UNIVERSITI TEKNOLOGI MARA

STUDY ON COCRYSTAL FORMATION OF IBUPROFEN AND GLUTARIC ACID VIA SLOW COOLING TECHNIQUE

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ABSTRACT

Ibuprofen is non-steroidal anti-inflammatory drug (NSAID) that used to treat pain or inflammation and to reduce fever. It is fall under Biopharmaceutical Classification System (BCS) Class II which has low solubility but high permeability. In order to improve the bioavailability of ibuprofen, an engineering approach has been done. For that purpose, an engineering crystal approach is done by preparing the co-crystal of ibuprofen and co-former such as glutaric acid to help in improving drug solubility. The method used to prepare the co-crystal is slow cooling technique. Using this technique, there are several samples of ibuprofen-glutaric acid that successfully to perform co-crystal. The successful samples were characterized using Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC) and optical microscope in order to confirm their morphology and purity. The findings from the study shows that the result of FTIR shows that there is new bond formed from the interaction of ibuprofen and glutaric acid. The result from DSC showing that there is formation of new melting point in between pure component used in this experiment. Lastly, the optical microscope had successfully identify the morphology that revealed by the co-crystals**.**

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LIST OF FIGURES

CHAPTER 1

INTRODUCTION TO CO-CRYSTAL

1.1 RESEARCH BACKGROUND

The definition of term "cocrystal" is a subject of disagreement. This term has been debated in crystallography field. The simplest meaning of cocrystal can be define as a crystalline structure that made up of two or more components in a definite stoichiometric ratio, where the components may be atoms, ions or molecules. However, there is more inclusive meaning for cocrystal which is it composes of two or more components that form a unique crystalline structure having unique properties.(Wikipedia, n.d)

The discovery of cocrystal happened in 1844 by Friedrich Wohler. He was the person who studied the first reported cocrystal, quinhydrone. Quinhydrone is a type of cocrystal of quinone or hydroquinone. Archaically, it is known as quinol. From his studied, he has found that the material that made up the cocrystal was made up of 1:1 molar combination of the components. Then, this cocrystal of quinhydrone is continues analyzed by numerous groups over the next decade. From this research, several cocrystals were made using halogenated quinones. In 1990's, the cocrystals then are continued to be discovered. There is some discover the cocrystals by chance and there are also using screening techniques. The engineering of cocrystals with desired physical and chemical properties is