UNIVERSITI TEKNOLOGI MARA

STUDY ON DISSOLUTION BEHAVIOUR OF BETA SUCCINIC ACID IN ONE (1) ETHANOL SOLVENT USING MOLECULAR MODELLING METHOD

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1 CHAPTER 1 INTRODUCTION

1.1 Abstract

Succinic acid (SA) is a potential co-former that commonly used to produce co-crystal likes Carbamazepine-Succinic acid (CBZ-SA) co-crystal. The physicochemical properties of SA are of interest since they control the behavior of crystal in different environment. In this study, the morphology of co-former Succinic acid (SA) was referred to the previous study that have been done while the dissolution behavior of SA in ethanol was tested using dynamic simulation by considering the transport properties of both co-crystal and solvent. The predicted SA morphology shows a hexagonal-like shape with the chosen crystal facet of (1 0 0), (0 2 0), (1 1 1), (3 1 0) and (2 1 2). In this research work, the MD simulation of dissolution of β-succinic acid has been successfully carried out. Two main assessment done by analysis of mean square displacement (MSD) and radial distribution function (RDF). From the analysis, facet (3 1 0) has the highest dissolution coefficient tends to dissolve faster compare to the most morphological important crystalline facet.

1.2 Research Background

In the medicine and pharmacology industry, there are continuous advancement in research and development to produce a better drug. The advancement of technology can produce good drugs in terms of their raw material, simplicity of process, quality and quantity of the drugs, cleanliness and prices. Drugs is important for human as it can prevent or cure the disease.

Despite of that, the major concern of industries is the drug effectiveness on its dissolution ability due to dissolution rate (Nurul, Nili, Anuar, Azmi, & Othman, 2018). Human body will take a long time to consume if the drug have low dissolution rate. According to Vadlamudi, majority of pharmaceutical drugs in powder form have problems with stability and solubility (Vadlamudi & Dhanaraj, 2017). The solubility in water are poor for most of the active pharmaceutical ingredient (API) drugs (Cascone, 2017).

There are lot of method to counter the solubility problem. Most of pharmaceutical sector use co-crystallization method. Viertelhaus stated that the development of co-crystal helps to improve bioavailability without altering the API's functions (Viertelhaus & Hafner, 2015). Co-crystals