

**NOTE**

**Spectrophotometric Estimation of Venlafaxine Hydrochloride and Ritodrine Hydrochloride**

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Simple and sensitive UV spectrophotometric methods for the determination of venlafaxine hydrochloride and ritodrine hydrochloride are developed and having maximum absorbance at 225 and 226 nm respectively and obey Beer's law in the concentration ranges of 5-25 µg/mL and 4-20 µg/mL respectively. These methods are extended to pharmaceutical preparations and there is no interference from any common pharmaceutical additives and diluents.

**Key Words:** Spectrophotometric determination, Beer's law, Venlafaxine hydrochloride, Ritodrine hydrochloride.

Venlafaxine hydrochloride<sup>1,2</sup> (VNH) is a new antidepressant agent and chemically it is cyclohexanol, 1-[(2-dimethylamino)-1-(4-methoxyphenyl) ethyl]-hydrochloride and not yet official in any pharmacopoeia. Ritodrine hydrochloride<sup>3-5</sup> (RTH) is a sympathomimetic agent and chemically it is benzene methanol, 4-hydroxy- $\alpha$ -[1-[2-(4-hydroxyphenyl)ethyl]amino]ethyl hydrochloride. RTH is official in USP<sup>6</sup> and is given by intravenous infusion to arrest premature labour. Literature survey reveals that spectrophotometric, fluorimetric, HPLC and GC methods were reported for the determination of VNH<sup>7-8</sup> and RTH<sup>9-14</sup> in its formulation and in biological fluids. The present investigation has been undertaken to develop a UV spectrophotometric method for the determination of VNH and RTH, which exhibit absorption maxima at 225 and 226 nm respectively.

Spectral and absorbance measurements were made on Systronics UV-Visible Spectrophotometer 117 with 10 mm matched quartz cells.

**Preparation of standard solutions**

Accurately weighed 100 mg of VNH or RTH were dissolved in distilled water and the volume was made up to 100 mL with water. The above stock solutions were further diluted with water to get the working standard solutions of 100 µg/mL.

**Preparation of sample solutions**

Twenty tablets or capsules were accurately weighed, finely powdered and the

powder corresponding to 100 mg was dissolved in distilled water; if necessary, the solutions were filtered and the filtrates were diluted to 100 mL with water.

### Procedure

Aliquots of working standard solution of VNH ranging from 0.5 to 2.5 mL (100  $\mu\text{g/mL}$ ) and RTH ranging from 0.4 to 2.0 mL (100  $\mu\text{g/mL}$ ) were transferred into a series of 10 mL volumetric flasks and the volume was made up to the mark with distilled water. The absorbance of the resulting solutions was measured at 225 nm for VNH and 226 nm for RTH against blank and the amounts of VNH and RTH present in the sample solutions were computed from their respective calibration curves.

The Beer's law limits, Sandell's sensitivity, molar extinction coefficient are presented in Table-1. The regression analysis using the method of least squares was made for the slope (a), intercept (b) and correlation coefficient (r) obtained from different concentrations and the results are incorporated in Table-1. The per cent relative standard deviation, % range of error (0.05 to 0.01 confidence limits) were calculated from the eight measurements containing 3/4th of the amount of the upper Beer's law limits of RTH and VNH and are given in Table-1. The proposed methods have been applied to commercial formulations and the results obtained by the proposed methods are presented in Table-2. To evaluate validity and reproducibility of the methods, known amounts of pure drug were added to previously analyzed samples and the mixtures were analyzed by the proposed methods and the results are presented in Table-2.

TABLE-1  
OPTICAL CHARACTERISTICS AND PRECISION

Parameters	VNH	RTH
Beer's law limit ( $\mu\text{g/ml}$ )	5-25	4-20
Sandell's sensitivity ( $\mu\text{g/cm}^2/0.001$ absorbance unit)	0.02679	0.0223
Molar extinction coefficient ( $1 \text{ mole}^{-1} \text{ cm}^{-1}$ )	$1.1717 \times 10^4$	$1.4517 \times 10^4$
% Relative standard deviation	0.2976	0.4499
% Range of error:		
0.05 confidence limits	0.249	0.376
0.01 confidence limits	0.368	0.557
Correlation coefficient	0.99992	0.99995
Regression equation ( $Y^*$ )		
Slope (a)	0.037	0.04535
Intercept (b)	0.001	-0.00280

$Y^* = b + aC$ , where "C" is concentration in  $\mu\text{g/ml}$  and Y is absorbance unit

TABLE-2  
ESTIMATION OF VNH AND RTH IN PHARMACEUTICAL FORMULATIONS

Sample	Labeled amount (mg)	Amount found (mg) by proposed method	Recovery (%)
VNH capsules			
1	75	75.280	100.37
2	75	75.040	100.05
3	75	74.960	99.94
RTH tablets			
1	10	9.963	99.63
2	10	9.981	99.81
3	10	9.950	99.50

The results indicate that the proposed methods are found to be simple, rapid, sensitive, accurate, precise and reproducible and can be used for the routine determination of both the drugs in bulk as well as in their pharmaceutical preparations.

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