Free Radicals Activity of *Cassia Surattensis*

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ABSTRACT

A study is carried out to evaluate the free radical scavenging methanolic (MeOH) extract from the leave, flower, stem and pod of Cassia surattensis. Cassia surattensis leave, flower, stem and pod were collected, powdered and extracted with methanol by maceration at room temperature for 4 days. The extract was concentrated in a rotary evaporator. An amount of 1.0mg of each dry extract was dissolved in methanol and screened for their capabilities on scavenging of 2,2-diphenyl-1-picrylhydrazyl radical (DPPH). The commercial antioxidant butylated hydroxytoluene (BHT, Sigma) was used for comparison or as a positive control. It was shown that all the methanol extracts of the samples tested were endowed with antioxidant activity. The free radical scavenging activity of the extract from flower and stem were higher than that present in the BHT a commercial antioxidant. The extract obtained from leave and pod showed a lower antioxidant activity compared with the commercial antioxidant. The present study shows the antioxidant effect of the Cassia surattensis. In this study, Cassia surattensis was identified as potentially novel sources of free radical scavenging compounds.

Keywords: *Antioxidant activity, Cassia surattensis, DPPH*

Introduction

There has been interest in the contribution of free radical reaction participating in reactive oxygen species to the overall metabolic perturbation that result in tissue injury and disease. Reactive oxygen such as superoxide anion, hydrogen peroxide, and hydroxyradical are generated in specific organelles of cells (Mitochondria and Microsomes) under normal physiological condition. These reactive oxygen species can damage DNA, so as to cause mutation and chromosomal damage, oxidize cellular thiols and abstract hydrogen atoms from unsaturated fatty acids to initiate the peroxidation of membrane lipids (Halliwell and Gutteridge, 1985; Ames et al., 1993). Recently, various phytochemicals and their effect on health, especially the suppression of active oxygen species by natural antioxidant from tea, spices and herbs, have been intensively studied (Sies. & Stahl, 1995; Elmastas et al., 2006)

Cassia surattensis belong to the family of Fabaceae. They are distributed throughout Malaysia. This flowering plants are native to southern Asia, from southern Pakistan east through India to Myanmar and south to Sri Lanka. *C. surattensis* widely grown as an ornamental plant in tropical and subtropical areas. This plant species has been tradionally used in many countries for food and medicinal use. No local used was known for *C. surattensis,* but the bark and leaves are said to be antiblenorrhagic (Perry, 1980). A property also mention for a decoction of the roots (Burkill, 1935). The Balinese rub the leaves of *C. surattensis* into both internal and external cooling medicine (Perry, 1980). Because purified phenolic compounds are difficult to obtain and because extracts sometimes have better antioxidant activities than those of pure molecules, there is a growing interest for the use of plant extracts (Calliste et al., 2005). Hence, in this work we studied the antioxidant potential of different extracts of *C. surattensis*.

Materials and Methods

Standards and Reagents

Standards; BHT (Butylated hydroxytoluene) and (+)-catechin, were purchased from Sigma (St. Louis, MO, USA). 2,2-diphenyl-1-picrylhydrazyl (DPPH_) was obtained from Alfa Aesar (Ward Hill, MA, USA). All other chemicals were obtained from Sigma Chemical Co. (St. Louis, MO, USA). Methanol was obtained from Pronalab (Lisbon, Portugal).

Plant Collection and Extraction

Samples were collected from Penang, Malaysia, on June of 2007. Plants were identified by a botanist of School of Biological Sciences, Universiti Sains Malaysia, Penang, Malaysia. Flowers, leaves, stem and pod of selected plants were dried (room temperature) and powdered with a mortar.

Preparation of Plant Extracts

Some 100g of dried and powdered plant material were extracted at room temperature with 500 mL of methanol under constant shaking for 24 h. After filtration, the methanolic (MeOH) solutions were evaporated to dryness in a rotary evaporator for the antioxidant assays.

DPPH Radical-scavenging Activity

Various concentrations of *C. surattensis* extracts (50.0 µl) were mixed with 5.0 ml of methanolic solution containing DPPH radicals (0.004% w/v). The mixture was shaken vigorously and left to stand for 30 min in the dark (until stable absorbance values were obtained). The reduction of the DPPH radical was determined by reading the absorbance at 517 nm. The radical-scavenging activity (RSA) was calculated as a percentage of DPPH discoloration, using the equation: % RSA = $[(A_{DPPH} - A_S)/A_{DPPH}] \times 100$, where A_S is the absorbance of the solution when the sample extract is added at a particular level and A_{DPPH} is the absorbance of the DPPH solution (Oktay *et al.*, 2003) The extract concentration providing 50% of radical scavenging activity (EC_{50}) was calculated from the graph of RSA percentage against extract concentration. BHT was used as standard.

Statistical Analysis

For all the experiments three samples were analysed and all the assays were carried out in triplicate. The results are expressed as mean values and standard error or standard deviation (SD). The differences between the *C. surattensis* extracts were analysed using one-way analysis of variance (ANOVA), followed by Tukey's HSD Test with a = 0.05. This treatment was carried out using the SPSS v. 12.0 programme.

Results and Discussion

There is a strong need for effectual antioxidants from natural resources as alternatives to synthetic antioxidant in order to prevent the free radicals implicated diseases which can have serious effects on the cardiovascular system, either through lipid peroxidation or vasoconstriction Therefore, in this study, the antioxidant properties of the methanol extracts of leaves, flowers, stem and pod of *C. surattensis* were evaluated. The antioxidant properties of the methanol extracts of leaves, flowers, stem and pod of *C. surattensis* were examined for DPPH radical scavenging activity according to the method described and the results of the screening are shown in Fig.1 as comparable with known antioxidant BHT.

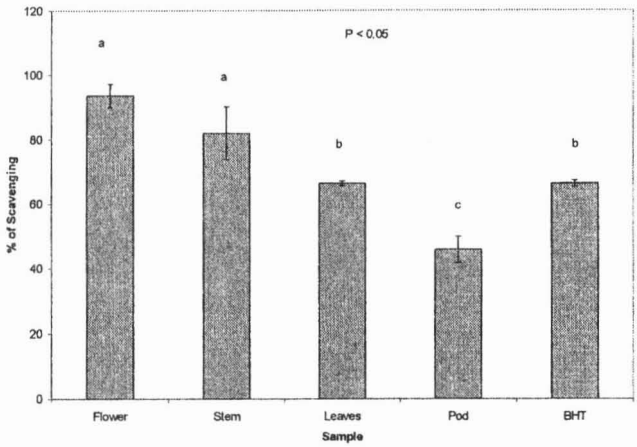

Figure 1. Scavenging Effect (%) of Extract of *Cassia Surattensis* and Known Antioxidant BHT, at 1.0mg/mL

The radical-scavenging activity (RSA) values were expressed as the ratio percentage of sample absorbance decrease and the absorbance of DPPH · solution in the absence of extract at 517 nm. From the analysis of Figure 1, we can conclude that the scavenging effects of flowers, stem and leaves extracts on DPPH radicals were excellent ($P<0.05$), especially in the case of *C. surattensis* flower (93.54% at 1.0 mg/ml). The RSA values were also remarkably good for stem (81.97% at 1.0 mg/ml) and leaves (66.28% at 1.0 mg/ml), but *C. surattensis* pod (45.72% at 1.0 mg/ml) revealed a low value of antioxidant activity compared with BHT (66.23% at 1.0 mg/ml). Nevertheless the overall activity of the raw extracts was higher than that of commercial antioxidant BHT, for the *C. surattensis,* except for pod.

Conclusion

As far as we know, this is the first report concerning the antioxidant activity of four (flowers, leaves, stem and pod) different parts extracts of *C. surattensis*. The work herein indicates that the flower of *C. surattensis* present the highest antioxidant activity values. The results obtained indicate a high potential of application for these *C. surattensis* flower extracts as an antioxidant. It can be included in foods with notable benefits for mankind or animal health. There is lack of information available on the chemical composition of *C. surattensis,* which exhibit antioxidant activity. Further phytochemical work need to be done on these extracts including fractionation to isolate active constituent and subsequent pharmacological evaluation.

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