SYNTHESIS OF PARACETAMOL DERIVATIVES USING THE PEROXIDASE ENZYME FROM CAULIFLOWER

By

Yola Krisna
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SWISS GERMAN UNIVERSITY
EduTown BSD City
Tangerang 15339
Indonesia

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

Yola Krisna

Student

Date

Approved by:

Hery Sutanto, M.Si.

Thesis Advisor

Date

Yulia Anita, M.Sc.

Thesis Co-Advisor

Date

Dr. Dipl.-Ing. Samuel P. Kusumocahyo

Dean

Date

ABSTRACT

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By

Yola Krisna
Hery Sutanto, M.Si, Advisor
Yulia Anita, M.Sc, Co-Advisor

SWISS GERMAN UNIVERSITY

Paracetamol or acetaminophen is classified as a mild analgesic and commonly used as an active pharmaceutical ingredient as a pain reliever and fever reducer and other minor aches and pains. Unfortunately, a little overdose of paracetamol may cause hepatoxocity or liver injury which lead to liver failure, liver transplant, or death. Reduction of paracetamol by cytochrome P-450 enzymes in the liver cells are produce NAPQI (*N-acetyl-p-benzoquinone imine*), a toxic metabolite that may cause a liver tissue injury. To prevent an oxidation of paracetamol, a dimer of paracetamol was synthesize to protect paracetamol from being oxidized. An enzymatic oxidative coupling synthesis reaction may produce several possible paracetamol derivatives products besides the dimeric compound as our main interest. Peroxidase enzyme as a catalyst was extracted from cauliflower, part of Brassicaceae family. A cation radical compound as the product of the reaction between peroxidase enzyme and hydrogen peroxide, initiates the dimerization of paracetamol through termination of the radicals. Based on the antioxidant activity assay using DPPH method, the antioxdidant activity of dimer of paracetamol is higher than paracetamol.

Keywords: Paracetamol, synthesis reaction, dimerization, dimer of paracetamol, peroxidase enzyme, antioxidant activity, cauliflower.

DEDICATION

I dedicate this thesis for my parents, my brother and everyone who has supported and encourage me during the work.

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