

**UNIVERSITI TEKNOLOGI MARA**

**ISOLATION AND IDENTIFICATION  
OF ALKALOIDS AND NON-  
ALKALOIDAL COMPOUNDS FROM  
*PANDANUS PYGMAEUS*, *PANDANUS  
CONOIDEUS* AND *PANDANUS  
LERAM***

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Thesis submitted in fulfillment  
of the requirements for the degree of  
**Master of Science**

**Faculty of Pharmacy**

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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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## ABSTRACT

A phytochemical investigation in order to isolate alkaloids was performed on the middle polar extract of three non-aromatic *Pandanus* species which are *Pandanus pygmaeus* (*P. pygmaeus*), *Pandanus conoideus* (*P. conoideus*) and *Pandanus leram* (*P. leram*). All of these plants were subjected to neutral extraction and were successively macerated with hexane, dichloromethane (CH<sub>2</sub>Cl<sub>2</sub>) and methanol (MeOH). Dragendorff's reagent was used in a preliminary test to detect the presence of alkaloids in plant extracts. The crude extracts of these three *Pandanus* species produced positive results with Dragendorff's reagent. The crude extracts were then further fractionated and purified using various chromatographic techniques including flash column chromatography, open column chromatography, centrifugal thin-layer chromatography (Chromatotron<sup>TM</sup>) and preparative thin layer chromatography (prep TLC). The structural elucidation of compounds was established based on spectroscopic evidence of 1D and 2D nuclear magnetic resonance (NMR) and mass spectroscopy (MS), and comparison with literature values. A total of three alkaloids were isolated from the extracts of two *Pandanus* species, *P. pygmaeus* and *P. conoideus*. Phytochemical studies on CH<sub>2</sub>Cl<sub>2</sub> extract of *P. pygmaeus* leaves resulted in the isolation of two alkaloids, and one of which is new. The isolation of known indolizidine alkaloid, pygmaeusamine and its isomer, pygmaeusamine-B was a major success and therefore, the hypothesis of this study is accepted. In addition, the structure of pygmaeusamine-B showed C<sub>9</sub>-N-C<sub>9</sub> skeleton and consists of two lactone moieties. Thus, it supported the suggested nomenclature of *Pandanus* alkaloids. Further investigation on CH<sub>2</sub>Cl<sub>2</sub> extract of *P. conoideus* roots yielded one steroidal type of alkaloid. All of the alkaloids isolated from these two *Pandanus* species are from non-acid base extraction and suggested that these alkaloids are natural products and not the experimental artifacts. In short, this is the first documented occurrence of novel *Pandanus* isomer, and the steroid alkaloid from *P. pygmaeus* and *P. conoideus*, respectively. Along the investigation on these three *Pandanus* species, one aromatic compound, biphenyl was isolated from *P. pygmaeus* and two terpenes, stigmastenone and β-sitostenone were isolated from CH<sub>2</sub>Cl<sub>2</sub> extract of *P. conoideus* roots and chloroform fractions of *P. leram* leaves which are also believed to be the first report related to the plant species.

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