TABLE 2: COMPARISON OF THE PROPOSED METHOD WITH THE REPORTED METHOD

Dosage form	Label Claim (mg)	Percentage recovery	
		Proposed	Reported*
TABLET			
a) Cefcare (Aristo)	500	109.6	107.9
b) Cefudur (Protec)	500	107.4	106.2
CAPSULE			
a) Modcef(Sarabai)	500	103.4	102.9
b) Bidcaps(Kopran)	500	101.5	101.7

*IP 1996 standards 90-120% w/w.

companies by the proposed and reported methods were compared in Table 2.

To evaluate the validity and reproducibility of the method, known amount of pure drug was added to the previously analyzed pharmaceutical formulations and the mixture was analyzed by the proposed method and the recoveries (average of six determination) were given in Table 2. Interference studies revealed the excipients commonly present in the dosage forms did not interfere in the proposed method.

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Assay of Lamotrigine and Nicorandil by Difference Spectroscopy

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Two analytical methods for the estimation of lamotrigine and nicorandil in bulk drug and in their tablet formulations are described. These methods are based upon difference spectroscopy and are quite, simple, rapid, sensitive and selective. The Beer's law range was followed in the concentration range of 5-35 μg/ml and 10-40 μg/ml. The molar absorptivities were 9.731×10^3 l/mol.cm and 2.407×10^3 l/mol.cm for lamotrigine and nicorandil respectively.

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Lamotrigine, 3,5 diamino-6-(2,3 dichlorophenyl)-1,2,4-triazine[1] is used for the treatment of partial seizures in adults. Lamotrigine is not official in any pharmacopoeia. The analytical methods reported in literature include HPLC[2-3] methods but no spectrophotometric method has so far been reported. Nicorandil, N-(2-hydroxyethyl) nicotinamide nitrate[1] is a vasodilator used in angina pectoris. Nicorandil, too, is not official and only HPLC[4-5] methods are available in literature for the determination of nicorandil. Difference spectrophotometric methods are developed for the estimation of lamotrigine and nicorandil in bulk drug and in their tablet formulations.

A Hitachi U-2000 UV/Vis spectrophotometer with matched 1 cm quartz cells was used for all the spectral measurements. The solutions of 0.1 N HCl and 0.1 N NaOH were prepared in double distilled water as per IP procedure. Stock solutions of lamotrigine and nicorandil were prepared in methanol as 1 mg/ml solutions. Standard solutions of lamotrigine were prepared by diluting aliquots (0.05-0.35 ml) of standard solution to 10 ml with 0.1 N NaOH and 0.1 N HCl separately whereas the aliquots of 0.1-0.4 ml of the stock solution of nicorandil were diluted to 10 ml with 0.1 N NaOH and 0.1 N HCl.

The difference spectra were obtained by treating the acidic form as blank and the basic form as the sample and scanning the spectrum from 250 to 350 nm. The maxima and minima were obtained at 313 and 269 nm for lamotrigine and at 261 and 279 nm in case of nicorandil. The amplitude was linear in the concentration range of 5-35 μg/ml for lamotrigine and 10-40 μg/ml for nicorandil.

Lamitor tablets (Torrent Pharmaceuticals) containing 25 mg of lamotrigine and nicoran (Torrent Pharmaceuticals) and Corflow tablets (Wockhardt) containing 5 mg nicorandil were analyzed by the proposed methods. Ten tablets of each brand were powdered to a fine powder and powder equivalent to 25 mg of the drug was weighed accurately. The powder was transferred into 25 ml volumetric flasks and dissolved in methanol to prepare the stock solution of 1 mg/ml. The solution was filtered and diluted with 0.1 N HCl and 0.1 N NaOH to get a working sample solution of 20 or 25 μg/ml. The absorbance of the solution was measured and the amount of lamotrigine or nicorandil was computed from the calibration curve.

The ionized and unionized forms of lamotrigine and nicorandil show different spectral characteristics making it possible to get a difference spectrum. The difference spectra for lamotrigine and nicorandil are shown in fig. 1 and 2, respectively. The calibration curve was plotted as amplitude against concentration. The calibration curves were linear in the concentration range of 5 to 35 μg/ml for lamotrigine and 10 to 40 μg/ml for nicorandil. The slope, intercept and correlation coefficient were obtained by linear least square treatment of the results. The optical characteristics are summarized in Table 1. The recovery experiments were carried out by spiking the samples at three levels with known quantities of standard solutions, the results obtained were found to be in good agreement of the label claim. This shows that spectrophotometric isolation of drugs with excipients is complete as the method uses an ideal reference solution that contains both drug and excipients in the same concentration but at a pH different from that of the drug solution in the

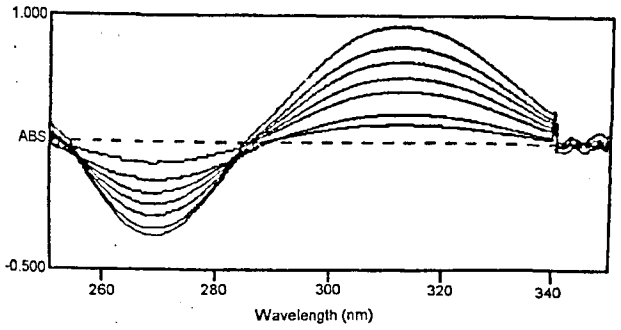

Fig. 1: Difference Spectra of Lamotrigine.

The difference spectra of lamotrigine were obtained by treating the acidic form as blank and the basic form as the sample. The calibration curve was linear in the concentration range of 5-35 μg/ml.

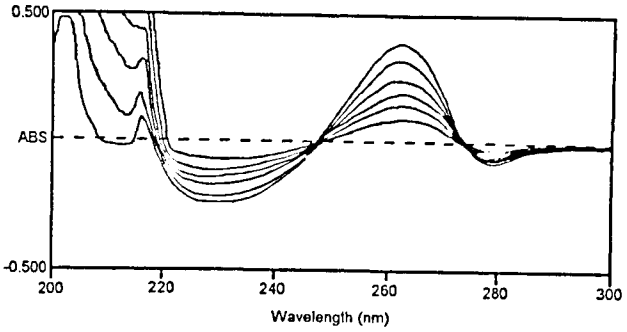

Fig. 2: Difference Spectra of Nicorandil.

The difference spectra of nicorandil were obtained by treating the acidic form as blank and the basic form as the sample. The calibration curve was linear in the concentration range of 10-40 μg/ml.

TABLE 1: OPTICAL CHARACTERISTICS AND OTHER PARAMETERS

Data	Lamotrigine	Nicorandil
λ_{max} (nm)	313	261
λ_{min} (nm)	269	279
Beer's law range (μg/ml)	5 to 35	10 to 40
Molar extinction coefficient (L mole^{-1}cm^{-1})	9.73×10^3	2.4×10^3
Sandell's sensitivity g/cm^2/0.001 absorbance units	0.026	0.087
Regression equation	0.035x +0.0	0.011x +0.0
Slope	0.035	0.011
Intercept	0.0	0.0
Correlation coefficient	0.9992	0.9959
Pecision (% RSD)	0.507	0.432

sample cell. These extraneous components are not affected by pH change therefore their contributions towards the total absorbance are identical and thereby cancelled making the method free from excipients interference. The proposed methods are simple, selective and precise and can be used for the determination of lamotrigine and nicorandil in bulk drug and in its dosage formulation.

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TABLE 2: ANALYSIS OF TABLET FORMULATIONS

Data	Formulations		
	L1	N1	N2
Label amount (mg)	25	5.0	5.0
Amount found (mg)	25.0	4.93	4.92
% Recovery	99.13	98.0	98.00
Standard Deviation	0.53	0.74	0.68

All values are expressed as the average of three values. L1 indicates the Lamitor tablets (Torrent Pharmaceuticals) and N1 refers to Nicoran tablets (Torrent Pharmaceuticals) and N2 refers to Corflow tablet(Wockhardt Ltd.)

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