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Development of UV Spectrophotometric Methods for Multicomponent Formulation Containing Paracetamol and Lornoxicam

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Abstract

In present era, market is floated with various combinations dosage forms and the number is increased day by day. These multicomponent formulations are gaining interest due to greater patient acceptability, increased potency, multiple action, fewer side effects, and quicker relief. Therefore, it is desired that these formulations meet the entire standards related to their quality, safety, and efficacy. This can only be possible if different analytical techniques are available for their determination. Different UV spectrophotometric methods are used in simultaneous multicomponent analysis. Such methods are based on recording and mathematically processing absorption spectra. This review is mainly focused on simultaneous equation method, difference spectrophotometry, derivative spectrophotometry, absorbance ratio spectra, derivative ratio spectra, double divisor ratio spectra derivative method, successive ratio - derivative spectra, Q-absorbance ratio method, isosbestic point method, absorpitivity factor method, dual wavelength method, ratio subtraction method, mean centering of the ratio spectra, absorption factor method and multivariate methods. An overview of theories and some applications of these methods are presented.

KEYWORDS: Simultaneous estimation, UV determination, NSAID, Paracetamol, Lornoxicam

Introduction

Combination drug products occupy a time-honored and important role in therapeutics. When rationally formulated, fixed-combination drugs may produce greater convenience, lower cost, and sometimes greater efficacy and safety. [1] Analysis of samples with numerous components presents a major challenge in modern analysis. [2] Multicomponent analysis has become one of the most appealing topics for analytical chemists in the last few years, in fields as clinical chemistry, drug analysis, pollution control etc. [3] Different analytical techniques can be applied for multicomponent analysis including; spectrophotometry, chromatography, and electrophoresis. UV spectrophotometric methods for simultaneous determination of drugs are highlighted in this review.

MATERIALS AND METHOD

Nothing less than AR or HPLC grade compounds were utilised. All of the experiments made use of whatmann filter paper (no.41) and double-distilled water.

Instruments:

For this spectrophotometric approach, we utilised a Shimadzu® UV 1700 double beam UV-visible spectrophotometer in conjunction with a matched pair of quartz cells with a path length of 1.0 cm. For the chromatographic experiments, a Shimadzu® HPLC 1100 series chromatograph was utilised, which is equipped with a binary pump LC-10ADvp, a UV-Visible

detector with a manual injector 7725 I (Rheodyne) with a 20 µl loop, and a reversed phase 5 µ phenomenex ODS C18 column (250×4.6 nm) with a pore size of 100 A°.

1) Preparation of standard solutions:

(A) Preparation of Lornoxicam (LOR) standard solution:

a) Stock solution (A1):

The correct amount of LOR (~25 mg) was measured and added to a 50.0 mL volumetric flask, where it was dissolved in an adequate amount of 0.1 N NaOH. The volume was then filled up to the mark using the same amount of NaOH. The concentration is 500 micrograms per millilitre.

b) Working stock solution (B1):

In a 50.0 mL volumetric flask, 10 mL of stock solution (A1) was transferred and the remaining volume was filled up to the mark with 0.1 N NaOH. Concentration 100 micrograms per millilitre

c) Working standard solution (C1):

0.1 N NaOH was added to 50.0 mL volumetric flask to bring the volume up to the mark after 5 mL of working stock solution (B1) was transferred. (In concentration of 10 µg/mL)

1) **Preparation of Paracetamol (PARA) standard solution:**

a) Stock solution (A2):

The correct amount of PARA, which was measured at around 25 mg, was added to a 50.0 mL volumetric flask, dissolved in an adequate amount of 0.1 N NaOH, and then filled up to the mark with the same amount of NaOH. The concentration is 500 micrograms per millilitre.

b) Working stock solution (B2):

A volumetric flask with a capacity of 50.0 mL was filled to the mark with 0.1 N NaOH after 10 mL of stock solution (A2) had been introduced to it. Concentration 100 micrograms per millilitre

c) Working standard solution (C2):

The volume of the 50.0 mL volumetric flask was filled to the mark with 0.1 N NaOH after 5 mL of the working stock solution (B2) was introduced to it. (In concentration of 10 µg/mL)

1) Selection of Wavelengths:

The LOR and PARA working standard solutions (C1 and C2, respectively) were scanned in the UV range of 200 to 400 nm at 1.0 cm against a solvent blank during the experiment. Figure 6 shows the recoded overlay spectra.a

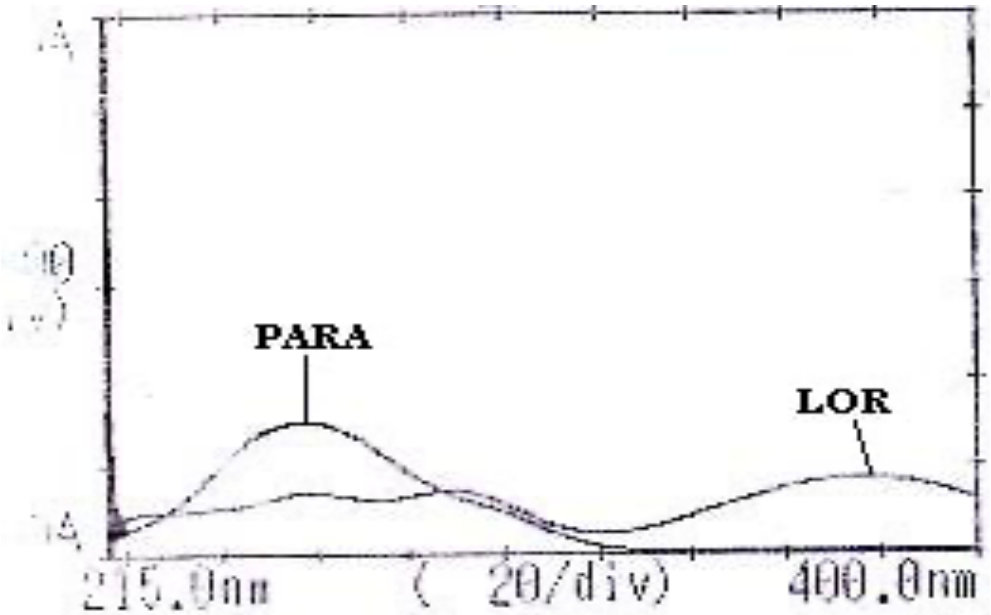

Fig. 1.a Overlain spectra of PARA and LOR

In contrast to PARA's peak at 257.5 nm, LOR's peak at 375.0 nm is clearly seen in the spectra. For the purpose of medication estimate using the absorption correction approach, these two wavelengths were chosen. The absorbance ratio method was developed using two wavelengths, 257.5 nm and 285.5 nm.

2) Study of Beer-Lambert's law:

To achieve concentrations ranging from 5-25 µg/mL for LOR and PARA separately, portions of their working stock solutions were diluted with 0.1 N NaOH. In the same way, LOR and PARA were diluted to get a series of concentrations ranging from 5-25 µg/mL by appropriately mixing and diluting their standard stock solutions. Using a 1.0 cm cell and a solvent blank, we measured the absorbance of the three solutions at 257.5, 285.5, and 375.0 nm. Figures 6.b, 6.c, and 6.d show the resulting concentration vs. absorbance graphs.

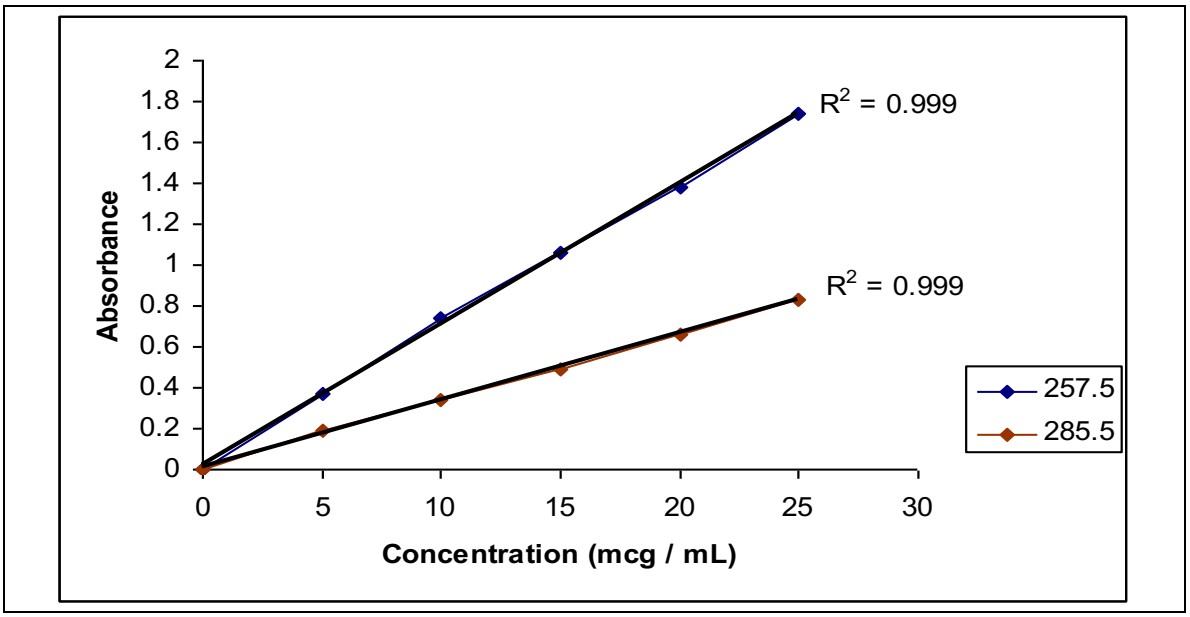

Fig. 1.b: Plot of Beer- Lambert's of PARA at 257.5 and 285.5 nm.

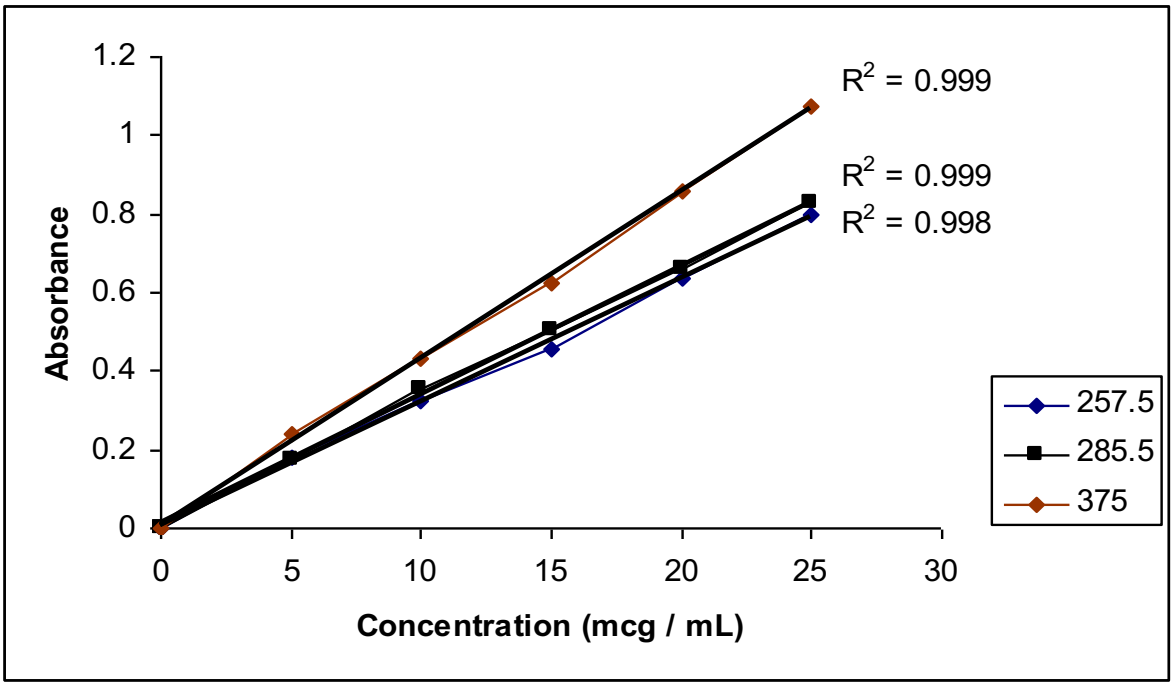

Fig. 1c: Plot of Beer- Lambert's of LOR at 257.5, 285.5 and 375.0 nm.

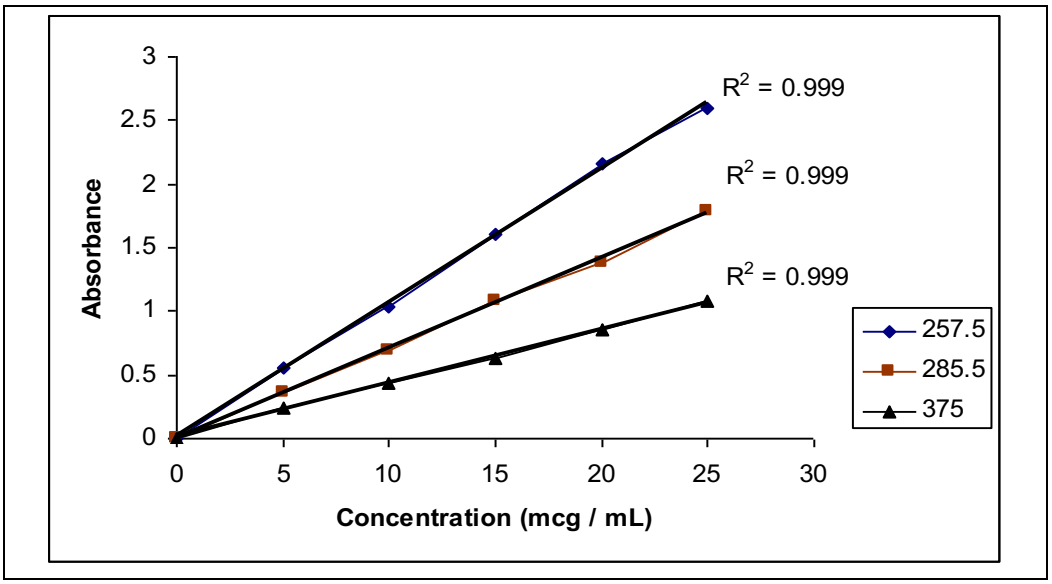

Fig. 1.d Plot of Beer- Lambert's of Mixture at 257.5, 285.5 and 375.0 nm.

3) Additivity Study:

The cumulative effect of the two medications at certain wavelengths was investigated using data acquired from the research of Beer-Lambert's law. Theoretical mixture absorbances were computed by adding the absorbances of the LOR and PARA solutions separately. In order to compare the computed and observed absorbance values, we kept the concentration of the mixture constant. In Table No. 6.1, you can see the outcomes of the additivity test.

Table No. 1.1: Results of additivity study

Sr. No	Conc. (µg/ml)	Absorbances at (nm)											
		257.5	285.5	375	257.5	285.5	257.5		285.5		375	
		LOR			PARA		Mixture					
							Th. Value	Obs. Value	Th. Value	Obs. Value	Th. Value	Obs. Value
1	5+5	0.178	0.177	0.238	0.370	0.186	0.548	0.551	0.363	0.366	0.238	0.252
2	10+10	0.322	0.352	0.432	0.736	0.336	1.058	1.031	0.688	0.689	0.432	0.451
3	15+15	0.455	0.506	0.625	1.062	0.486	1.517	1.608	0.992	1.077	0.625	0.740
4	20+20	0.636	0.659	0.858	1.385	0.665	2.021	2.157	1.324	1.381	0.858	1.001
5	25+25	0.797	0.826	1.073	1.738	0.834	2.535	2.601	1.660	1.783	1.073	1.216

Obs. Value- Observed Value, Th. Value - Theoretical Value

Since the observed mixed absorbance is so near to the values of the separate absorbances, it follows that the two medications do not interact with each other, according to the additivity table.

4) Determination of Absorptivity value:

In this investigation, we employed LOR and PARA standard solutions (C1) and (C2), which were prepared according to the procedures previously detailed.

We measured the absorbance of each solution in triplicate in a 1.0 cm cell against a solvent blank at 257.5, 285.5, and 375.0 nm. We calculated the A (1% 1cm) values using formula No. 6.1 and recorded the results in Table No. 6.2 and 6.3. We repeated the procedure for preparing the working standard solution of both drugs five times.

$$A\ (1\%\ 1cm) = \frac{\text{Absorbance at selected wavelengths}}{\text{Concentration (g / 100mL)}} \times 100 \qquad \text{.....(6.1)}$$

Table No. 1.2: Absorptivity values, A (1%, 1cm) of PARA

Sr. No.	Conc. g/100ml	Absorbances at nm		A (1%, 1cm)*	
		257.5	285.5	257.5	285.5
1	0.000984	0.676	0.322	686.94	327.23
2	0.000992	0.681	0.325	686.49	327.62
3	0.001	0.689	0.329	689.0	328.5
4	0.001008	0.699	0.334	693.94	331.34
5	0.001016	0.712	0.338	694.88	333.9
			Mean	**690.25**	**329.79**
			± S.D.	**3.51**	**3.51**
			%RSD	**0.51**	**0.50**

* Each value is mean of three observations

Table No. 6.3: Absorptivity values, A (1%, 1cm) of LOR

Sr. No.	Conc. g/100ml	Absorbances at nm		A (1%, 1cm)*	
		257.5	285.5	257.5	285.5
1	0.000984	0.676	0.322	686.94	327.23
2	0.000992	0.681	0.325	686.49	327.62
3	0.001	0.689	0.329	689.0	328.5
4	0.001008	0.699	0.334	693.94	331.34
5	0.001016	0.712	0.338	694.88	333.9
			Mean	**690.25**	**329.79**
			± S.D.	**3.51**	**3.51**
			%RSD	**0.51**	**0.50**

* Each value is mean of three observations

Table No. 1.3: Absorptivity values, A (1%, 1cm) of LOR

Sr. No.	Conc. g/100ml	Absorbances at nm			A (1%, 1cm)*		
		257.5	285.5	375.0	257.5	285.5	375.0
1	0.000984	0.305	0.318	0.413	309.96	323.17	419.72
2	0.000992	0.306	0.319	0.415	308.47	321.57	418.35
3	0.001	0.307	0.320	0.416	307.0	320.0	416.5
4	0.001008	0.312	0.326	0.425	309.52	323.41	421.63
5	0.001016	0.324	0.338	0.435	318.89	332.67	428.15
				mean	**310.76**	**324.17**	**420.87**
				± S.D.	**1.31**	**1.58**	**2.16**
				%RSD	**0.423**	**0.489**	**0.514**

* Each value is mean of three observations

5) Application of the proposed methods for estimation of drugs in standard laboratory mixture:

The 50.0 mL volumetric flasks were filled with precisely measured amounts of LOR (~25 mg) and PARA (~25 mg). A appropriate amount of 0.1 N NaOH was then added, the flasks were shaken, and the volume was filled to the mark with 0.1 N NaOH. To make 50.0 mL, 0.1 N NaOH was added to a 10.0 mL sample of each solution previously mentioned. Using 0.1 N NaOH, a volume of 5.0 mL

from the aforementioned solutions was further reduced to 50.0 mL. Using a 1.0 cm cell and a solvent blank, the absorbances of the three solutions were measured at 257.5, 285.5, and 375.0 nm. To get the LOR and PARA amounts, we used the following formula:

a) Absorbance ratio method (ARM):

For estimation of PARA

$$Cx = \frac{Qm - Qy}{Qx - Qy} \times \frac{A}{ax} \quad \text{…. (6.2)}$$

For estimation of LOR

$$Cy = \frac{Qm - Qx}{Qy - Qx} \times \frac{A}{ay} \quad \text{….. (6.3)}$$

Where,

Cx = Concentration of PARA
Cy = Concentration of LOR
Qm = Ratio of absorbance of laboratory mixture at 257.5 and 285.5 nm
Qx = Ratio of absorptivity of PARA at 257.5 nm and 285.5 nm
Qy = Ratio of absorptivity of LOR at 257.5 nm and 285.5 nm
ax = Absorptivity of PARA at 257.5 nm (A 1% , 1cm = 690.25)
ay = Absorptivity of LOR at 285.5 nm (A 1% , 1cm = 324.17)
A = Absorbance of mixture at isoabsorptive point

b) Absorbance correction method (ACM):

For estimation of PARA

$$Cx = \frac{A_2}{ay_1} \quad \text{…. (6.4)}$$

For estimation of LOR

$$Cy = \frac{A_1 - (A_2 * R)}{ax_1} \quad \text{…. (6.5)}$$

Where,

A1= Absorbance of diluted mixture at 257.5
A2 = Absorbance of diluted mixture at 375.0 nm
Cx = Concentration of PARA
Cy = Concentration of LOR
ax_1 = Absoptivity of PARA at 257.5 nm (A 1% , 1cm = 690.25)
ay_1 = Absoptivity of LOR at 375.0 nm (A 1%, 1cm = 420.87)

Amount of drug estimated (Cx/Cy) = C x D x V …. (6.6)

C = Cx or Cy = Conc. of PARA or LOR in g/mL
D = Dilution factor = 50.0
V = Volume of stock = 50.0 mL

Using the amount of drugs estimated by above methods, percent estimation was calculated by using formula given below:

$$\%\ \text{Estimation (LOR/PARA)} = \frac{\text{Amt. of drug estimated}}{\text{Weight of drug taken}} \times 100 \quad \text{…..(1.7)}$$

Absorbances of drugs and the results of estimation of drugs in standard laboratory mixture are shown in **Table No. 1.4** and **1.5** respectively.

Table No. 1.4: **Absorbances of drugs in Laboratory mixture**

Sr. No.	Wt. taken (mg)		Absorbances at (nm)		
	PARA	LOR	257.5	285.5	375.0
1	25.4	25.4	1.032	0.674	0.432
2	25.3	25.2	1.017	0.667	0.432
3	25.0	25.4	1.013	0.664	0.430
4	25.4	25.4	1.027	0.669	0.429
5	25.2	25.2	1.018	0.665	0.426

Table No. 1.5: Results of estimation of drugs in Laboratory mixture

Sr. No.	Amount estimated (mg)				% Estimation			
	ARM		ACM		ARM		ACM	
	PARA	LOR	PARA	LOR	PARA	LOR	PARA	LOR
1	25.68	25.87	25.78	25.66	101.10	101.85	101.49	101.02
2	25.13	25.89	25.24	25.66	99.33	102.74	99.76	101.83
3	25.05	25.75	25.15	25.54	100.20	101.38	100.60	100.55
4	25.66	25.50	25.67	25.49	101.02	100.39	101.06	100.35
5	25.54	25.54	25.43	25.31	101.34	101.34	100.91	100.43
				Mean	**100.59**	**101.54**	**100.96**	**100.83**
				± SD	**0.741**	**0.764**	**0.584**	**0.548**
				%RSD	**0.736**	**0.578**	**0.578**	**0.544**

6) Application of proposed methods for estimation of LOR and PARA in marketed formulation:

Procedure:

The average weight was calculated by weighing twenty pills. A precise amount of 25 mg PARA (~0.4 LOR) tablet powder and approximately 24.6 mg of pure Lornoxicam were added to a 50.0 mL volumetric flask containing an adequate amount of 0.1N NaOH. The mixture was agitated for 30 minutes before being filled to the mark. The solution was filtered with whatmann filter paper (no.41) after it was made. To achieve a final concentration of approximately 10 µg/mL for each medication, 0.1 N NaOH was used to dilute 10.0 mL of the filtrate. We used a 1.0 cm cell with a solvent blank to test the absorbances of the final solutions at various wavelengths.

Using the same formula as mentioned under "estimation in standard laboratory mixture," the amount of medicines was approximated. Also, the following formula was used to calculate the percentage of claims that were labelled:

$$\% \text{ labeled claim} = \frac{\text{Amt. estimated x Avg. wt. of tablet}}{\text{Wt. taken x label claim}} \times 100 \quad \textbf{(6.8)}$$

Absorbances of drugs and the results of estimation of drugs in marketed formulation are shown in **Table No. 1.6** and **1.7** respectively.

Table No. 1.6: Absorbances of drugs in Marketed formulation

Sr.No.	Wt. taken (mg)	Pure LOR added (mg)	Absorbances at (nm)		
			257.5	285.5	375.0
1	36.1	24.81	1.028	0.668	0.425
2	36.0	25.19	1.017	0.666	0.436
3	36.3	24.90	1.029	0.669	0.426
4	36.1	25.29	1.019	0.665	0.432
5	36.3	24.79	1.025	0.667	0.424

Table No. 1.7: Results of estimation of drugs in Marketed formulation

LORAX-P ®					PARA -500 mg + LOR-8 mg			
Sr. No.	Amount estimated (mg)				% labeled claim			
	ARM		ACM		ARM		ACM	
	PARA	LOR	PARA	LOR	PARA	LOR	PARA	LOR
1	25.60	25.22	25.5	25.21	100.98	101.08	100.59	98.61
2	25.10	25.59	25.1	25.59	99.28	98.88	99.28	98.89
3	25.90	25.30	25.9	25.31	100.60	98.07	101.60	100.52
4	25.23	25.69	25.1	25.70	99.52	98.61	99.00	101.08
5	25.63	25.20	25.5	25.20	100.54	100.52	100.03	100.52
				Mean	**100.18**	**99.43**	**100.10**	**99.92**
				± SD	**0.662**	**1.160**	**0.935**	**0.984**
				%RSD	**0.660**	**1.167**	**0.934**	**0.984**
Avg. wt. of tablet - 712 mg								

7) Recovery study:

It was carried out by standard addition method.

A precisely measured amount of tablet powder containing 25 mg PARA (~0.4 LOR) was put to a 50.0 mL volumetric flask along with about 24.6 mg of LOR. It was then mixed with a known amount of PARA at five distinct concentrations. After adding enough 0.1N NaOH to bring the volume to the mark, the contents of the flask were shaken for 30 minutes. After that, whatmann filter paper (no.41) was used to filter the content. The final concentration described in the marketed formulation was achieved by further diluting 10.0 mL of the filtrate with 0.1N NaOH. At specific wavelengths, a 1.0 cm cell was used to measure the absorbance of each solution relative to a solvent blank. The formula used to determine the content of each drug was identical to that found in the marketed version. We were able to retrieve the guaranteed amounts of each medication from the additional pure drug by subtracting the amount of each drug from the overall quantity of respective drug estimated and then analysing the powder from pre-analyzed tablets. We used the following formula to determine the amount of recovery and the percentage that came from the marketed preparation.

$$\text{Amt contributed by Marketed preparation} = \frac{\text{Wt. taken}}{\text{Avg. wt.}} \times \text{Amt. of drug present in Avg. wt. as per mean \% estimated as label claim} \quad \textbf{… (1.9)}$$

$$\% \text{ Recovery} = \frac{\text{Total drug estimated} - \text{Amt. contributed}}{\text{Amt. of pure drug added}} \times 100 \quad \textbf{… (1.10)}$$

Absorbances of drugs and the results of recovery study are shown in **Table No. 1.8** and **1.9** respectively

Table No. 1.8: Absorbances of drugs in Recovery study

Sr.No.	Wt. taken (mg)	Amt. of pure drug added(mg)		Absorbances at (nm)		
		PARA	LOR	257.5	285.5	375.0
1	35.9	9.9	25.0	1.291	0.794	0.429
2	35.7	15.1	24.9	1.432	0.859	0.427
3	35.7	20.2	25.1	1.578	0.929	0.428
4	35.9	25.0	25.2	1.711	0.995	0.430
5	35.9	30.3	25.2	1.819	1.064	0.429

Table No. 1.9: Results of Recovery

Sr.No.	Total drug Estim. (mg)				Amount recovered (mg)				% Recovery			
	ARM		ACM		ARM		ACM		ARM		ACM	
	PARA	LOR	PARA	LOR	PARA	LOR	PARA	LOR	PARA	LOR	PARA	LOR
1	35.27	25.47	35.22	25.48	10.06	25.07	10.01	25.08	101.61	100.28	101.11	100.32
2	40.41	25.36	40.37	25.36	15.34	24.96	15.30	24.96	101.58	100.24	101.32	100.24
3	45.62	25.42	45.63	25.42	20.55	25.02	20.56	25.02	101.73	99.68	101.78	99.68
4	50.39	25.53	50.38	25.54	25.18	25.13	25.17	25.14	100.72	99.72	100.68	99.76
5	55.76	25.47	55.76	25.48	30.55	25.07	30.55	25.08	100.82	99.48	100.82	99.52
								Mean	**101.29**	**99.88**	**100.69**	**101.12**
								± SD	**0.430**	**0.35**	**0.430**	**0.355**
								%RSD	**0.427**	**0.38**	**0.427**	**0.356**

8) Validation of proposed method :

Validations of the proposed methods were carried out as per ICH guidelines.

1) Accuracy :

Results from recovery experiments using the conventional addition approach confirmed the methods' efficacy. The findings are documented in Table No. 6.9.

2) Precision:

Standards and deviations (SD and RSD) of measurement series are a way to express the precision of an analytical procedure. Repeated investigation of uniform tablet powder samples confirmed the accuracy of the suggested procedures for estimating LOR and PARA; the findings are shown in Table 6.7.

3) Linearity and range:

Proportions of pre-analyzed tablet powder corresponding to 80, 90, 100, 110, and 120% of the PARA and LOR label claims were measured and diluted according to the instructions provided for the commercial formulation. At specific wavelengths, a 1.0 cm cell was used to measure the absorbance of each solution relative to a solvent blank. Table 1.10 records the absorbances.

Table No. 1.10: Absorbances of Linearity and Range study

Sr. No.	% of labeled claim	Absorbances of mixture at (nm)		
		257.5	**285.5**	**375.0**
1	80	0.847	0.557	0.359
2	90	0.950	0.622	0.395
3	100	1.067	0.701	0.452
4	110	1.170	0.770	0.487
5	120	1.263	0.815	0.540
Coefficient of Correlation		**0.999**	**0.999**	**0.999**

A plot of % label claim vs. absorbance was plotted and found to be linear as depicted in **Fig 1.e**

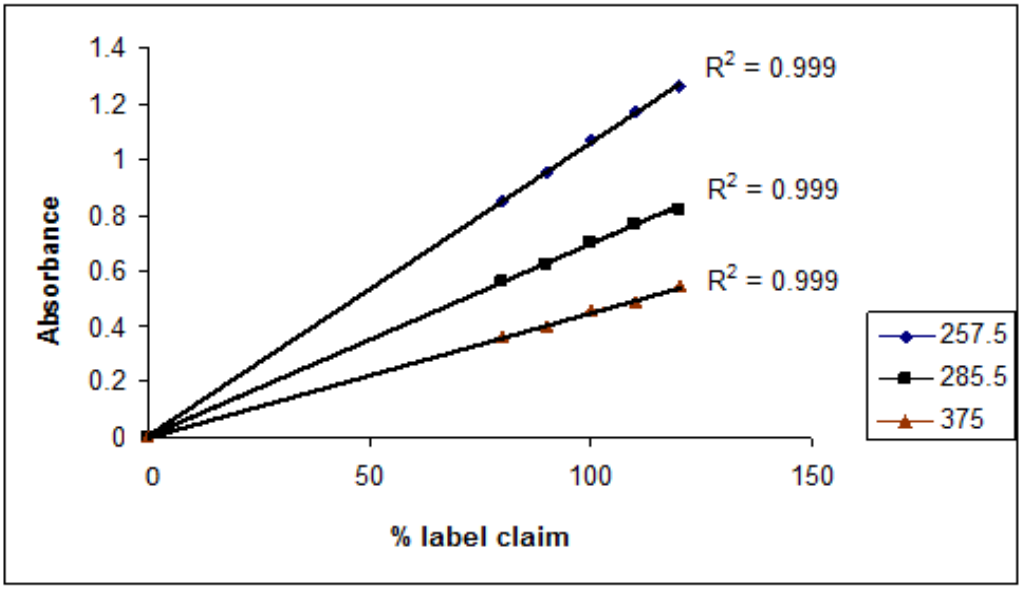

Fig. 1.e: Plot of Linearity and Range at selected wavelengths

4) Ruggedness:

Interday and Intraday variation:

In a 50.0 mL volumetric flask, a precisely measured amount of pre-analyzed tablet powder (equal to 25 mg PARA or approximately 0.4 LOR) and approximately 24.6 mg of pure Lornoxicam were added. The mixture was then dissolved in an adequate amount of 0.1N NaOH after being agitated for 30 minutes. The volume was then adjusted to the mark. The solution was filtered with whatmann

filter paper (no.41) after it was made. To obtain a final concentration of about (10 µg/mL LOR, 10 µg/mL PARA), 10.0 mL of the filtrate was diluted with 0.1 N NaOH. After 0, 3, and 6 hours, the solution's absorbance was measured at certain wavelengths in a 1.0 cm cell. Table No. 1.11 displays the results of the intraday study and the percentage of claims that were labelled.

Table No. 1.11: Results of estimation of drugs in Intraday study

Time	Wt. taken (mg)	Pure LOR added(mg)	% labeled claim			
			ARM		ACM	
			PARA	LOR	PARA	LOR
0 hr.	35.9	24.90	101.94	99.16	100.60	99.16
3 hr.	35.9	24.90	101.94	99.16	100.60	99.16
6 hr.	35.9	24.90	101.54	101.64	100.37	101.64
		Mean	**101.80**	**99.16**	**100.37**	**99.16**
		± SD	**0.22**	**1.25**	**0.136**	**1.25**

The same procedure was followed to test the absorbances of the same solution on the first, third, and fifth days. The formula stated under the marketed formulation was then used to compute the percent labelled claim. Table No. 1.12 displays the results of the drug estimation by interday study.

Table No. 1.12: Results of estimation of drugs in Interday study

Day	Wt. taken (mg)	Pure LOR added (mg)	Amt. estimated (mg)				%labeled claim			
			ARM		ACM		ARM		ACM	
			PARA	LOR	PARA	LOR	PARA	LOR	PARA	LOR
1	35.9	24.90	25.2	25.31	25.3	25.30	99.96	101.64	100.35	99.16
3	35.9	24.90	24.9	25.28	24.7	25.26	98.77	94.21	97.97	89.25
5	35.9	24.90	24.1	24.70	24.3	24.87	95.59	--	96.39	--

Different analyst:

Three separate analysts used the suggested procedures to determine the percentage of medications in tablet powder. You can see the results of the drug estimation in Table No. 1.13.

Table No. 1.13: Results of estimation of drugs by Analyst to Analyst variation study

Analyst	Wt. taken (mg)	Pure LOR added(mg)	% labeled claim			
			ARM		ACM	
			PARA	LOR	PARA	LOR
I	35.6	24.90	99.95	100.00	101.14	101.64
II	35.9	25.09	100.35	99.16	101.54	101.64
III	35.9	24.99	100.80	99.16	102.00	99.16
		Mean	**100.36**	**99.44**	**101.54**	**100.81**
		± SD	**0.627**	**0.401**	**0.590**	**0.423**

5) Robustness:

By purposefully using 0.5 N NaOH as solvent instead of 0.1N NaOH, the robustness of the suggested procedures was assessed. Table No. 1.14 displays the results of the drug estimation.

Table No. 1.14: Results of estimation of drugs

Sr.No.	Wt. taken (mg)	Pure LOR added(mg)	% labeled claim			
			ARM		ACM	
			PARA	LOR	PARA	LOR
1	35.9	24.90	101.54	99.66	101.94	99.164
2	35.9	25.09	101.94	101.64	101.94	99.164
3	35.9	24.99	101.54	101.64	101.54	99.164
		Mean	**101.54**	**101.54**	**101.54**	**99.164**
		± SD	**0.198**	**0.229**	**0.229**	**0.1**

6) Limit of Detection:

Limit of detection for LOR and PARA was found to be 1 µg/mL and 0.16µg/mL respectively.

CONCLUSION

UV spectroscopy techniques were developed. 0.1N NaOH was chosen as the solvent for the solubility study of Lornoxicam (LOR) and Paracetamol(PARA).The λmax of paracetamol is 257.5 nm while that of lornoxicam is 375.0 nm, respectively. In order to create an absorbance adjustment mechanism, these wavelengths were chosen. While developing the absorbance ratio approach, it was noted from the overlain spectra that the two medications exhibit the same absorbance at 285.5, which is the isoabsorptive wavelength. Across a concentration range of 5-25 µg/mL for PARA and LOR, respectively, the two medicines, both alone and in combination, were shown to adhere to Beer-Lambert's rule. Over a concentration range of 5-25 µg/mL for PARA and LOR, respectively, an additivity research was conducted on solutions containing LOR, PARA, and a combination of the two. The calculated and observed absorbance values of the mixture were found to be quite close, suggesting that the medications do not interact physically or chemically at the wavelengths that were chosen. Tables 1.2 and 1.3 display the PARA and LOR A (1%, 1cm) values, correspondingly. The suggested approaches were initially tested for PARA and LOR estimates in a normal laboratory combination; after showing promising results, they were expanded to include marketed formulations of these medicines. Similarly, the recovery research was conducted using the conventional addition approach.

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