

## ABSTRACT

### CHARACTERIZATION OF *p*-METHOXYCINNAMICACID (*p*MCA)- $\beta$ -CYCLODEXTRIN INCLUSION COMPLEX (Prepared By Solvent Drop Grinding Method)

Beatrice

**Abstract:**

*p*-Methoxycinnamic acid (*p*MCA) is the substance hydrolyzed from ethyl *p*-methoxycinnamic. *p*MCA has analgesic and anti-inflammatory effect, but it has low solubility in water (0.712 mg/mL) at temperature of 25°C. The low solubility can affect to low bioavailability and onset of action of *p*MCA. One of the solutions to this problem is to form an inclusion complex with  $\beta$ -cyclodextrin ( $\beta$ CD) with solvent drop grinding method in order to improve its solubility; where inclusion complex is formed by mechanical interaction between substances which was improved by the existence of solvent. The purpose of this study was to characterize inclusion complex of *p*MCA- $\beta$ CD prepared in 1:1 molar ratio with solvent drop grinding method compared to *p*MCA and physical mixture of *p*MCA- $\beta$ CD. The inclusion complex, *p*MCA and physical mixture of *p*MCA- $\beta$ CD was characterized by Powder X-Ray Diffraction analysis (PXRD) at  $2\theta$  from 5° to 40°, Fourier Transform Infrared Spectroscopy (FTIR) at 4000-450 cm<sup>-1</sup>, and Differential Thermal Analysis (DTA) at 30-300°C with the speed of heating 10°C/min. The diffractogram of inclusion complex *p*MCA- $\beta$ CD showed the lower intensity of the *p*MCA peak lines. The DTA study showed the endothermic peak of inclusion complex was shift to higher temperature at 175.2°C. FTIR spectra showed the loss of *p*MCA's aromatic group and O-H carboxylic functional group in inclusion complex spectrum. These changing of characteristics proved that inclusion complex prepared by solvent drop grinding method has different characteristic from *p*MCA and physical mixture of *p*MCA- $\beta$ CD.

**Keyword** : characterization, inclusion complex, solvent drop grinding method, *p*-methoxycinnamic acid,  $\beta$ -cyclodextrin