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Antioxidant activity of *Schinopsis balansae* Engl. leaves and phytochemical content

Khaled N. Rashed

Pharmacognosy Department, National Research Centre, Dokki, Giza, Egypt.

ABSTARCT

This study was carried out to evaluate antioxidant activity of Schinopsis balansae leaves methanol 80% extract and also to investigate the chemical content of the plant extract. Methanol 80% extract was tested for free radical scavenging activity on model reaction with stable 2,2-diphenyl-1-picrylhydrazyl radical (DPPH). The results showed that methanol 80% extract has a potential antioxidant activity. Phytochemical analysis of the methanol extract prove the presence of flavonoids, tannins, triterpenes and carbohydrates. The results may help to discover new chemical classes of natural antioxidant substances that could serve as selective agents for infectious diseases.

Key words: *Schinopsis balansae*, leaves, Free radical scavenging, phytoconstituents.

INTRODUCTION

Antioxidants are vital substances which possess the ability to protect the body from damages caused by free radical induced oxidative stress. A variety of free radical scavenging antioxidants are found in plants (Varahalarao and Chandraseker, 2009). Oxidation process is one of the most important routs for producing free radicals in food, drugs and even living systems. Catalase and hydroperoxidase enzymes convert hydrogen peroxide and hydroperoxides to non radical forms, function as natural antioxidants in human body. Study on the use of natural preservatives in foods and replacing chemical preservatives with natural ones are increasing. In this regard, consumers' awareness about risks of chemical preservatives and tendency toward using natural products is rising and so search for antioxidants principles from plants has been accelerated. *Schinopsis balansae* Engl. is a dioecious tree of Anacardiaceae family and the genus *Schinopsis* is endemic to South America. It is a hardwood tree which forms forests in the subtropical of north-eastern Argentina and Paraguay bark (Meyer & Barkley 1973). It is also found in the wild Pantanal vegetation in Brazil. Some of its common names are *quebracho colorado chaqueño* and *quebracho santafesino*. This tree can reach 24 metres in height and more than one metre in diameter. Its trunk is elegant, straight, with a brownish-gray bark (Meyer & Barkley 1973). No reports about biological

activities or phytoconstituents from the plant. The aim of the current study is to evaluate antioxidant activity of *Schinopsis balansae* Engl. leaves methanol 80% extract and also to investigate the chemical content of the plant extract.

MATERIALS AND METHODS

The energy spectrum of positronium in a Plant identification and collection

Schinopsis balansae Engl. leaves were collected from Al-Zohiriya garden, Giza, Egypt in May 2012. 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 was deposited in the herbarium of Al-Zohiriya garden, Giza, Egypt.

Preparation of the plant extract

Air-dried powder of *Schinopsis balansae* leaves (400 g) was extracted with methanol 80% several times at room temperature until exhaustion by maceration method. The extract was concentrated under reduced pressure to give 24 g of the crude extract and the extract was subjected to different phytochemical tests according to that described by Yadav and Agarwala (2011).

DPPH assay

The scavenging reaction between (DPPH•) and an antioxidant (H-A) can be written as: $\text{DPPH} \cdot + \text{H} - \text{A} \rightarrow \text{DPPH} - \text{H} + \text{A} \cdot$. (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 (%) = $(A_b - A_s) / A_b \times 100$.

(A_s - absorbance of the test sample, A_b - absorbance control reaction)

Table 1. Antioxidant activity of *Schinopsis balansae* leaves methanol extract

Sample tested	Concentration (%)	DPPH free radical scavenging effect (%)
Green tea extract	1%	96.41%
<i>Schinopsis balansae</i> leaves methanol extract	0.1%	88.97%

Table 2. Preliminary phytochemical analysis of *Schinopsis balansae* leaves

Chemical Constituents	methanol extract
Carbohydrates and/or glycosides	+
Tannins	
a. Condensed tannins	+
b. Hydrolysable tannins	+
Alkaloids and/or nitrogenous bases	-
Flavonoids	+
Sterols and/or triterpenes	+
Saponins	-
Coumarins	-
(+) denotes the presence of the constituents, (-) denotes the absence of the constituents	

RESULTS AND DISCUSSION

The results of antioxidant activity of *Schinopsis balansae* leaves methanol extract is shown in table 1, and the phytoconstituents of the plant extract is shown in table 2. These results prove that the methanol extract of *Schinopsis balansae* leaves has a potential antioxidant activity with comparison with green tea extract as a standard drug and this activity is may be due to the presence of different phytochemicals as flavonoids which have a wide range of biological activities and from these activities are antioxidant effect, (Giovanni et al., 2012). The highest level of radical scavenging properties at low concentrations of flavonoids exhibits quercetin and in the following order luteolin, rhamnetin, isorhamnetin and apigenin. The strong antioxidant potential could allow to administer flavonoids for prevention of numerous free radical based diseases (Giovanni et al., 2012). Triterpenes are a class of natural products present in all organisms, especially in plants. The triterpene acids exhibit unique and important biological and pharmacological activities, including antioxidant anti-inflammatory, antimicrobial, antiviral, cytotoxic and cardiovascular effects (Maria et al., 2012). 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).

CONCLUSION

The present study demonstrated the radical scavenging property of *Schinopsis balansae* leaves methanol extract and this significant antioxidant activity is may be due the presence of different phytoconstituents as flavonoids, tannins and triterpenes. Overall, the plant extract is a source of natural antioxidants, justifies their application in nutrition and health.

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