



Bioactive Compound Contents and Biological Activities of the Algerian Medicinal Plant *Rhus Pentaphylla* (Jacq.) Desf. (Anacardiaceae)

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Introduction

- Natural compounds have been proven as antioxidant and acetylcholinesterase (AChE) inhibitor sources [1]. The drugs approved so far for Alzheimer disease (AD) therapy act by inhibiting the AChE.
- Rhus pentaphylla* (Jacq.) Desf. (Fig. 1) is a shrub located principally in the North of Algeria, which is called "Tizgha". It has traditionally been used for diarrhea, abdominal colics and as digestive [2-4].
- In this work, the antioxidant and AChE inhibitory activities of two extracts prepared from *R. pentaphylla* were evaluated. Moreover, the total phenolic, flavonoid and tannin contents were measured, highlighting the correlation between these bioactive compounds and biological activities.

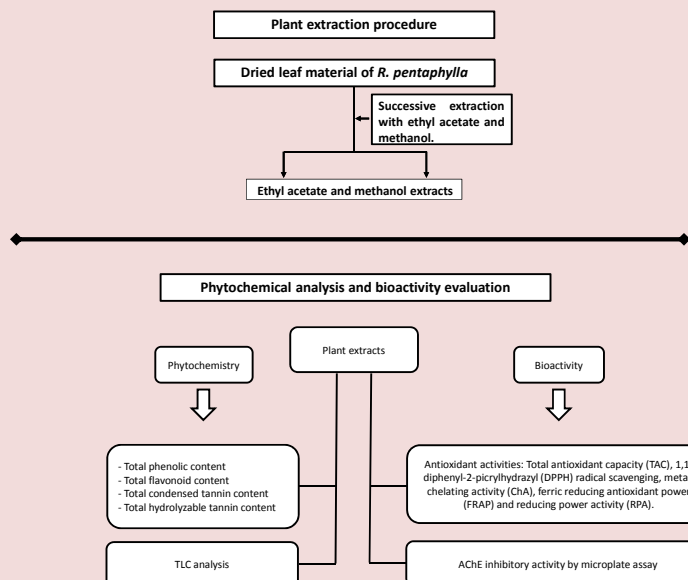


Fig. 1: Image of *R. pentaphylla* (Jacq.) Desf.

Objectives

- The objective of this work was to identify new natural sources of enzyme inhibition, might be functional in therapy of AD and also sources of natural antioxidants.

Methods



Results

Table 1: Results of the analysis of phenolic compounds in the plant extracts.

Extract	Phenolic acids	Flavonoids	Anthraquinones
Ethyl acetate	Caffeic acid	Kaempferol	Chrysophanol
	Gallic acid	Naringin	
		Quercetin	
		Astragalín	
		Isoquercitrin	
Methanol	Chlorogenic acid	Apigenin-7-O-glucoside	
	Gallic acid	Hyperoside	
		Quercetin	
		Astragalín	
		Isoquercitrin	
		Apigenin-7-O-glucoside	
		Hyperoside	
	Quercetin-3-O-glucuronide		
	Rutin		

Table 2: Extract yield, total phenolic, flavonoid, condensed tannin and hydrolyzable tannin contents of *R. pentaphylla* extracts.

Extract	Yield (%)	TPC	TFC	TCTC	THTC
		(mg GAE/g DE) ^A	(mg CE/g DE) ^A	(mg CE/g DE) ^A	(mg TAE/g DE) ^A
Ethyl acetate	2.77	135.12±5.26 ^a	36.26±1.77 ^a	7.91±0.61 ^a	898.64±26.56 ^a
Methanol	15.16	195.69±4.20 ^b	32.57±1.21 ^b	32.79±1.52 ^b	380.99±12.78 ^b

^A Standard error of the mean of three assays.

^{a,b} Differences within columns (samples not connected by the same letter are statistically different at $p < 0.05$ as determined by Tukey and Student-Newman-Keul's multiple range tests).

TPC = Total Phenolic Content, TFC = Total Flavonoids Content, TCTC = Total Condensed Tannins Content, THTC = Total Hydrolyzable Tannins Content.

Table 3: Antioxidant and acetylcholinesterase inhibitory activities of *R. pentaphylla* extracts.

Extract or standard	TAC (mg AAE/g DE) ^B	DPPH (µg/mL) ^{B,C}	ChA (µg/mL) ^{B,C}	FRAP (µg/mL) ^{B,D}	RPA (µg/mL) ^{B,E}	AChE (µg/mL) ^{B,C}
Ethyl acetate	167.57±2.81 ^a	59.12±2.01 ^a	762.45±101.22 ^a	318.84±8.81 ^a	140.59±7.24 ^a	510.35±23.84 ^a
Methanol	177.75±5.30 ^b	61.14±0.39 ^a	2749.03±110.37 ^b	436.05±8.23 ^b	89.71±2.26 ^b	404.94±3.35 ^b
Ascorbic acid ^A	n.t.	3.96±0.00 ^b	n.t.	30.22±0.05 ^c	n.t.	n.t.
Quercetin ^A	n.t.	4.09±0.15 ^b	n.t.	21.00±0.20 ^c	n.t.	n.t.
BHT ^A	n.t.	24.39±0.38 ^c	n.t.	54.38±0.48 ^d	n.t.	n.t.
Trolox ^A	n.t.	6.72±0.05 ^b	n.t.	110.10±1.75 ^e	n.t.	n.t.
EDTA ^A	n.t.	n.t.	3.92±0.03 ^c	n.t.	n.t.	n.t.
Galanthamine ^A	n.t.	n.t.	n.t.	n.t.	n.t.	0.29±0.00 ^c

^A Compounds used as positive control.

^B Standard error of the mean of three assays.

^C Concentration that shows 50% activity.

^D The effective concentration at which the absorbance is 0.5 for ferric reducing activity power (FRAP).

^E The results are expressed as CAE1 value, which means the concentration of antioxidant in the reactive system having a ferric-TPTZ reducing activity equivalent to that of 1 mM FeSO₄.

^{a-e} Differences within columns (samples not connected by the same letter are statistically different at $p < 0.05$ as determined by Tukey and Student-Newman-Keul's multiple range tests).

n.t.: not tested.

Conclusion

- This study evaluated the *in vitro* biological activities and total levels of relevant bioactive compounds of extracts obtained from *R. pentaphylla*.
- The extracts exhibited antioxidant and enzymatic inhibition properties and had high levels of total phenolics, flavonoids and tannins, thus suggesting that they should be further explored as a source of bioactive compounds with application in, for example, the food and pharmaceutical industries.

References

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