

Short report

Antioxidant activity of *Punica granatum* fruits

D. Ricci *, L. Giamperi, A. Bucchini, D. Fraternali

Istituto di Botanica e Orto Botanico "Pierina Scaramella", Via Bramante 28, Facoltà di Farmacia-Università degli Studi di Urbino 61029, Urbino, Italy

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Abstract

Arils, juice and rinds of *Punica granatum* fruits and their aqueous and ethyl acetate extracts displayed good antioxidant activity.
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1. Plant

Punica granatum L. (Punicaceae), fruits collected in Urbino (500 m above sea level) in September 2004 were identified by D. Fraternali. A voucher specimen (15-04) is deposited in the Herbarium of the Botanical Garden of the University of Urbino, Italy.

2. Uses in traditional medicine

The rinds of fruits are valued as astringents in diarrhoea and dysentery [1–3]. In folk medicine pomegranate preparations of the dried pericarp and the juice of the fruits are employed as an oral medication in the treatment of colic, colitis, leucorrhoea, menorrhagia, oxyuriasis, paralysis and rectocele, and external application to caked breast [4] and to the nape of the neck in mumps [5] and headache [6]. A number of therapeutic actions of these materials have been described including vermifugal, taenicial, astringent, antispasmodic, antihysterical, diuretic, carminative, sudorific, galactagogue and emmenagogue [7]. Pomegranate peel is used for treating the infection of male or female sexual organs, mastitis, acne, folliculitis, piles, allergic dermatitis, tympanitis [8] and for the treatment of oral diseases [9].

3. Previously isolated classes of constituents

Tannins, alkaloids, glycosides [10].

* Corresponding author.

E-mail address: d.ricci@uniurb.it (D. Ricci).

Table 1
Effect of *P. granatum* fruit extracts on the in vitro free radical (DPPH and superoxide) and lipid peroxidation generation

		Poliphenols (mg/g DW)	Antioxidant activity		
			DPPH IC ₅₀ (mg DW/ml)	Lipid peroxidation IC ₅₀ (mg DW/ml)	Superoxide IC ₅₀ (mg DW/ml)
Arils	Arils	0.051±0.0075	7.528±0.977	6.532±1.290	28±0.934
	Aqueous extract	0.040±0.0072	13.074±1.556	13.340±0.385	32.7±0.467
	Ethyl acetate extract	0.007±0.0012	15.100±0.951	19.013±0.238	142±12.6
Juice	Juice	0.063±0.0003	1.777±0.077	1.524±0.102	15.2±0.028
	Aqueous extract	0.052±0.0001	2.511±0.109	5.144±0.125	9.65±0.496
	Ethyl acetate extract	0.001±0.0003	3.857±0.255	8.7±0.341	19.3±0.469
Rind	Rind	1.892±0.1070	0.069±0.0067	0.0787±0.001	1.26±0.031
	Aqueous extract	0.907±0.0757	0.094±0.001	0.198±0.013	0.944±0.031
	Ethyl acetate extract	0.031±0.0003	8.492±0.042	0.245±0.008	6.93±0.189
Trolox ^a			0.012±0.001	0.012±0.001	0.006±0.002

Data are referred to DW (dry weight) and the values are the average of five determinations (±S.D.).

Percent inhibition was calculated with respect to control represented by Na-phosphate buffer and ethyl acetate, respectively.

^a Positive control.

4. Tested material

Arils, fruit juice, rinds (mesocarp and endocarp) and their aqueous and ethyl acetate extracts. 2 ml 50 mM Na-phosphate buffer (pH 7.5) and 5 ml ethyl acetate were added to the samples (2 g of FW), and the resulting mixture was shaken and centrifugated subsequently at 15,000 rev./min. The aqueous and organic phase were collected to measure antioxidant activity.

The total phenolic content of extracts was determined by the Prussian Blue method according to Hagerman and Butler [11], opportunely modified.

5. Studied activity

The antioxidant activity was evaluated using: DPPH (2,2-diphenyl-picryl-hydrazil) test [12], 5-lipoxygenase assay [13] and luminol/xanthine/xanthine oxidase system (chemiluminescence assay) [14]. Reagents were from Sigma-Aldrich Chemical Co.

6. Results

Summarized in Table 1.

7. Conclusions

The preparations of various parts of *P. granatum* fruits possess a significant antioxidant activity in all tests performed. Pomegranate arils, juice and rind exhibited almost always a higher activity as compared to their aqueous and ethyl acetate extracts. In particular, the activity was higher in the juice than in the arils, and this difference seems to be due to the presence of rind tannins in juice, as shown by Gil et al. [15].

The use of pomegranate as table fruit or juice can so be recommended in human nutrition for its antioxidant qualities, in the form of the relative contributions of hydrophilic and lipophilic components. The rinds, that usually cannot be utilized and represent waste material, in all tests performed showed the best antioxidant activity and their aqueous extracts resulted quite as active as the whole rind, suggesting the possibility to utilize this kind of extract as an enriched source of antioxidant compounds in human diet.

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