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NOTE

Spectrophotometric Estimation of Ritodrine Hydrochloride in Pharmaceutical Formulations

A. BHANU PRASAD, N. RAMI REDDY† and I.E. CHAKRAVARTHY*
Department of Chemistry, S.K.U.P.G. Centre, Kurnool-518 002, India

A simple, accurate and economical procedure for estimation of ritodrine hydrochloride (RTH) in pharmaceutical formulations has been developed. In this method, the ritodrine hydrochloride was brominated with bromate-bromide mixture under strong acidic condition. After bromination, the excess brominating mixture (bromate-bromide) was reacted with potassium iodide to produce stable yellow colour of KI_3 complex. The absorbance of the yellow colour was measured at 350 nm against distilled water as blank. There is no interference from any common pharmaceutical additives. The proposed method is simple, sensitive and economical for the estimation of ritodrine hydrochloride in bulk drug and pharmaceutical formulations.

Key Words: Spectrophotometric estimation, Ritodrine hydrochloride.

RTH is used as a sympathomimetic agent and chemically it is benzene methanol, 4-hydroxy-α-[1-[[2-(4-hydroxy-phenyl)ethyl]amino]ethyl] hydrochloride. Literature survey reveals that various spectrophotometric methods[1-3], were reported for the estimation of ritodrine hydrochloride in its formulations. In the present method, ritodrine hydrochloride was treated with brominating mixture in the strong acidic medium. The ritodrine hydrochloride gets brominated. The excess brominating mixture was reacted with potassium iodide to liberate iodine which in turn reacted with excess potassium iodide to form yellow colour of KI_3 complex. The absorbance of the yellow colour was measured at 350 nm.

A Milton Roy 1001 spectrophotometer with 10 mm matched quartz cells was used for the spectral and absorbance measurements. All the chemicals and reagents used were of analytical grade. Double distilled water was used throughout the investigation. Hydrochloric acid (4 N) was prepared and standardized with standard procedure. Potassium iodide (0.1 N) was prepared by dissolving 0.166 g in 100 mL distilled water. Brominating mixture (0.1 N) was prepared by dissolving 0.695 g of potassium bromate and 1.75 g of potassium bromide in 100 mL distilled water. Further diluted to get the working concentration of 0.02 N brominating mixture solution.

†Department of Chemistry, S.B.S.Y.M. Degree College, Kurnool-518 004, India.

Standard stock solution: 50 mg of pure authentic ritodrine hydrochloride was weighed accurately and transferred into 50 mL distilled water to obtain a stock solution of 1 mg/mL and this stock solution was diluted with distilled water to obtain the working standard solution of concentration 100 μg/mL.

Calibration curve

Aliquots of standard ritodrine hydrochloride solution (100 μg/mL) ranging from 0.2–1.0 mL were transferred into a series of 25 calibrated flasks. To each 1.0 mL of hydrochloric acid (4 N) and 1.0 mL brominating mixture (0.02 N) were added.The flasks were shaken well and kept for 5 min for complete bromination. After 5 min, 1.0 mL of potasium iodide (0.1 N) was added and the total volume in each flask was brought to 25 mL with distilled water. After 5 min the absorbance of the yellow colour solution in each flask was measured at 350 nm against the distilled water blank. The amount of ritodrine hydrochloride present in the sample solution was computed from its calibration curve.

Estimation of ritodrine hydrochloride in tablet dosage forms

Twenty tablets were weighed and finely powdered and an accurately weighed portion of the powder, equivalent to 50 mg of ritodrine hydrochloride was placed in a 50 mL volumetric flask containing 30 mL of water. The contents of the flask were shaken well and made up to the mark with distilled water to get concentration of 1 mg/mL. This stock solution was further diluted to obtain working concentration of 100 μg/mL. The same calibration curve procedure was followed for the estimation of ritodrine hydrochloride in different brands of tablet dosage forms.

The experiment results were analyzed by using Spectronics 1001 plus spectrophotometer. In this method, the ritodrine hydrochloride underwent bromination when treated with an excess solution of bromate-bromide mixture under strong acidic medium. At this stage, from bromate-bromide mixture, bromine was liberated and the liberated bromine was treated with ritodrine hydrochloride to get the brominated ritodrine hydrochloride. The excess brominating mixture was treated with potassium iodide solution to liberate iodine, which in turn reacted with excess potassium iodide to form yellow colour of KI_3 complex. The absorbance of the yellow colour was measured at 350 nm against distilled water blank. Studying the effect of brominating mixture, hydrochloric acid, potassium iodide and sequence of addition optimized the experimental conditions. The values obtained from the estimation of ritodrine hydrochloride in pharmaceutical formulations by the proposed and reported method were tabulated in Table-1. Beer's law was obeyed in the concentration range of 20–100 μg/mL of ritodrine hydrochloride. In order to ascertain reproducibility of the proposed method, known amounts of pure ritodrine hydrochloride were added to the pre-analyzed samples and the mixtures were analysed by the proposed method. The results of recovery studies are incorporated in Table-1. The recovery values ranging from 99.6–100.4% indicate the reproducibility of the proposed method. The common excipients and the additives are usually present in dosage forms.

TABLE-1
ESTIMATION OF RITODRINE HYDROCHLORIDE IN PHARMACEUTICAL PREPARATIONS

S. No.	Sample	Labelled claim (mg/tab)	Amount found (mg)		% Recovery
			Proposed method[a]	Reported method	
1.	T_1	10	10.2	99.8	99.8
2.	T_2	10	9.98	10	99.6
3.	T_3	10	9.86	9.82	99.9
4.	T_4	10	9.94	9.90	100.2
5.	T_5	10	10.06	99.9	100.4

[a]Average of five determinations.

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BIOCATALYSIS (GORDON RESEARCH CONFERENCE)

MERIDEN, NH, USA

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