Antioxidants, Phytochemicals, and Cytotoxicity Studies on \textit{Phaleria macrocarpa} (Scheff.) Boerl Seeds

Ma Ma Lay,\textsuperscript{1} Saiful Anuar Karsani,\textsuperscript{1,2} Behrooz Banisalam,\textsuperscript{1} Sadegh Mohajer,\textsuperscript{1} and Sri Nurestri Abd Malek\textsuperscript{1}

\textsuperscript{1} Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia
\textsuperscript{2} University of Malaya Centre for Proteomics Research (UMCPR), University of Malaya, 50603 Kuala Lumpur, Malaysia

Correspondence should be addressed to Ma Ma Lay; mamalayster@gmail.com

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In recent years, the utilization of certain medicinal plants as therapeutic agents has drastically increased. \textit{Phaleria macrocarpa} (Scheff.) Boerl is frequently used in traditional medicine. The present investigation was undertaken with the purpose of developing pharmacopoeial standards for this species. Nutritional values such as ash, fiber, protein, fat, and carbohydrate contents were investigated, and phytochemical screenings with different reagents showed the presence of flavonoids, glycosides, saponin glycosides, phenolic compounds, steroids, tannins, and terpenoids. Our results also revealed that the water fraction had the highest antioxidant activity compared to the methanol extract and other fractions. The methanol and the fractionated extracts (hexane, chloroform, ethyl acetate, and water) of \textit{P. macrocarpa} seeds were also investigated for their cytotoxic effects on selected human cancer cell lines (MCF-7, HT-29, MDA-MB231, Ca Ski, and SKOV-3) and a normal human fibroblast lung cell line (MRC-5).

Information from this study can be applied for future pharmacological and therapeutic evaluations of the species, and may assist in the standardization for quality, purity, and sample identification. To the best of our knowledge, this is the first report on the phytochemical screening and cytotoxic effect of the crude and fractionated extracts of \textit{P. macrocarpa} seeds on selected cells lines.

1. Introduction

Herbal medicine plays a key role in the development of pharmaceuticals and thus there is a high demand in natural medicine for the global market. Although there are thousands of species listed as medicinal plants, only a small number are commercially used in traditional treatments. In this respect, there are very few in-depth scientific studies on the medicinal properties of plants. However, traditional herbal medicine is still prominent and is considered an important alternative to conventional medicine particularly in developing countries. Despite its well-known benefits, \textit{Phaleria macrocarpa} (Scheff.) Boerl is still relatively unknown in terms of its biochemical constituents and biological activity. \textit{P. macrocarpa} is a plant commonly used in East Asian herbal medicines. \textit{P. macrocarpa} is used as a remedy for a variety of ailments such as cancer, diabetes mellitus, allergies, liver and heart diseases, kidney failure, blood diseases, high blood pressure, and stroke. It is also used to treat various skin diseases including acne [1, 2].

\textit{P. macrocarpa} plantshave round, oval shaped seeds that have a diameter of approximately 1 cm. The seed is the most poisonous part of the plant, having higher toxicity levels than the stem, roots, and leaves. \textit{P. macrocarpa} fruits and leaves are used in traditional medicine as a concoction. The seeds which have an unpleasant odor are usually used for the treatment of skin diseases. The compounds quercetin and naringin have been found in the seeds [3]. The essential oils of the seedconsist of heptadecane, octadecane, diclosan, triclosan, vinyl laurate, and dioctyl ester [4]. Another study reported the presence of Mahkoside A and kaempferol 3-\textbeta-D-glucoside in the seeds [5]. Two novel compounds, 29-norcucurbitacin and desacetylfevicordin A, and three known 29-norcucurbitacin derivatives have also been isolated from the ethyl acetate fraction of \textit{P. macrocarpa} seeds [6].