Antioxidant Properties of Selected Etlingera and Zingiber Species (Zingiberaceae) from Borneo Island

Farrawati Sabli, Maryati Mohamed, Asmah Rahmat, Halijah Ibrahim and Mohd Fadzelly Abu Bakar

Laboratory of Phytochemistry and Phytotherapy, Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah, Malaysia
Faculty of Civil and Environmental Engineering, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400, UPM, Serdang, Selangor, Malaysia
Institute of Biological Sciences, Faculty of Science, Universiti of Malaya, 50603, Kuala Lumpur, Malaysia

Corresponding Author: Mohd Fadzelly Abu Bakar, Laboratory of Phytochemistry and Phytotherapy, Institute of Tropical Biology and Conservation, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah, Malaysia

ABSTRACT
In this study, total phenolic and flavonoid contents as well as antioxidant properties of methanolic extracts of rhizomes and stems of four Zingiberaceae (Etlingera belalongensis, Etlingera velutina, Zingiber cinoem and Zingiber pseudopungens) were investigated. Evaluation of antioxidant activity was conducted using 1,1-diphenyl-2-picrylhydrazyl free radical-scavenging (DPPH) assay, 2,2'-azino-bis-3-ethylbenzothiazoline-6-sulphonate radical scavenging (ABTS) assay and Ferric-Reducing Antioxidant Power (FRAP). The results showed the total phenolic and total flavonoid contents were in the range of 5.5-41.7 mg gallic acid equivalent/g and 1.09-5.86 mg catechin equivalent/g of dry sample, respectively. The antioxidant activities of the extracts as assessed by using DPPH and FRAP assays were strongly correlated with all phytochemical tested (p<0.05). As a conclusion, selected tropical gingers found in Sabah investigated in this study can be developed as natural antioxidant agents.

Key words: Zingiberaceae, antioxidant activity, total phenolic contents, total flavonoid

INTRODUCTION
Zingiberaceae is a valuable herb that has been used in traditional medicine since many years. About 40 species of the genus of Etlingera and 29 species of the genus of Zingiber can be found in Borneo Island (Poulsen, 2006). Seventy percent (70%) of the total number of Etlingera species can be found here in Sabah (Poulsen, 2006).

Antioxidant is a substance that can fight and destroy excess free radicals and repair oxidative damage. Nowadays, the synthetic antioxidants are widely used in the food industry and also included in the human diet. The use of natural antioxidant is safer than synthetic antioxidants (Zheng and Wang, 2001). Phytochemicals are compound that benefit to health can be found in herbs, fruit and plants. Polyphenols are the main bioactive phytochemicals that have been shown to prevent many types of chronic diseases such as cancer and cardiovascular diseases.

The natural antioxidant from medicinal plants is widely studied nowadays. Traditionally, Zingiberaceae family are often used as ingredient in 'Jamu' (Indonesian traditional herbal