UNIVERSITI TEKNOLOGI MARA

TERNARY SOLID DISPERSION OF SIMVASTATIN, β-CYCLODEXTRIN AND HPMC: SOLID STATE CHARACTERIZATION

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ABSTRACT

Simvastatin (SV) is a drug with poor solubility. Its solubility can be enhanced by incorporating the suitable excipients. In this study, the excipients used were hydroxypropyl methylcellulose (HPMC) polymer matrix and β-cyclodextrin (β-CD). The technique used was solid dispersion. In equilibrium solubility study, different concentration of SV, HPMC and β-CD are used to make 13 samples consisting of binary and ternary system. Then, the solid state characteristics of the samples in these systems were characterized by using differential scanning calorimetry (DSC), x-ray diffraction (XRD), fourier transformed infrared spectroscopic (FTIR) and thermal gravimetric analysis (TGA). The comparison of solid state characteristics of pure material, SV is made by comparing it with the samples in binary and ternary system.

CHAPTER 1

INTRODUCTION

1.1 Background

Drug solubility improvement becomes the most important challenges in the field of pharmaceutics. Katy Margulis-Goshen et al 2009 reported that nearly 40% of new pharmacologically potent molecules show poor aqueous solubility which leads to poor bioavailability (Margulis-Goshen & Magdassi, 2009). According to biopharmaceutics classification system (BCS), drug substances are categorized into four categories based on their solubility (Yohei Kawabata et al., 2011). Drugs with low solubility and high permeability are classified as BCS Class II while drugs with low solubility and low permeability are under BCS class IV (Yohei Kawabata et al., 2011).

Statins or inhibitors of 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase is generally capable in lowering cholesterol (Priyanka Pandya et al., 2008). The statins differ with respect to their ring structure and substituents. The five statins currently in use are lovastatin (LV), rosuvastatin (RV), simvastatin (SV), atorvastatin (AV) and fluvastatin (FV) (Hojjati, Yamini, Khajeh, & Vatanara, 2007). LV is a naturally statin of fungal origin while SV is produced by semi synthetic