UNIVERSITI TEKNOLOGI MARA

PHYTOCHEMISTRY OF *Macaranga hosei* (EUPHORBIACEAE) AND *Myrmecodia tuberosa* (RUBIACEAE)

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ABSTRACT

Phytochemical studies on *Macaranga hosei* and *Myrmecodia tuberosa* were conducted with the aim of isolating bioactive compounds. This study also aims to determine anti-microbial and antioxidant properties of the crude extracts and some isolated pure compounds for *Macaranga hosei* and as well as to identify antioxidant, antimicrobial, antidiabetic, anticancer and total phenolic contents of *Myrmecodia tuberosa*. The phytochemical study was carried out using various chromatographic methods, included thin layer chromatography (TLC), preparative thin layer chromatography (PTLC), column chromatography, sephedex LH-20 and radial chromatography while the crude extracts and isolated pure compounds were also assayed for the antibacterial based on minimal inhibitory concentrations (MIC) and minimum bacterial concentration (MBC), antioxidant based on DPPH scavenging activities, antidiabetic based on α-glucosidase assay, anticancer based on MTT assays and total phenolic content using the modifications of Folin ciocalteu assay. The structures isolated pure compounds elucidated using modern spectrophotometry methods such as ^{1}H NMR, ^{13}C NMR, APT, HMBC, HMQC, COSY, FTIR and GC-MS. Six pure compounds, namely taraxerone (**S1**), taraxerol (**S2**), epitaraxerol (**S3**), stigmasterol (**S4**), β-sitosterol (**S5**) and taraxerene (**S6**) were successfully isolated from *M. hosei* while three pure compounds, namely oleanane (**M1**), stigmasterol (**M2**) and β-sitosterol (**M3**) were isolated from *M. tuberosa*. The chloroform and methanol crude extracts for both bark and leaves of *M. hosei* showed very strong DPPH activities while all isolated pure compounds tested were not active. The chloroform crude extracts for both leaves and bark were active and able to inhibit and kill the bacterial used in this study compared to other extracts and pure compounds. The bioassays study on *M. tuberosa* indicated that this plant has a high concentration of phenolic contents, high antioxidant activity, moderate α-glucosidase activity and strong cytotoxicity activities against HT-29, HELA, and MCF-7.

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CHAPTER ONE
INTRODUCTION

1.1 General Introduction

All living organisms produce numerous chemical substances that are called natural products. The two types of natural products are primary metabolites that are essential for body functions, for examples carbohydrates, proteins and fats while secondary metabolites that essential for the survival of organism itself, for examples codeine, morphine, digoxin and quinine. It is not always understood why particular plants produce specific secondary metabolites but some of them are known to have definite functions; for example, some are toxic and form a defense system against predators, while some are attractive to insects and aid pollination.

Since ancient times, plants have been a primary source of medicine and have influenced culture, thought and economic activity of human beings through the ages (De, 1980a). The traditional medical practitioners used various types of medicinal plants for curing various diseases (Khera, 2011). Plants remain vital sources of medicines for a large number of the world population, especially in the developing countries (WHO, 2002) because most of the community in a developing country cannot afford to buy expensive modern pharmaceutical drugs.

Besides, the growing interest in alternative therapies and the therapeutic uses of natural products, especially those derived from plants (Mentz and Schenkel, 1989) is due to several reasons such as side effects of synthetic drugs, economic constraint of poor country and cultural values. More than 80 percent of the people living in Africa use plant and animal-based medicines (Daniel, 2000).

Most of the modern medications are derived originally from herbal plants (Al-Bakri and Afifi, 2007). The traditional knowledge about the medicinal plant is recruiting from the older generation to the younger generation in the verbal form from one person to another. The younger generation is more dependent on western medicine and they are not interested in studying traditional remedy. Therefore, they are unable to recognize the name and the uses of herbs and possess very little knowledge of traditional herbal remedies. After a few generations, only a few people