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Cerimetric Determination of Propranolol in Bulk Drug Form and in Tablets

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Abstract: Two simple, accurate and precise methods are described for the determination of propranolol hydrochloride with cerium(IV) sulphate. The titrimetric method is based on the oxidation of the drug by a known excess amount of cerium(IV) sulphate and back titration of the unconsumed oxidant with ammonium ferrous sulphate. In the spectrophotometric method, the unreacted cerium(IV) sulphate is treated with iron(II) sulphate, and the iron(III) sulphate produced is complexed with thiocyanate and measured at 480 nm, thereby permitting the determination of the amount of unreacted cerium(IV) sulphate. In both procedures, the amount of the reacted oxidant corresponds to the drug content. Different variables affecting the reaction between propranolol and cerium(IV) sulphate were studied and optimised. In titrimetry, the reaction stoichiometry which formed the basis for calculations was established. At 480 nm, Beer's law is obeyed for 0-5 $\mu\text{g mL}^{-1}$ of propranolol hydrochloride. The molar absorptivity and Sandell sensitivity of the procedure were calculated in addition to limits of detection and quantification. Excipients used as additives in pharmaceutical formulations did not interfere in the proposed procedures. The procedures described were successfully applied to the determination of propranolol hydrochloride in bulk drug form and in tablets.

Key Words: Propranolol, titrimetry, spectrophotometry, cerium(IV) sulphate, iron(III), thiocyanate

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