UNIVERSITI TEKNOLOGI MARA

CHEMICAL STUDIES OF 3-PYRROLIN-2-ONE FOR THE SYNTHESIS OF γ-LACTAM γ-LACTONE

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of the requirements for the degree of
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CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 14th January 2015 to conduct the final examination of Aimi Suhaily binti Saaidin on her Master of Science thesis entitled " Chemical studies of 3-pyrrolin-2-one for the synthesis of γ-lactam γ-lactone" in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

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I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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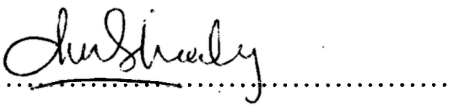
Signature	:	
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ABSTRACT

Unsaturated pyrrolidinone has been extensively studied due to its unique structure and its presence in various biologically active natural compounds. In this study, 3-pyrrolin-2-one, **162** has been constructed *via* five steps which included condensation of glycine methyl ester and methyl malonyl chloride, Dieckmann cyclization, decarbomethoxylation, reduction and elimination with an overall yield of 33%. The synthesized compound **162** was then used as the intermediate for a few chemical transformations such as Michael addition and epoxidation reaction. Synthesis of fused bicyclic 3,4-γ-lactone-γ-lactam towards mescaline isocitrimide was also attempted. The synthetic approach was divided into two different routes. The first route began by insertion of dimethyl malonate onto the synthesized intermediate of 3-pyrrolin-2-one *via* Michael addition reaction, followed by methylation of the β-diester and bromination at C3 position. However, the bromination reaction failed to give us the desired product which then diverted us to the second route. In this route, the γ-lactone-γ-lactam ring system was successfully synthesized by coupling readily available benzylated glycine methyl ester and methyl malonyl chloride followed by Dieckmann cyclization, alkylation at C3 position and Krapcho decarboxylation. The fused bicyclic ring was afforded through stereoselective reduction which accompanied concomitant lactonization with an overall yield of 0.8%. In brief, we have developed an operationally simple procedure towards the synthesis of 3-pyrrolin-2-one and fused bicyclic 3,4-γ-lactone-γ-lactam ring skeleton. The results extracted from this study thus far may be used to develop new scientific knowledge and remarkable findings.

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