UNIVERSITI TEKNOLOGI MARA

STRUCTURE ELUCIDATION OF TRANSFORMED METABOLITES FROM BIOACTIVE COMPOUNDS USING MICROBIAL TRANSFORMATIONS AS A GREEN SYNTHETIC TOOL

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AUTHOR'S DECLARATION

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

I, hereby, acknowledge that I have been supplied with the Academics Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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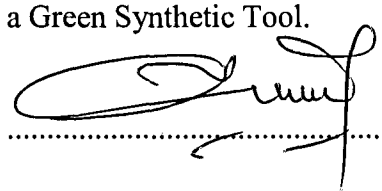
Signature of Student	:	
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ABSTRACT

Biotransformation is considerably one of the foundational pillars of green chemistry practice. Chemical modification through biotransformation are performed in mild condition, room temperature, in water based syntheses pot and can provide efficient alternative to chemical syntheses as the microbial transformation can reduce the use and generation of hazardous substances. Biotransformation is an important tool for modification of organic compounds, especially natural product with complex structures like steroids. Microorganisms whole cell based biotransformation have been carried out by using steroidal compounds as starting point and few range of fungi have been screened in this bioconversion activity. This research has been focused on the structural modifications of steroids mediated by fungi, in order to investigate the effect of culture on substrate. In the study we have chosen to investigate the effect of *Trichothecium roseum* and SSW endophyte and it has been carried out for the first time. Biotransformation of tibolone by fungal *Trichothecium roseum* yielded five metabolites. The hydroxylations were mainly undergone in rings A, B and C, especially at C-3, C-6 and C-12 positions. The structural modification of an anti-inflammatory drug, prednisolone by a marine endophytic fungus coded as SSW isolated from marine algae sea weed was reported for the first time. The biotransformation led to the formation of a known compound named 20β-hydroxy prednisolone. Transformation of 21-acetylprednisolone was done in parallel with prednisolone in order to see the effect of side chain of prednisolone in biotransformation. Endophytic fungus *Penicilium lapidosum* (SSW) also gave a positive result on deacetylation of 21-acetylprednisolone to prednisolone in two days fermentation and finally transformed to 20β-hydroxyprednisolone after six days fermentation. The absolute configuration of 20β-hydroxyprednisolone was also confirmed first time by both experimental and calculated chemical coupling constants and ECD spectra. The isolation and identification of marine endophytic fungus SSW was successfully performed in this study. The SSW strain sequence was blasted in National Centre for Biological Information (NCBI) Genebank. The blast showed 99% homology with *Penicilium lapidosum* database sequence.

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TABLE OF CONTENT