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Research Article

COMPARSION OF ANTIOXIDANT POTENTIAL OF DIMOCARPUS LONGAN LOUR. EXTRACTS AND THE MAIN PHYTOCONSTITUENTS

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ABSTRACT

The present study was carried out to evaluate antioxidant activity of *Dimocarpus longan* stems extracts and also to investigate the main phytoconstituents in the bio-active extract. N-hexane, dichloromethane, ethyl acetate and methanol 80% extract were tested for free radical scavenging activity on model reaction with stable 2,2-diphenyl-1-picrylhydrazyl radical (DPPH). The results showed that ethyl acetate was the most active one as antioxidant agent and phytochemical analysis of that extract revealed the presence of triterpenes, flavonoids, tannins and carbohydrates. The results may help to discover new chemical classes of natural antioxidant substances that could serve as selective agents for infectious diseases.

Keywords: *Dimocarpus longan*, stems, antioxidant activity.

INTRODUCTION

Due to an ever increasing number of malignant, cardio-vascular diseases and infections, in recent times, the attention is drawn to plants with antioxidative activity. These disorders are considered to be provoked, in most cases, by harmful effects of free radicals, and in recent years, the use of natural antioxidants has been promoted because of the concerns on the safety against synthetic drugs (Shahidi and Wanasundara 2000). Antioxidants are vital substances which possess the ability to protect the body from damage caused by free radicals (Ozsoy et al., 2008). It has been observed that natural antioxidants are safer than synthetic antioxidants. Therefore, there is an increasing interest amongst scientific communities in identifying natural sources of antioxidants Traditionally practiced natural antioxidants are already exploited commercially, but still there is demand to find more plant species concerning the antioxidant potential (Chu, 2000). *Dimocarpus longan* Lour. from soapberry family is commonly known as Longan and it is native to Southeast Asia, such as China, Taiwan and Thailand. It is a tropical tree that produces edible fruit. The fruit of *Dimocarpus longan* was used as a traditional Chinese medicine for different treatments, such as promoting blood metabolism, soothing nerves, and relieving insomnia (Hsu et al., 1985). Previous phytochemical and pharmacological studies of *Dimocarpus longan* showed that longan pericarp contain high amounts of bioactive compounds, such as phenolic acids, flavonoids, and polysaccharides and exhibit antibacterial, antiviral, antioxidant, anti-inflammatory, and anticarcinogenic properties (Bravo 1998, Pan et al., 2008). The main objective of this study is to compare antioxidant activity of different extracts of *Dimocarpus longan* stems and to investigate the main bio-active constituents in the most active extract.

MATERIALS AND METHODS

Plant identification and collection:

The stems of *Dimocarpus longan* were collected from Al-Zohiriya garden, Giza, Egypt in May 2011. The plant was identified by Dr. Mohammed El-Gebaly, Department of Botany, National Research Centre (NRC) and by Mrs. Tereez Labib Consultant of Plant Taxonomy at the Ministry of Agriculture and director of Orman botanical garden, Giza, Egypt. A voucher specimen is deposited in the herbarium of Al-Zohiriya garden, Giza, Egypt.

Preparation of the extracts:

Air dried stems of *Dimocarpus longan* (300 g) were extracted with n-hexane, dichloromethane, ethyl acetate and methanol 80% solvents at room temperature by maceration method. Each extract was concentrated to dryness in vacuo to give 9.5 g, 6 g, 5 g and 25 g of n-hexane, dichloromethane, ethyl acetate and methanol 80% extracts, respectively.

DPPH assay:

The scavenging reaction between (DPPH•) and an antioxidant (H-A) can be written as: DPPH • + H -

A→ DPPH - H + A•.(Anna et al., 2012). Antioxidants react with DPPH•, which is a stable free radical and is reduced to the DPPH-H and as consequence the absorbance decreased from the DPPH• radical to the DPPH-H form. The degree of discoloration indicates the scavenging potential of the antioxidant extract in terms of hydrogen donating ability. DPPH radical scavenging activity from the plant extract was measured by taking 100µg/ml of extract, 900µl of acetate buffer and 3 ml freshly prepared 100µM DPPH solution in methanol. Reagent blank was 1 ml buffer and 3 ml DPPH solution. The absorbance was measured after 90 min of incubation in dark at 517 nm. DPPH radical scavenging activity (%) was determined by following equation: DPPH radical scavenging: Activity (%) = A_b-A_s /A_b x 100. (A_s - absorbance of the test sample, A_b - absorbance control reaction).

RESULTS AND DISCUSSION

Phytochemical analysis of ethyl acetate extract of *Dimocarpus longan:*

Phytochemical analysis of ethyl acetate extract has shown that the extract contained triterpenes, flavonoids, tannins and carbohydrates (table 2.)

Table 1: Antioxidant activity of *Dimocarpus longan* stems extracts

Extracts	Concentration (%)	DPPH free radical scavenging effect (%)
Green tea extract	1%	96.41%
N-hexane extract	0.1%	38.95%
Dichloromethane extract	0.1%	72.3%
Ethyl acetate extract	0.1%	87.66%
Methanol extract	0.1%	69.29%

Antioxidant activity of *Dimocarpus longan* extracts:

The DPPH radical scavenging activity of *Dimocarpus longan* stems extracts were compared with that of known natural green tea (table 2) where ethyl acetate extract showed a significant antioxidant potential (87.66%) and the other extracts were less active as antioxidant agents. As revealed by (Ahmadi et al. 2007), DPPH method measures the ability of antioxidants present in scavenging the hydrophilic free radicals. In line to this theory, ethyl acetate extract has better ability in scavenge hydrophilic free radicals as compared to other *Dimocarpus longan* extracts that might due to the presence of hydrophilic antioxidants. Furthermore, the high antioxidant activity could be due to the increased in hydroxyl groups or antioxidant compounds found particularly in the *Dimocarpus longan* ethyl acetate extract. Ethyl acetate extract is very rich with phenolic compounds (tannins and flavonoids). Flavonoids show antioxidant activity and their effects on human nutrition and health are considerable. The mechanisms of action of flavonoids are through scavenging or chelating process (Kessler et al., 2003). The highest level of radical scavenging properties at low concentrations of flavonoids exhibits quercetin and in the following order luteolin, rhamnetin, isorhamnetin and apigenin (Kessler et al., 2003). Tannins are the most abundant antioxidants in the human diet and they

exhibit many biologically important functions which include protection against oxidative stress and degenerative diseases, gallic acid showed strong antioxidant activity by preventing lipid per-oxidation **(**Shahrzad *et. al*., 2001).

Table 2: Phytochemical Analysis from Dimocarpus longan stems extracts

Constituents	n-hexane	dichloromethane	Ethyl acetate	Methanol 80%
Triterpenes and /or Sterols	+	+	+	+
Carbohydrates and/or glycosides	-	-	+	+
Flavonoids	-	-	+	+
Coumarins	-	-	-	-
Alkaloids and/or nitrogenous compounds	-	-	-	-
Tannins	-	-	+	+
Saponins	-	-	-	-
(+) presence of constituents, (-) absence of constituents				

CONCLUSION

The presented results indicate that antioxidant potential of *Dimocarpus longan* stems ethyl acetate extract is due the presence of bio-active phytoconstituents as phenolic compounds (tannins and flavonoids) and triterpenes and these results also endorsed the ethnobotanical use of this plant from the collected territory due to presence of various chemicals.

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