Antioxidant Potential and Phenolic Content of Ethanolic Extract of Selected Malaysian Plants

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Abstract

This study evaluated the antioxidant capacity and total content of phenolic compounds in an ethanolic extract of some commonly consumed raw Malaysian plants. The antioxidant activities of the samples were measured by two different methods while the Folin–Ciocalteau reagent assay was used to estimate the phenolic contents of extracts. Cosmos caudatus extract showed the highest antioxidant potential followed by Centella asiatica, Oenanthe javanica, Euodia redevi and Ocimum basilicum extracts respectively in both DPPH free radical scavenging activity and Superoxide Dismutase Activity Assays. Although the highest total phenolic content was found in Cosmos caudatus extract, there is no positive correlation between evaluated antioxidant activities and the phenolic contents of examined plants.

Keywords: Radical scavenging, superoxide dismutase, phenolic content.

Introduction

Malaysians consume some raw plants as side dishes termed indigenously as ULAMS. The medical potential of some of these plants, which were also applied as traditional medicinal plants has been reported. Centella asiatica was shown to have the ability of reducing age-related decline in cognitive function and mood disorder in the healthy elderly, improving venous wall alterations in chronic venous hypertension and protecting the venous endothelium. Antiviral and antiangiarial capacities of Ocimum basilicum oil and anti-hepatitis activity of Oenanthe javanica are some examples of reported medicinal uses for ULAMS.

Different forms of free radicals such as nitric oxide and the alkoxyl radicals, were produced through aerobic respirations and increase the risk of chronic diseases. Application of a healthy diet including edible antioxidants can help human body to neutralize these free radicals and reduce the oxidative stress damages. Plants are good source of edible antioxidants such as ascorbic acid, tocopherols, carotenoids and several phenolic compounds.

Among all plant secondary metabolites which act as antioxidants phenolic compounds form a large and varied group. Phenolic compounds contribute significantly to the antioxidant potential of several plant species. A positive linear correlation between total phenolic contents and antioxidant activities for aqueous and methanolic extracts of different Chinese medicinal plants and different Jordanian plant species was shown.

There are different methods to estimate the antioxidant potential of a plant samples. 2,2-diphenyl-1-picrylhydrazil (DPPH) free radical scavenging assay is one of the most common applied methods. Evaluation of antioxidant capacity Cocoa, teas, red wine, brown alga, sorghum, sweet potato, mushrooms and fruits using 2,2-diphenyl-1-picrylhydrazil (DPPH) free radical scavenging assay show the capability of this method to be used for different types of samples. Superoxide Dismutase (SOD) Activity Assay is another commonly used technique which is applied to measure antioxidant activity of different samples. The method was first defined by McCord and Fridovich and later was modified by several of other researchers such as Oberley and Spitz.

Although antioxidant capacity of some ULAM methanolic and aqueous extracts was examined, the antioxidant activities of ethanolic extracts of some selected ULAMS were evaluated in this study. Total phenolic content of the ethanolic extracts of specific plant parts was also measured to study the total content of phenolic compounds and the correlation of antioxidant potential in different parts of the AP plant body.

Material and Methods

Chemicals: Hydrogen peroxide (H₂O₂) was obtained from UNI-CHEM (South Kearny, N.J.). 2, 2'-diphenyl-1-picrylhydrazil (DPPH*). Tert-butylated hydroxytoluene (BHT) and ascorbic acid (vitamin C) were purchased from Sigma-Aldrich (St. Louis, Mo) while 95% ethanol was obtained from Systerm ChemAR. Tween 80 (Polyoxyethylhylene sorbitan mono-oleate) was purchased from Hopkin & Williams (London).

Sample Preparation and Extraction: Leaves of five local plants (Oenanthe javanica, Cosmos caudatus, Centella asiatica, Ocimum basilicum and Euodia redevi) were collected. The explants were cleaned in tap water and air-dried at room temperature in the dark separately. Dried leaves of each selected plant 3 grams by quantity were ground to