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RESEARCH PAPER

KINETIC STUDY ON EXTENDED RELEASE OF THEOPHYLLINE CAPLET WITH DIFFERENT BRANDS HYPROMELLOSE MATRIX

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The aim of the present investigation was to prepare and evaluate kinetics of extended release formulations of theophylline using Methocel K4M CR Premium/MK and Metolose 90SH-4000SR/M9. All formulated tablets with various concentrations (%4.0; 4.25; 4.5; 4.75; 5.0) of hypermellose were prepared by wet granulation method and found to be complied with the official requirements. The results showed the zero order kinetics and similarity (f2>50) with the marketed brand product were indicated by the formulations containing MK 4.75% - MK 5.0% and M9 5%. It was concluded that the higher the hypromellose concentration the slower the release of drug.

Key words: Theophylline, Hypromellose, Extended release kinetics, Independent parameters.

INTRODUCTION

For very small dosage administration of drugs resulting in restrictive absorption, the usage of controlled release is better suited (Bhardwaj *et al* 2000). Theophylline, which has short half-life, belongs to narrow therapeutic index Drug (Bayomi *et al* 2001). To this character, extended release formulation should be prepared to achieve adequate blood levels and maintained with a minimal fluctuations. Meanwhile, administration of such dosage form often reduce patient disobedience, resulting in attaining effective therapy.

Although many researchers reported multiparticulate and other sustained release formulations (Dahiya *et al* 2008; Dahiya and Tyagi, 2008; Dahiya and Gupta, 2011; Basarkar *et al* 2013; Tyagi and Kori, 2013; Verma *et al* 2014; Nagpal *et al* 2014; Dahiya and Onker, 2015), matrix tablet has also been found as one of the most significant extended release pharmaceutical formulation. Extended release formulations generally formulated as coated tablet, consist of complex and expensive steps. Hydroxypropyl Methyl Celullose (HPMC) or Hypromellose with special substitution site have been commonly used in simple controlled release formulations (Ishikawa *et al* 2000; Saiful *et al* 2010; Sultana and Khosru, 2012; Abdassah *et al* 2015). This is based on highly adsorbable hydrogelling capacity in the matrix as viscosity barrier for drug release (Shin-Etsu, 2005). In this study, we used hypromellose from different origin and having similar grade : Methocel K4M-CR Premium (Dow), Metolose 90SH-4000SR (Shin-Etsu) for comparing drug release kinetic profiles and theophylline retarded caplet (market derived) as standard quality evaluation.

This paper depicts the kinetic release profile of theophylline extended release formula from different origin hypromellose matrices, labscale manufacturing and testing the release behavior of these products using dependent methods (mathematical model) and independent