

**ISOLATION AND CHARACTERISATION OF CHEMICAL CONSTITUENTS FROM
Myrmecodia tuberosa (RUBIACEAE)**



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1. Letter of Report Submission

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Assistant Vice Chancellor (Research)
Research Management Institute (RMI)
Universiti Teknologi MARA
40450 Shah Alam

Dear Professor,

**FINAL RESEARCH REPORT “ ISOLATION AND CHARACTERISATION OF
CHEMICAL CONSTITUENTS FROM *Myrmecodia tuberosa* (RUBIACEAE)”**

With reference to the above, I am pleased to submit two hard copies and one soft copy in CD of the Final Research Report entitled “Isolation and Characterisation of Chemical Constituents from *Myrmecodia tuberosa* (Rubiaceae)”.

Thank you.

Yours faithfully



KHONG HENG YEN
Leader
Research Project

5. Report

5.1 Proposed Executive Summary

Medicinal plants have been used for centuries as remedies for human diseases as they contain components of therapeutic value. Most of the modern medications are derived originally from ancient herbal traditions. Previous studies have revealed that *Myrmecodia* species isolated flavanoids as the major compounds. In addition, chemical compounds derived from *Myrmecodia* species also exhibited interesting biological activities, including cytotoxic, antibacterial, antidiabetic and anti-cancer. It would be interesting therefore, to identify the bioactive compounds of *Myrmecodia tuberosa* from Sarawak and determine their anti-diabetic and antioxidant properties.

This study will be conducted on the barks of *Myrmecodia tuberosa*. Powdered air-dried barks samples of *M. tuberosa* (2-3 kg) will be extracted in methanol to yield methanol crude extracts and then will be fractionated, isolated and purified using chromatographic methods. Analyses for structural elucidations of pure bioactive compounds will involve the modern spectroscopic techniques such as NMR, FTIR and MS. All the crude extracts and pure compounds (subject to the availability) will be assayed for the anti-diabetic and antioxidant, which will be carried out based on slight modified Matsui et al. (1996) method and the 2,2-diphenyl-1-picrylhydrazyl (DPPH) respectively.

The isolation and characterization of these bioactive compounds derived from the barks of *Myrmecodia tuberosa* will lead us to establish a chemical and biological profile of the extract for standardization and product development. The outcome of this project is a document of medicinal plants rich in bioactive compounds for further investigation for potential in drug development. Moreover, it will also provide useful information for biotechnology research and development based on government National Biotechnology Policy to develop products derived from local plants and herbs.

5.3 Introduction

Myrmecodia tuberosa locally known as “Sarang Semut”, belongs to Rubiaceae family. *Anthorrhiza*, *Hydnophytum*, *Myrmecodia*, *Myrmephytum* and *Squamellaria* are the five known genera belong to the family of Rubiaceae that has tuber and epiphytic myrmecophytes (Huxley and Jebb, 1991). *Hydnophytum* has the widest distribution while the *Myrmecodia* genus has the second-widest distribution in the world (Thompson, 1981). *Myrmecodia* sp. can be found in Malaysia, Philippines, south to the Cape York Peninsula in Queensland, southern Thailand, Cambodia, Vietnam and New Guinea (Huxley, 1978). Usually, the genera of *Hydnophytum* and *Myrmecodia* species are associated with *Iridomyrmex* ant species. However, other ant species of the genera like *Anaplolepis*, *Camponotus*, *Crematogaster*, *Pedomyrma*, *Pheidole*, *Polyrachis*, *Monomorium*, *Technomyrex*, *Turneria*, and *Vollenhovia* also reported live in the tuber of this plant (Wilson, 1961). The ant-plants are saturated by ant colonies, (Plummer, 2000) and they are aggressive towards enemies of the host plant and are important for plant defense, (Kahkonen *et.al.*, 1999). Plant parts produce sweet secretions consumed by the ants, (Pacini and Nepi, 2007) and the plant utilizes directly nutrients derived from animals, (Blois, 1958).



Pack of *M.tuberosa* sale at night market, Sabah



Natural habitat of *M. tuberosa*

The plant is traditionally used in Malaysia and Indonesia as an alternative treatment for cancer and tumor especially, in breast, liver, lung, ovarian and brain cancer. This plant is also used to lowering the glucose level in the blood. Thus, the