

## ABSTRACT

**The Effect of Hydroxypropyl- $\beta$ -cyclodextrin (HP $\beta$ CD) as Inclusion Complex Forming Compound on Solubility of *para*-Methoxycinnamic Acid (APMS) at Various pH**

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*para* Methoxycinnamic Acid (*p*MCA) is the hydrolysis compound from ethyl-*p*-methoxycinnamate (EPMC) which considered as the largest amount of compound in kencur (*Kaempferia galanga*). *p*MCA has analgesic and antiinflammation activity. However, it has poor solubility on water. Thus, inclusion complex formation can be performed to increase the *p*MCA solubility. Inclusion complex is one of the complex system formed by the existence of guest molecule trapped in the host molecule. Hydroxypropyl- $\beta$ -cyclodextrin (HP $\beta$ CD) is a host with an ability to form inclusion complex. *p*MCA is considered as a weak acid with pKa value of 4,04. Its solubility is affected by pH because the change of pH can cause the amount change of ionic and non-ionic state. In the formation of inclusion complex, non-ionic state will enter into HP $\beta$ CD easily and form a more stable complex than ionic state. The result of this study indicated that the addition of HP $\beta$ CD 0,01 M had a positive effect to increase the solubility of *p*MCA at pH 2,0; 3,0; 4,0; 5,0; 6,0 and 7,0. The increase of pH led to percentage increase of *p*MCA solubility with 0.01 M HP $\beta$ CD becoming smaller. However, the *p*MCA solubility increase at pH 2.0 was not greater than pH 3.0. Based on t-test, there was difference between *p*MCA solubility in various pH of buffer solution without and with HP $\beta$ CD 0,01 M. It is suggested to use buffer component which has no effect to HP $\beta$ CD structure in subsequent study.

Keywords: inclusion complex, *para* methoxycinnamic acid (*p*MCA), hydroxypropyl- $\beta$ -cyclodextrin (HP $\beta$ CD), pH, solubility enhancement.