

성숙된 탕자나무(*P. trifoliata*) 과실 물 추출물의 생리활성

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서수정, 이양숙, 윤홍근, 김남우***Physiological Activities of Water Extract from *Poncirus trifoliata* Ripe Fruit**

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The dried immature fruit of *Poncirus trifoliata* (L.) Raf (Rutaceae), well known as 'Jisil', have been used as a remedy for digestive disease, allergic and chronic inflammatory disease in Korea traditional medicine. Recently, the activities of anti-inflammatory, anti-platelet, anti-thrombotic and anti-helicobacter pylori for *P. trifoliata* were reported. Increased mucine release and induction of apoptosis have also been reported and *P. trifoliata* has been used for the treatment of various cancer in clinic. However, no reports on the physiological activities of matured fruit of *P. trifoliata* have been found. In the present study, we analyzed the physiological active components and antioxidant activity of water extracts from pericarp, sarcocarp and seed of matured fruit of *P. trifoliata*.

Materials and Methods

○ Preparation of material extract

The *P. trifoliata* ripe fruit were collected in November 2007, at the Gyeongsan, Gyeongbuk. Fresh fruit of *P. trifoliata* (100 g) were assorted three parts (pericarp, sarcocarp and seed), and it was extracted three times in a reflux condenser with 1 ℓ of distilled water at 80°C for 3 h. The solutions were mixed, filtered, concentrated using a rotary vacuum evaporator, and freeze-dried.

○ Experimental methods

- The analysis of reducing sugar and soluble protein content were followed Somogyi-Nelson method (1994) and Lowry method (1951).

- The contents of total polyphenols for fresh fruit and water extract from ripe fruit of *P. trifoliata* were measured by Folin-Denis (AOAC, 2005) method.

- The flavonoid compounds were analyzed using the method of Nieva Moreno *et al.* (2000).

- Electron donating ability (EDA) was evaluated using the Blois (1958) method.

- Xanthine oxidase inhibition was conducted according to Stirpe and Corte (1969).

- Nitrite scavenging ability (NSA) of water extracts were conducted according to the method of Kato *et al.* (1987).

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Results

The content of reducing sugar was the highest 2,339.38 mg% in sarcocarp. The soluble protein in pericarp and seed were 207.49 mg% and 206.54 mg%. The contents of total polyphenols in pericarp of fresh fruit and water extract were 51.72 mg% and 45.91 mg/g. The contents of flavonoids were 849.70 mg% in fresh pericarp and 20.39 mg/g in water extract of sarcocarp. The EDA of pericarp extract was 88.30% at 1.0 mg/ml. The xanthine oxidase inhibitory levels of *P. trifoliata* extracts were 92.59~94.75% at 0.5 mg/ml. The NSA of pericarp extract was highest as 52.27% when the extracts were tested at pH 1.2 and 2.0 mg/ml concentration.

Table 1. Contents of total polyphenol and flavonoid compounds of ripe fruit of *P. trifoliata*.

Fresh (mg%)	Pericarp	Sarcocarp	Seed
Reducing sugar	805.31 ± 4.11 ^b	2,339.38 ± 10.44 ^a	522.49 ± 5.22 ^c
Soluble protein	207.49 ± 0.47 ^a	137.20 ± 0.99 ^b	206.54 ± 0.47 ^a
Total polyphenols	51.72 ± 1.45 ^a	33.44 ± 1.22 ^b	21.61 ± 0.32 ^c
Flavonoid compounds	849.70 ± 26.80 ^a	54.29 ± 10.96 ^c	66.94 ± 8.29 ^b

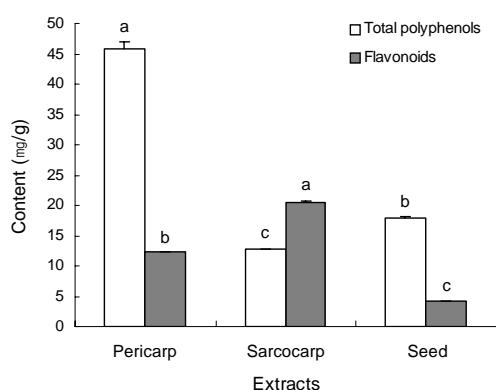


Fig. 1. Contents of total polyphenol and flavonoids compounds of extracts of the *P. trifoliata* fruit.

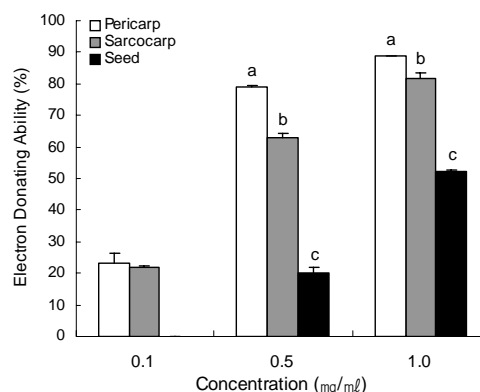


Fig. 2. Electron donating ability of extracts of the *P. trifoliata* fruit.

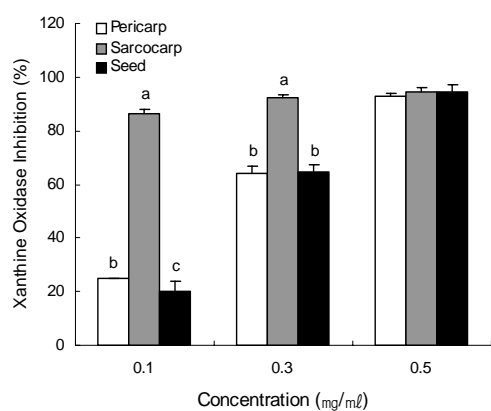


Fig. 3. Xanthine oxidase inhibition of extracts from *P. trifoliata* fruit.

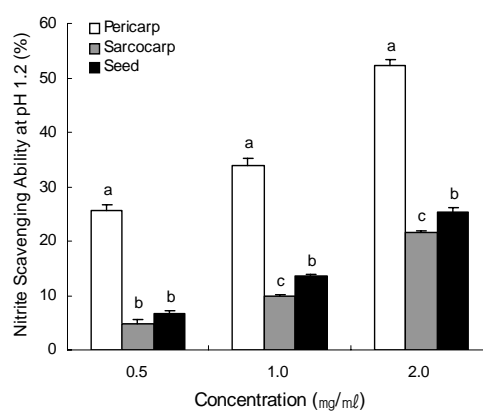


Fig. 4. Nitrite scavenging abilities of extracts from *P. trifoliata* fruit.