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CO –CRYSTALLIZATION OF ACETAMINOPHEN AND ACIDIC COMPONENTS OF *Labisia pumila*

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ABSTRACT

Acetaminophen and Kacip Fatimah (*Labisia Pumila*) are very popular in Malaysia. Malaysian may co-administer both compounds together without realizing the interaction between the compounds. The interaction may in the form of co-crystal formation. The interaction may produce beneficial or toxic effect in the body. The objective of this study is to investigate the feasibility of the co-crystal between acetaminophen and phenolic acid derivatives of Kacip Fatimah. Co-crystal is a crystal that structurally homogeneous containing two or more components in a specific ratio. The components consist of a neutral drug and a co-crystal former. The neutral drug may be the acetaminophen while the co-crystal former is phenolic acid such as gallic acid, caffeic acid and chlorogenic acid. Acetaminophen and phenolic acids had undergo the preliminary characterization using Differential Scanning Calorimetry (DSC), Powder X-ray diffraction (PXRD) and Attenuated Total Reflection Fourier Transform Infrared Spectroscopy (ATR-FTIR). This characterization shows that they do not interact with each other to form co-crystal. It also was proved by co-crystal formation and the Single Crystal diffraction (SCD). The crystal formed was acetaminophen crystal instead of co-crystal for all acetaminophen and phenolic acid combination. Thus, acetaminophen and phenolic acid derivatives of Kacip Fatimah may not interact with each other to form co-crystal.

Keywords: Acetaminophen, Kacip Fatimah, gallic acid, caffeic acid, chlorogenic acid, co-crystal.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Acetaminophen or mostly known as Paracetamol is broadly used as an analgesic. It is used to reduce fever and pain symptoms (Bertolini et al., 2006). The Malaysian customers also have increased interest in taking functional foods such as Kacip Fatimah. The definition of functional food is that any herbal food that can prevent or cure some diseases due to their medicinal properties (Rezai, Teng, Mohamed, & Shamsudin, 2012).

Labisia pumila (or locally known as Kacip Fatimah) is a very popular functional food in Malaysia. The popularity of Kacip Fatimah can be proved through many commercial products that are based on this plant such as capsules and canned drinks (Chua, Lee, Abdullah, & Sarmidi, 2012). The popularity of Kacip Fatimah makes it to be considered as high-value herbal product in agricultural National Key Economic Areas (NKEA) by the government (Zaki & Rani, 2013). It is widely used traditionally to maintain healthy female reproductive system, for the treatment of postpartum condition and to regain body strength (Chua et al., 2012). Kacip Fatimah also have analgesic effect like acetaminophen (Okechukwu, Ekeuku, Loshnie, & Akowuah, 2014). The Kacip Fatimah extract constitutes mostly phenolic compounds such as phenolic acids and flavonoids. Phenolic acid can be divided into two classes, cinnamic acid and benzoic acid.