

ELUCIDATING THE ANTIOXIDANT PROPERTIES OF *Eleutherine palmifolia* (L.) Merr, *Arcangelisia flava* (L.) Merr, and *Myrmecodia tuberosa* Jack

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ABSTRACT

Eleutherine palmifolia (L.) Merr, *Arcangelisia flava* (L.) Merr, and *Myrmecodia tuberosa* Jack are indigenous plants traditionally used by the Dayak Iban tribe to treat various diseases as natural medicines. Previous research on these plants revealed a variety of bioactivities, including anticancer, antifungal, antidiabetic, and antibacterial effects. However, information on these plants is scarce. In addition, despite being prevalent in Borneo, *M. tuberosa* has received little interest in research unlike its other species from the same genus. This study aims to investigate the phytochemicals from *E. palmifolia*, *A. flava* and *M. tuberosa* using cold maceration and Soxhlet extraction. In this study, the weight of *E. palmifolia*, *A. flava* and *M. tuberosa* before extraction processes were 51.94 g, 87.83 g and 21.25 g respectively, which were grounded into powder and extracted using both extraction techniques using different solvents (*n*-hexane, chloroform, ethyl acetate and methanol). The total phenolic content (TPC), total flavonoid content (TFC), and radical scavenging assay (RSA) using 2,2-diphenyl-1-picrylhydrazyl (DPPH) were investigated to assess the antioxidant potential. The extraction of *E. palmifolia*, *A. flava* and *M. tuberosa* extracts yielded various crude extracts, with the methanolic extract of *A. flava* through cold maceration showing the highest RSA with IC₅₀ value (10.06±2.89 µg/mL). The methanolic extract of *M. tuberosa* obtained using the Soxhlet method exhibited the highest RSA with IC₅₀ value (78.89±7.13 µg/mL). For cold maceration, the ethyl acetate extract of *M. tuberosa* exhibited the highest TPC value (343.74±11.26 mg GAE/g extract), whereas the *n*-hexane extract of *M. tuberosa* obtained using the Soxhlet method displayed the highest TPC value (251.00±363.43 mg GAE/g extract). The TFC values varied across extracts, with the ethyl acetate extract of *E. palmifolia* through cold maceration displaying the highest TFC value (74.23±1.68 mg RE/ g extract). The *n*-hexane extract of *E. palmifolia* obtained using the Soxhlet method showed the highest TFC value (61.51±0.65 mg RE/ g extract). The antioxidant analysis showed that the methanolic extracts of *A. flava* obtained through cold maceration and methanolic extracts of *M. tuberosa* extracted from the Soxhlet method exhibited the uppermost capacity to inhibit free radicals by 50%. However, the cold maceration technique yields an extract richer in phenolic compounds than the Soxhlet extraction method.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

The existence of promising medicinal compounds in plant phytochemicals makes them a popular source for newly developed drugs (Verma & Singh, 2008). This is a result of the widespread discovery of medicinal plants, which have enormous health advantages for people and may be used as an inexpensive alternative to pharmaceuticals. For example, aloe vera gel is used by individuals to treat minor illnesses, wounds, cuts, and sunburns (Tiwari & Upadhyay, 2018). Most commonly, ginger is used to cure colds and coughs. It is well known for having expectorant qualities, which help to thin and expel mucus from the trachea, bronchi, and lungs (Sarvananda et al., 2017). In the meantime, turmeric is frequently used as a medication. It helps stop the growth of bacteria, harmful microorganisms, and germs. Hence for the development of industrial and health medicine, the Dayak tribe's traditional knowledge of multiple kinds of medicinal plants is significant (Az-Zahra et al., 2021). *Eleutherine palmifolia* (L.) Merr (Dayak onion or 'bawang Dayak'), *Arcangelisia flava* (L.) Merr (yellow root or 'kayu kuning') and *Myrmecodia tuberosa* Jack locally known as ant plant