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Original Article

ANALYSIS OF BIOACTIVE COMPOUNDS AND ANTIOXIDANT ACTIVITY OF *PRUNUS CERASUS* (SOUR CHERRY)

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ABSTRACT

Objective: *Prunus cerasus* L. is consumed as a dietary supplement to promoting health benefits. The purpose of this study was to investigate the phenol and flavonoids content of sour cherry methanol extract in terms of antioxidant activity.

Methods: The content of polyphenols and flavonoids was quantified. DPPH and FRAP assay were used to evaluate the radical scavenging properties and reducing the antioxidant power of sour cherry fruit.

Results: DPPH scavenging activity was evaluated IC_{50} 10.32±2.23 mg/ml and FRAP was estimated at 205±30 µmol/g.

Conclusion: Sour cherry methanol extract includes various bioactive compounds like polyphenols, flavonoids and anthocyanidins, which can be valuable beneficial effects to the prevention of various vascular diseases.

Keywords: Antioxidant, DPPH, FRAP, *Prunus cerasus,* Flavonoids

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INTRODUCTION

Prunus cerasus is a species of *Prunus*. It has many different names like sour cherry, tart cherry, morello cherry, pie cherry and red cherry. Sour cherry is important source of cartenoids (*beta*-carotene), vitamins (A, B1, B2, C, E, K, and Niacin) and minerals (Ca2+, Fe2+, K+, Na+,Mn2+, and Phosphorous), various sugar such as Fructose, Glucose, Maltose fiber, antioxidant agents like Caffeicacids, p-Coumaric acids, 1-(3',4'-dihydroxycinnamoyl)-cyclopenta-2,5-diol,1(3',4-dihydroxycinnamoyl)-cyclopenta-2,3-diol, cyaniding-3-O-glucosylrutinoside [1-3].

Sour cherry is an excellent source of phytochemicals that powerfully influence its contribute and quality to its nutritional value and organoleptic attributes [4, 5]. Phenolics compounds are major groups of phytochemicals in sour cherry fruits that showing a large spectrum of wellbeing promoting benefits [5]. Special concentration focused on anthocyanins, the polyphenols compounds responsible for red skin and color. Currently, several studies have been showed that anthocyanins present a broad variety of biological properties such as neuroprotective effects, anti-oxidant, anti-inflammatory anti-microbial and anti-carcinogenic activities.

Anthocyanins, is major groups of a secondary metabolite which is belonging group of flavonoids. Which are responsible for colors in fruits, vegetables, flowers. However, awareness in anthocyanins has been recently intensified due to their potential health benefits.

The best properties of flavonoids their strong antioxidant activity in metabolic reaction because of their capacity to scavenge oxygen radicals and other reactive species. This feature of flavonoids makes a important part of studies on the ageing process, oxidative stress and cancer [6], specially because anthocyanins has been investigated that it inhibit the growth of cancer cells and perform as chemotherapeutics for several diseases [7, 8].

The result that *Prunus cerasus* contains important levels of anthocyanins [8] has been attracting much concentration. Anthocyanins from *Prunus cerasus* have been presented to have anti-inflammatory activities and strong antioxidant activity [9] and the growth of human colon cancer cell lines and reduce tumor development in ApcMin mice [10].

MATERIALS AND METHODS

Materials

Sour cherry fruits were purchased from medicinal herbs supplier. All chemicals were analytical grade or higher and were purchased from Sigma-Aldrich.

Preparation of extract

100 gm of shade-dried sour cherry powder was used with 200 ml in methanol for extraction at 60 degree for 48 h in Soxhlet apparatus. The solvent was removed and evaporated at room temperature.

Determination of total phenols

The total phenols content in sourcherry methanolic extract was determined using the Folin-Ciocalteu procedure [10] briefly, 1.0 ml was mixed with 1.0 ml of Folin-Ciocalteu's reagent and 8 ml (7.5%) of sodium carbonate. Tubes were allowed to stand for 3 h. Then, 750 µl each aliquot was poured into 750 µl of water. Absorption was measured at 765 nm. The total phenols are expressed as milligrams of gallic acid equivalents (GAE) per 100 g of fresh. All tests were performed in triplicate.

Determination of total flavonoids

The amount of flavonoid of sour cherry methanolic extracts was measured according to Zhishen method [11]. The reaction mixture was follow as, 0.5 ml of extract or standard solution of catechin was added to 10 ml volumetric flask. Makeup volume up to 5 ml by Distilled water. At 0 time, 0.3 ml of NaNO2 (5%) was added. After 5 min, 0.6 ml of AlCl3 (10%) was added, and after 6 min, 2 ml of NaOH (1.0 M) was added to the mixture followed by the addition of 2.1 ml of distilled water. Absorbance was measurred at 510 nm. Flavonoid content is expressed as milligrams of catechin equivalents (CA) per 100 g of fresh material. All tests were performed in triplicate.

Free radical scavenging activity (DPPH)

This assay is based to capacity of the scavenging capacity of antioxidants [12, 13]. 150 µl of the extract was added 150 µl DPPH methanolic solution. After 30 min, absorbance was calculated at 517 nm. Control contained solvent and DPPH solution. Radical scavenging capacity was calculated by the formula:

RSC (%) = [(Abs control–Abs sample)/Abs control] × 100.

FRAP

The reducing power of methanol extract of sour cherry was determined using the method of Oyaizu [14, 15]. Extract in 2.5 ml phosphate buffer (0.2 M, pH 6.6) was added to 2.5 ml potassium ferricyanide (10 mg/ml) and the reaction mixture was incubated at 50 °C for 30 min. 2.5 ml trichloroacetic acid (100 mg/ml) was added to the mixture. Aliquots of 2.5 ml of the reaction mixture were mixed with 2.5 ml distilled water and 0.5 ml ferric chloride (1.0 mg/ml), and then the absorbance was measured spectrophotometrically at 700 nm. Higher absorbance of the reaction mixture presented greater reducing power. Ascorbic acid used as standard.

RESULTS

Total phenol and flavonoid

An analysis of total phenols and flavonoids content was performed by spectrophotometrically method. The amount of phenolic was observed 139.2±2.35 mg of gallic acid equivalents 100 g of fresh product. Whereas, total flavonoids content was calculated 4.3±0.23 mg of catechin equivalents in 100 g fresh product (table 1).

Table 1: TPC and TFC analysis of *Prunus cerasus* fruit

	Total phenol content (mg GAE/100g)	Total flavonoids content (mg CE/100g)
Methanol extract	139.2±2.35	4.3±0.23

Antioxidant activity

Antioxidant activity was analyzed by two methods: DPPH, FRAP. 2, 2'-diphenyl-1-picrylhydrazyl (DPPH) is a free radical scavenging assay that is the basis on transferring an electron to construct free radicals. For this reason, free radicals are reduced in the being there of antioxidant molecules because antioxidant agents perform as H donor. DPPH Scavenging activity of sour cherry methanol extract was recorded (IC_{50} 10.32±2.23 mg/ml).

Ferric reducing antioxidant power (FRAP) is a simple assay that evaluate the antioxidant ability of supplements containing polyphenols. FRAP capacity of sourcherry was calculated 205±30 µmol/g (table 2).

Table 2: DPPH and FRAP analysis of *Prunus cerasus* fruit

	DPPH (IC_{50})mg/ml	FRAP (µmol/g)
Methanol extract	10.32±2.23	205±30

CONCLUSION

The analyzed fruit is easy to obtain for a human diet. Results of our study established that sour-cherry is rich in Phenols, flavonoids and anthocyanins. Sour cherry has high antioxidant activity due to high antioxidant activity it may use as health-promoting substances.

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AUTHORS CONTRIBUTIONS

All the author have contributed equally.

CONFLICT OF INTERESTS

Declared none

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