UNIVERSITI TEKNOLOGI MARA

CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITIES OF *SCAPHIUM MACROPODUM* (MIQ.) BEUMEE AND *SAPIUM BACCATUM* (ROXB.)

LAODE MUHAMMAD RAMADHAN AL MUQARRABUN

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of the requirement for the degree of
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AUTHOR'S DECLARATION

I declare the work in this thesis was carried out in accordance with the regulations 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 other academic institution or non-academic institution for any degree qualification.

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

Name of student : Laode Muhammad Ramadhan Al Muqarrabun

Student ID No. : 2011810156

Programme : Master of Science

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Signature of Student : .....

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ABSTRACT

The stem barks of *Scaphium macropodum*, known as Kembang Semangkuk Jantung (Malay), and *Sapium baccatum*, known as Ludai (Malay), have been investigated for their phytochemical and pharmacological properties. Several chromatographic techniques were used to separate the chemical compounds including Vacuum Liquid Chromatography (VLC), Radial Chromatography (RC) and Column Chromatography (CC). A new sesquiterpene named malayscaphiol (**SM4**) along with two lupane triterpenes, lupeol (**SM1**) and lupenone (**SM2**) and stigmasterol (**SM3**), were successfully isolated from the stem bark of *S. macropodum*, while a new triterpene, malaytaraxerate (**SB3**), along with two oleanane triterpenes, taraxerol (**SB1**) and taraxerone (**SB2**), docosyl *trans*-isoferulate (**SB4**) and docosanoic acid-2',3'-dihydroxypropyl ester (**SB5**) were identified from the stem bark of *S. baccatum*. The structures of the compounds were determined using several spectroscopic methods, i.e. mass spectrometry (MS), UV-Vis, FT-IR, 1D and 2D NMR including HMQC, HMBC, COSY and NOESY. Several isolated compounds were subjected to cytotoxicity and anti-cholinesterase (anti-AChE) assays to identify their biological properties. Six compounds i.e. **SM1**, **SM2**, **SM3**, **SB2**, **SB4** and **SB5** were subjected to cytotoxicity assay. All the tested compounds demonstrated weak anti-cancer activity against HT-29 and MDA-MB cell lines, with **SM1** and **SM2** exhibited the strongest cytotoxicity among the tested compounds against HT-29 and MDA-MB, respectively. Only **SM1** showed toxic effect towards normal cell line (3T3) with IC_{50} of 38.92 μg/mL. For anti-AChE assay, three compounds were tested i.e. **SM1**, **SM2** and **SB2**. All the tested compounds exhibited insignificant anti-AChE activity at concentration of 1000 μg/mL. The IC_{50} of the tested compounds could not be determined, because there was only one data point available in this test. Their anti-AChE activity were significantly lower than the standard tacrine (IC_{50} = 25 μg/mL).

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