Determination of Total Phenolic Compounds and Total Antioxidant Capacity on Different Types of Figs

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Abstract

Fig an important kind consumed in both the wet and dry. Figs are producing on Aydın and districts as intense. Fig is a valuable food with antioxidants; in addition it contains carbohydrates and proteins. Phenolics content and antioxidants have an important role against reactive oxygen species. In this study, were determined total antioxidant capacity (TAC) and total phenolic compounds (TPC) in both wet and dried sarılop and göklop figs produced on Aydın and districts. Measurements were carried out as spectrophotometric. The research results determined that dried sarılop figs have the maximum TAC value. The lowest TAC value is determined on wet göklop fig. Similar results apply for the TPC. The research results determined that dried sarılop figs have the maximum TPC value. The lowest TPC value is determined on wet göklop fig. In terms of antioxidant capacities and phenolic content fig is an important food.

Key words: Göklop, sarılop, phenolic compounds, total antioxidant capacity (TAC).

1. Introduction

Phenolics contain multiple hydroxyl groups. They are hydrogen-donating antioxidants and singlet oxygen quenchers [1]. Many medicinal plants vegetables and spices have been found to be excellent sources of phenolic compounds, high have been reported to show good antioxidant activity [2,3].

Fig (*Ficus carica*; Moraceae) is widely distributed in the Eastern Mediterranean to the Southern Asia region and is one of the most important crops in Turkey [4,5]. The main fig cultivars grown in Turkey (‘Sarılop’, ‘Bursa Siyahı’, ‘Göklop’, ‘Yediveren’, ‘Yeşilguz’, ‘Morguz’, ‘Sarı Zeybek’, and ‘Ufak Yeşil’) were evaluated along with 24 selections from a larger collection from the Mediterranean Region of Turkey. Aydin Province of Turkey has favorable climatic conditions to grow figs [6,7].

Sarılop and sarılop variety are known world-wide for its superior dried fruit quality. Climatic conditions prevailing in the Meander Basin especially in summer during fruit maturation and drying period play a crucial role on final quality. As a consequence, in the Meander Basin almost all fruit go for sun-drying whereas fig fruits produced in other regions are sold for the fresh market [8-10].

This study was carried out for determination of TAC in some fig cultivars.

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2. Materials and Methods

2.1. Fig Samples

Fig samples were purchased from local supermarkets in Aydın, Turkey (44 samples göklop and 44 samples sarılop). Before analysis the 1 g fig samples were mixed with 9 mL KCl. The solution was vortex-mixed for an hour at room temperature. It was centrifuged (Nuve-NF 200) at 5000 rpm for 20 minutes. UV/VIS spectrophotometer (Perkin Elmer UV/Vis model lambda 20) was used for TAC and TPC measurements.

2.2. TAC Method

TAC of the samples was measured by a new method developed by Erel [11]. This method is based on the decolourization of 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulphonic acid (ABTS) radical cation which stays more stable for a long time in the acetate buffer solution. While it is diluted with a more concentrated acetate buffer solution at high pH values, the color is spontaneously and slowly bleached. Antioxidants present in the sample accelerate the bleaching rate to a degree proportional to their concentrations which can be monitored spectrophotometrically and the bleaching rate is inversely related with the TAC of the sample. The reaction rate is calibrated with trolox which is widely used as a traditional standard for TAC measurement assays, and the assay results are expressed in mM Trolox equivalents/L.

2.3. TPC Method

Total contents of the phenolic compounds in the extracts were determined by Singleton and Rossi's method as gallic acid equivalents [12].

3. Results

The mean TAC values in figs in the two groups (sarılop, göklop) are shown in table 1.

Table 1. TAC values (values are given as mean±SD) in figs in the two groups (sarılop, göklop).

	Sarılop dried figs	Sarılop wet figs	Göklop dried figs	Göklop wet figs
TAC (mmol trolox equivalent/L)	3.6	2.4	3.0	2.1

The research results determined that dried sarılop figs have the maximum TAC value (3.6 mmol trolox equivalent/L). The lowest TAC value is determined on wet göklop fig (2.1 mmol trolox equivalent/L).
The mean TPC values in figs in the two groups (sarılop, göklop) are shown in table 2.

Table 2. TPC values (values are given as mean±SD) in figs in the two groups (sarılop, göklop).

	Sarılop dried figs	Sarılop wet figs	Göklop dried figs	Göklop wet figs
TPC (mg/ 100 g GAE)	108.43	85.67	97.71	90.33

The research results determined that dried sarılop figs have the maximum TPC value (108.43 mg/ 100 g GAE). The lowest TPC value is determined on wet göklop fig (85.67 mg/ 100 g GAE).

4. Discussion

Fig is grown in nearly all subtropical climates. A number of cultivated and wild forms of fig can be found in Turkey with a great diversity of colour, shape and flavour, primarily for fresh consumption.

In a research, phytochemical characters and antioxidant capacity of green-, yellow-, brown-, purple-, and black-fruited fig (Ficus carica L.) accessions have investigated [6]. In this study, the antioxidant capacity of fig fruits was determined by the ferric reducing antioxidant power (FRAP) assay. Antioxidant capacity was significantly correlated with the polyphenol and anthocyanin contents of fruits. In this research used TAC method developed by Erel [11]. In another research, to determine total antioxidant, similar our research, trolox equivalent antioxidant capacity (TEAC), the ferric reducing antioxidant power method has conducted [13].

One of the important points of this research, each dried fig (sarılop and göklop) has more TAC level. Therefore, can say that contain more antioxidants dried figs than wet. Similar results apply for the TPC. Determination of phenolic compounds which contribute to the antioxidant capacity was conducted [14]. The study conducted by Çalışkan and Polat; antioxidant capacity has significantly correlated with the polyphenol and anthocyanin contents of fruits [6].

The research results determined that dried sarılop figs have the maximum TPC value. The lowest TPC value is determined on wet göklop fig. The other is a result of research; phytochemical characters in figs were shown to be highly different depending on the cultivar.

Similar to our results, a strong correlation between the TPC and TAC of figs has been previously reported [15,16].

Fig fruit has been a typical component in the health-promoting Mediterranean diet for millennia. This study once showed that fig is importance nutrition in diet in point of TPC and TAC. According to research results, figs contain high phenolic content and high antioxidant capacity. But TPC and TAC contents diversity among variety.

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