I.A.U. Karaj Branch

Journal of Applied Chemical Research, 6, 2, 53-64 (2012)

Journal of Applied Chemical Research

www.jacr.kiau.ac.ir

Titrimetric and Spectrophotometric Methods for the Determination of β-blockers in Pharmaceutical Dosage Form

A. Bagheri*, I. Mesgarzadeh

Department of Chemistry, Islamic Azad University, Central Tehran Branch, Tehran, Iran

(Received 17 Nov. 2011; Final version received 16 Apr. 2012)

Abstract

Three new methods using titrimetric and spectrophotometry are described for the determination of Propranolol Hydrochloride (PPH) and Atenolol (AN) with potassium bromate as the oxidimetric reagent and acid dyes, Methyl orange and Indigo carmine. In direct titrimetric (method A), the drug is titrated directly with bromate in acid medium and in the presence of excess of bromide using methyl orange indicator.Both spectrophotometric methods are based on the oxidation of mentioned drugs by a known excess of bromate in acid medium and in the presence of excess of bromide followed by estimation of surplus oxidant by reacting with either Indigo carmine (method B) or Methyl orange (method C), and measuring the absorbance at 609 or 507 nm. Titrimetric methods are applicable over the ranges 1-18 mg for propranolol hydrochloride and 2-10 mg for atenolol. In spectrophotometric methods, the absorbance is found to increase linearly with increasing concentration of drugs, which is corroborated by calculated correlation coefficient (r) of 0.9933, 0.9977, 0.9928 (B) and 0.9951, 0.9976, 0.9984 (C). The systems obey Beer's law for 2.5-15, 0.625-7.5μg mL^{-1} (B) and 0.25- 5, 0.25-2μg mL^{-1}(C) for atenolol and propranolol hydrochloride. The proposed methods were applied successfully to the determination of mentioned drugs in tablets. The accuracy of the methods was ascertained by recovery studies.

Keywords*: Propranolol, Atenolol, Titrimetric, Spectrophotometry, Acids dyes, Pharmaceuticals.*

Introduction

Propranolol hydrochloride is a synthetic beta-adrenergic receptor blocking agent chemically described as (±) -1 - [(1 -methylethyl) amino]-3 -(1-naphthalenyloxy)-2-propranol hydrochloride [1]. It's widely used for the management of hypertension, decreasing angina frequency in patient with angina pectoris, controlling ventricular rate in patient with atrial fibrillation, reducing cardiovascular mortality by myocardial infraction, the treatment of migraine and etc. Atenolol, 4-

**** Corresponding author:*** *Dr. Azar Bagheri, Department of Chemistry, Islamic Azad University Central Tehran Branch, Tehran, Iran. E-mail: azar.bagheri@iauctb.ac.ir, Tel:+98 9122238223, Fax:+98 2188385782.*