4253	1.779
Famotidine	3	286644±4790	294010±5208	1.794

Detection and Quantitaion limits

The detection and quantitation limits were calculated based on the standard deviation of the y- intercept of the calibration curve of both drugs. The detection limit and quantitation limit for Famotidine was found to be 0.106 µg/ml and 0.322 µg/ml respectively. For Ibuprofen the detection and quantitation limit were found to be 1.052 µg/ml and 3.188 µg/ml respectively.

Robustness

The robustness of the method was determined by changing the flow rate and mobile phase composition and the results were recorded in Table 7. The results showed that the results were not affected by small deliberate changes.

Table 7 Robustness

S. No.	Parameter	Modification	Retention time (min)		Asymmetry	
			Fam	Ibu	Fam	Ibu
1	Flow rate (ml/min)	0.8	5.547	15.220	1.23	1.23
		0.9	4.940	14.033	1.19	1.20
		1.0	4.413	13.027	1.16	1.18
		1.1	4.040	12.313	1.19	1.25
		1.2	3.707	11.667	1.25	1.20
2	Mobile phase composition MeOH : 25 mM Heptane Sulfonate Sodium v/v	58:42 –78:22	4.747	14.333	1.21	1.19
		60:40 –80:20	4.413	13.027	1.16	1.18
		62:38 –82:18	4.213	12.113	1.33	1.16

Table 8 System Suitability Parameters

S. No.	Parameter	Values obtained		Acceptance Criteria
		Fam	Ibu	
1	Plate count	7688 ± 3128	38594 ± 17799	>5000
2	Tailing factor	1.06	1.15	≤ 2
3	Asymmetry (10 %)	1.177 ± 0.388	1.207 ± 0.032	0.9 – 1.2
4	Capacity factor	0.727	4.148	0.5 < k < 20
5	HETP	0.031	0.001	--

System Suitability
The system suitability parameters were recorded in Table 8.

Assay of the marketed formulation
The validated method was applied for the assay of the marketed formulation. A final solution containing 2.7 µg/ml of Famotidine and 80 µg/ml of Ibuprofen was injected and the amount was calculated. The results obtained were shown in Table 9.

Table 9 Assay of Marketed Formulation

Formulation	Labelled claim (mg)	Peak Area (Mean ± SD)	Amount found	Assay	% RSD
Duexis	Ibu – 800mg	230405 ± 1556	784.5 ± 3.567	98.06 %	0.4551
	Fam – 26.6mg	261811 ± 1355	27.1 ± 0.153	101.8 %	0.5643

3.2 Method II – UV –Derivative Spectrophotometry
3.2.1 Selection of wavelength
The wavelength for the analysis of each drug was selected in such a way that it was the zero crossing point of the other drug in the first order spectrum. The overlain first order spectrum of both drugs was shown in Figure 6. Ibuprofen was analysed at 244nm and Famotidine at 226 nm.

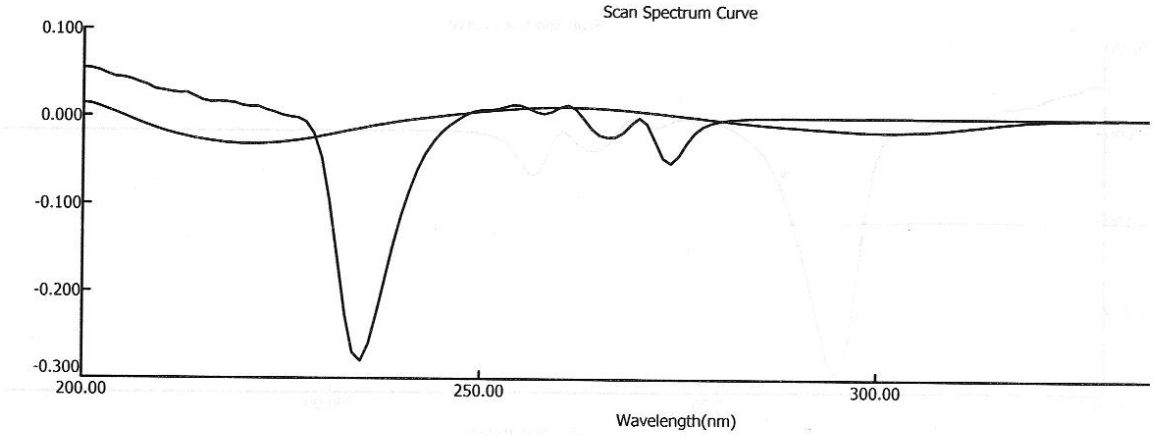


Fig 6 Overlain First Order Spectrum of Ibuprofen and Famotidine

3.2.2 Method Validation
Linearity
The linearity of method was determined in the range of 2- 16 µg/ml for Famotidine and 80 – 280 µg/ml for Ibuprofen. The linearity measurement was carried out in triplicate and the correlation coefficients for both drugs were found to be 0.999. The regression line equation for both drugs was:
Famotidine: **$y = 0.0016x + 0.0004$ (n=3, $r^2 = 0.999$)**
Ibuprofen: **$y = 0.0002x + 0.0036$ (n=3, $r^2 = 0.999$)**

Accuracy
The accuracy of the method was determined by calculating the percentage recovery at three different levels – 80%, 100%, and 120% in triplicate. The results recorded in Table 10 showed that the method was accurate.

Table 10 Accuracy of UV- Derivative Spectrophotometric method

Drug	Conc. in QC (µg/ml)	Recovery level	Amount spiked (µg/ml)	Total amount (µg/ml)	Total Amt found (mean ± SD) (n = 5)	% recovery	% RSD
Ibuprofen	120	80 %	96	216	220.7 ± 2.52	102.2	1.142
		100 %	120	240	241.7 ± 2.52	100.7	1.043
		120 %	144	264	261.3 ± 2.89	98.9	1.106
Famotidine	4	80 %	3.2	7.2	7.197 ± 0.03	99.95	0.431
		100 %	4	8	7.86 ± 0.04	98.25	0.509
		120 %	4.8	8.8	8.68 ± 0.12	98.64	1.382

Precision

The repeatability and intermediate precision were determined by measuring three different concentrations in triplicate and the results tabulated in Table 11 and 12 showed that the method was precise and reliable.

Table 11 Intra- Day Precision of UV – Derivative Spectrophotometric Method

Drug	Concentration (µg/ml)	Absorbance (Mean ± SD) (n = 3)	% RSD
Ibuprofen	120	0.0208 ± 0.00021	0.998
	180	0.0323 ± 0.0006	1.785
	240	0.0443 ± 0.0006	1.354
Famotidine	4	0.0071 ± 0.0001	1.408
	8	0.0131 ± 0.00012	0.916
	12	0.0203 ± 0.00031	1.527

Table 12 Inter – Day Precision of UV- Derivative Spectrophotometric Method

Drug	Concentration (µg/ml)	Absorbance			% RSD
		Day I	Day II	Day III	
Ibuprofen	120	0.0208	0.0214	0.0212	1.634
	180	0.0323	0.0330	0.0325	1.106
	240	0.0443	0.0432	0.0432	1.457
Famotidine	4	0.0071	0.0073	0.0073	1.596
	8	0.0131	0.0134	0.0136	1.883
	12	0.0203	0.020	0.0205	1.242

Detection and Quantitation Limits

The detection and quantitation limits were calculated by standard deviation of y- intercept of the calibration plot of both drugs. The detection and quantitation limit for Famotidine was found to be 0.95 µg/ml and 2.9 µg/ml respectively and for Ibuprofen, the detection and quantitation limit were found to be 2.85 µg/ml and 8.65 µg/ml respectively.

Assay of Marketed formulation

The validated method was applied for the assay of the marketed formulation. The final solution containing 4 µg/ml of Famotidine and 120 µg/ml of Ibuprofen was analysed under standard conditions and the amount was calculated. The results were recorded in Table 13.

Table 13 Assay of Marketed Formulation

S.No.	Formulation	Labelled claim (mg)	Amount found (mean ± SD) (n =5)	Assay	% RSD
1	Duexis	Ibu – 800 mg	813.27 ± 11.55	101.6	1.42
		Fam – 26.6 mg	26.14 ± 0.231	98.27	0.883

CONCLUSION

The present combination of Ibuprofen and Famotidine is recently approved for the treatment of chronic rheumatoid arthritis. As it is a new combination there were no methods for the simultaneous estimation of the drugs. The present work is intended to develop a simultaneous estimation method using both HPLC and UV- Spectrophotometry.

Various trials were carried out for the optimization of chromatographic conditions and the method was developed in gradient elution mode with methanol and 25 mM heptane sulfonate sodium as mobile phase with 1 ml/min flow rate. The pH was adjusted to 3.0 using dilute ortho phosphoric acid. The detection wavelength was set at 267 nm. The linearity was established at 1- 8 µg/ml and 40 -180 µg/ml for Famotidine and Ibuprofen, respectively. The accuracy of the method was determined by percentage recovery studies and was found to be 98.2 – 99.3 % for Famotidine and 99.7 – 101.8 % for Ibuprofen. The method was proved to be precise and robust.

The UV method was developed in first order spectroscopy as both drugs interfere in zero order spectrum. The detection wavelengths were selected such that they are the zero crossing point of the other drug. By this the interference was minimized. Famotidine was analyzed at 226 nm and Ibuprofen was analyzed at 244 nm. The linearity was established at 2 – 16 µg/ml and 80 – 280 µg/ml for Famotidine and Ibuprofen, respectively. The percentage recovery of both drugs was found to be 98.2 – 99.5 % for Famotidine and 98.9 – 102.2 % for Ibuprofen. The method was proved for precision.

Both methods are accurate, precise and reliable. As both the drugs have a better baseline separation, the method can also be extended for the estimation of related substances. The LOD and LOQ values denote that the HPLC method was more sensitive than the UV method. But UV method was simpler. Both methods can be used in routine analysis for the simultaneous estimation of Ibuprofen and Famotidine in pharmaceutical dosage forms.

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