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Evaluation of antioxidant activity of *Sapindus saponaria* L. leaves and phytochemical profile

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ABSTARCT

*This study was designated to evaluate antioxidant activity of *Sapindus saponaria* L. 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 moderate antioxidant activity and can act as free radical scavenging agent, phytochemical analysis of the methanol extract prove the presene of saponins, 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: *Sapindus saponaria*, leaves, Free radical scavenging, Phytoconstituents.

INTRODUCTION

The last past years a major growing interest focus on substances from plant exhibiting antioxidant properties that could supplied animal organisms then human as food components or specific pharmaceutical activities were more and more analyzed (Azuma *et al.*, 1995). In recent years, the use of natural antioxidants has been promoted because of the concerns on the safety against synthetic drugs (Shahidi 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). *Sapindus saponaria* L. is a tree from Sapindaceae family and it is popularly known as soapberry, being distributed in Central and South America. The bark, root and fruits are used in popular medicine as tranquilizer, astringent, diuretic, expectorant, tonic, blood cleanser, healing and to counter cough (Albiero *et al.*, 2001), being also a neutralizer of hemorrhage (Castro *et al.*, 1999). Its fruits have activity as antifungal (Tsuzuki *et al.*, 2007) and larvaecidal (Barreto *et al.*, 2006). The aim of this study was to evaluate antioxidant activity of *Sapindus saponaria* L. leaves methanol 80% extract and also to investigate the chemical content of the plant extract.

MATERIALS AND METHODS

Plant identification and collection

Sapindus saponaria L. 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 *Sapindus saponaria* leaves (500 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 28 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: $\text{DPPH} \bullet + \text{H} - \text{A} \rightarrow \text{DPPH} - \text{H} + \text{A} \bullet$. (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 *S. saponaria* leaves methanol extract

	Concentration (%)	DPPH free radical scavenging effect (%)
Green tea extract	1%	96.41%
<i>S. saponaria</i> leaves methanol extract	0.1%	50.97%

Table 2. Preliminary phytochemical analysis of *S. saponaria* 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	

RESULT AND DISSCUSION

The results of antioxidant activity of *S. saponaria* 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 *S. saponaria* leaves has a moderate antioxidant activity with comparison with green tea extract as a standard 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).

CONCLUSION

The presented results indicate a moderate antioxidant potential of *S. saponaria* leaves methanol extract and this activity is due the presence of different phytoconstituents as flavonoids and triterpenes.

REFERENCES

- [1] Albiero ALM, Bacchi EM, Mourao KSM. (2001). Caracterizacao anatomica das folhas, frutos e sementes de *Sapindus saponaria* L. (Sapindaceae). *Acta Science* 23, 549-560.
- [2]Anna G-G, Marlena D-M, Irena M. (2012). DPPH Radical Scavenging Activity And Phenolic Compound Content In Different Leaf Extracts From Selected Blackberry Species.*Acta Biologica Cracoviensia Series Botanica* 54 (2): 32–38.
- [3]Azuma Y, Nakawo KM, Jiankany H, Watanabe O .1995. Metting induced relocation of ions in glacier and in a seasonal snow-pack. *IAHS Predictions in Ungauged Basins* 223, 287-287.
- [4]Barreto CF, Cavasin GM, Silva HHG, Silva IG. (2006). Estudo das alteracoes morfo-histologicas em larvas de *Aedes aegypti* (Diptera, culicidae) submetidas ao extrato bruto etanolico de *Sapindus saponaria* Lin (SAPINDACEAE). *Rev Patol Trop* 35, 37-57.
- [4]Castro O, Guitierrez JM, Barrios M, Castre I, Romero UE. (1999). Neutralizacion del efecto hemorragico inducido por veneno de *Bothropsasper* (Serpentes:Viperidae) por extractos de plantas tropicales. *Rev Biol Trop* 47, 605-616.
- [5]Chu Y (2000). Flavonoid content of several vegetables and their antioxidant activi-ty. *Journal of Science, food and Agriculture* 80, 561-566.
- [6]Giovanni Agatia, Elisa Azzarellob, Susanna Pollastri b, Massimiliano Tattini . Flavonoids as antioxidants in plants: Location and functional significance *Plant Science* (2012) 196, 67– 76.
- [7]Ozsoy N, Can A, Yanardag, R, Akev N (2008). Antioxidant activity of *Smilax excelsa* leaf extracts. *Food Chemistry* 110, 571 - 583.

[8]Maria de L. e Silva, Juceni P. David, Lidércia C. R. C. Silva, Rauldenis A. F. Santos, Jorge M. David , Luciano S. Lima 3, Pedro S. Reis and Renato Fontana. Bioactive Oleanane, Lupane and Ursane Triterpene Acid Derivatives *Molecules* 2012, 17, 12197-12205.

[9]Shahidi, F., Wanasundara, P.K.J.P.D. 1992. Phenolic antioxidants: *Critical Reviews in Food Science and Nutrition* 32: 67-103.

[10]Tsuzuki JK, Svidzinski TIE, Shinobu CS, Silva LFA, Rodrigues-Filho E, Cortez DAG, Ferreira ICP. (2007). Antifungal activity of the extracts and saponins from *Sapindus sapanaria* L. *An Acad Bras Cienc* 79, 577-583.

[11]Yadav RNS, Agarwala M. (2011). Phytochemical analysis of some medicinal plants. *Journal of Phytology* 3(12): 10-14.