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Identification and Quantification of Lisinopril from Pure, Formulated and Urine samples by Micellar Thin Layer Chromatography

A. Mohammad *, S. Sharma, S.A. Bhawani

Analytical Research Laboratory, Department of Applied Chemistry,

Faculty of Engineering & Technology,

Aligarh Muslim University, Aligarh-202002, India.

****Email : alimohammad08@gmail.com***

Abstract: A simple, selective and economical micellar thin layer chromatographic method for on-plate analysis of lisinopril from pure, formulated and spiked urine samples was developed. The proposed method involves use of silica gel H layers as stationary phase and 4% aqueous N-cetyl-N, N, N-trimethylammonium bromide (CTAB) as solvent system. The nature as well as the concentration of surfactants influences the mobility of lisinopril. The effects of alkanols usually used as organic modifiers in the solvent system, pH of the solvent system and the presence of nonelectrolytes (organic) and electrolytes (inorganic) in the solvent system on the mobility of lisinopril were studied. The interference study was carried out by using various organic and inorganic metabolites usually present in human urine. The spectrophotometric determination of lisinopril (pure, formulated and spiked urine) samples was carried out at 595nm using ninhydrin as chromogenic reagent. The beers law is obeyed in a concentration range of 10-150 g/mL with correlation coefficient of 0.9778 and molar absorptivity of 4.083×10^3 mol^{-1} cm^{-1}. The recoveries of lisinopril (pure, formulated and urine spiked) were within range of 93.0 -100.2% with relative standard deviation ranging from 0.90 -2.8 %.

Keywords: Micellar thin layer chromatography, Lisinopril, Urine, Surfactants, Spectrophotometer

Introduction

Lisinopril, 1-[N- {(s)-I- carboxy- 3 phenyl propyl}-L-proline dehydrate (Fig-1) is a lysine analog of enalaprilat, the active metabolite of enalapril. It is long-acting, nonsulhydryl angiotensin- converting enzyme (ACE) inhibitor that is used for the treatment of hypertension and congestive heart failure in daily dosage 10-80 mg [1]. Pharmacological activity of lisinopril has been proved in various experimental and clinical studies [2,3]. Owing to its importance and widespread use, efforts have been made towards the development of simple and reliable analytical methods. As per our literature survey, lisinopril in pharmaceutical formulations has been determined by various analytical methodologies like polaragraphy[4], potentiometry [5] and spectrophotometry [6], but most of these analytical methods are not too suitable for the Identification of lisinopril from clinical samples because of the interferences caused by the amino acids and amino groups containing metabolites present in biological samples [7]. This report is an attempt in the direction of developing a simple and reliable method for on plate identification and quantification of lisinopril in pharmaceutical formulations as well as from human urine samples using silica gel H layers developed with a new mobile phase comprising of micellar solutions of N-cetyl-N, N, N- trimethylammonium bromide (CTAB). Micellar solutions have found numerous practical applications in many areas of separation science. Micellar liquid chromatography (MLC) has gained immense popularity and wider applicability due to operational simplicity, cost effectiveness, relatively non toxicity and enhanced separation efficiency, low aggressiveness [8-11]. Incorporation of aqueous micellar solutions as mobile phase was pioneered by Armstrong and Terrill [12] as they accentuated the importance of TLC where simultaneous separation of ionic or non-ionic species in a variety of matrices is required. A peculiarity of the micellar mobile phases (MMPs) is that they have no macroscopic analogues [13], as a result the typical separations can be easily achieved by using MMPs than aqueous organic mobile phases. Previously MMPs were successfully employed in TLC based critical separations of aromatic hydrocarbons [14], nucleotides [15], vitamin K_1 and K_5 [16], o-,m- and p- aminophenol [17], amino acids [18], separation of penicillins [19].