Available online at www.sciencedirect.com
ScienceDirect
Food Chemistry 107 (2008) 939–948
Food Chemistry
www.elsevier.com/locate/foodchem

Analytical Methods

Some compositional properties of main Malatya apricot (*Prunus armeniaca* L.) varieties

Elif Betul Akin [a], Ihsan Karabulut [b], Ali Topcu [c,*]

[a] *Turkish Patent Institute, 06330 Ankara, Turkey*
[b] *Department of Food Engineering, Inonu University, 44280 Malatya, Turkey*
[c] *Department of Food Engineering, Hacettepe University, 06800 Beytepe, Ankara, Turkey*

Received 18 February 2007; received in revised form 12 June 2007; accepted 18 August 2007

Abstract

Malatya apricot (*Prunus armeniaca* L.) varieties are among the most important agricultural products of Turkey and protected as a geographical indication. In this research, it was aimed to determine some important analytical properties (dry matter, soluble solid content, a_w, ash, titratable acidity, pH, color, total phenolics, total carotenoids, β-carotene, sugars, organic acids, and mineral content) of Malatya apricots and to reveal the characteristic properties that differ these products from the similar ones. The apricot varieties, namely Hacıhaliloğlu, Hasanbey, Soğancı, Kabaaşı, Çataloğlu, Çöloğlu, and Hacıkız that are widely cultivated in Malatya region and other regions (Ereğli, İzmir, Iğdır, and Bursa) of Turkey were involved in the study. All analytical properties were found to be significantly different ($p < 0.05$) among different apricot varieties. The results have shown that dry matter and sugar content of Malatya apricot varieties are considerably higher than the other apricot varieties investigated in this study, as well as the data of other researches on apricots. All apricot varieties were found to be a good source of phenolic compounds (4233.70–8180.49 mg of gallic acid equiv/100 g of dry weight), carotenoids (14.83–91.89 mg of β-carotene equiv/100 g of dry weight), and β-carotene (5.74–48.69 mg/100 g of dry weight). Sucrose, glucose, and fructose were determined as the major sugars in all apricot varieties. In addition, sorbitol contents (16.91–26.84 mg/100 g of dry weight) of Malatya apricots were remarkably higher than the other apricot varieties. This was considered to be the one of the unique properties of Malatya apricots. Malic acid was the predominant organic acid in all Malatya apricot varieties. The results have also shown that the potassium content of Malatya apricots was significantly high and these apricots were important sources of Mg, Zn, and Se. This study has revealed that Malatya apricot contains functional food components with high nutritional value.
© 2007 Elsevier Ltd. All rights reserved.

Keywords: Apricot; Dry matter; Color; Phenolics; Carotenoids; β-Carotene; Sugars; Sorbitol; Malic acid; Minerals

1. Introduction

Turkey is the leading apricot producer of the world. According to the FAO Statistical Database (FAO, 2005), in 2005, 390 000 tons of apricot were produced in Turkey contributing to ~13% of the total apricot production in the world. Malatya region, of eastern Turkey, is particularly important for cultivation, production, and processing of apricots, as around 50% of the fresh apricots and 90% of the dried apricots of the whole country are produced in this region. Moreover, the apricots grown in this region has a reputation for their characteristics and quality. The climate, structure and content of the soil, and the other environmental conditions in Malatya region enables the production of quality apricots with high dry matter and sugar content. The most cultivated apricot varieties in Malatya region are, Hacıhaliloğlu, Hasanbey, Soğancı, Kabaaşı, Çataloğlu, and Çöloğlu (Asma, 2000) and are protected as geographical indication in Turkey by Turkish Patent Institute (TPI, 2007) Geographical indications are signs indicating the origin of a product, which possesses a specific quality, reputation or other characteristics attributable to that place, area, region or country of origin.

* Corresponding author. Tel.: +90 312 2977115; fax: +90 312 2992123.
E-mail address: gali@hacettepe.edu.tr (A. Topcu).

0308-8146/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.foodchem.2007.08.052

Foodstuffs, protected as geographical indications are mostly reputable and high quality products and thus, play an essential role for the economic development of the region they belong to (Josling, 2005; Dimara, Petrou, & Skuras, 2004). Hence, it is important to determine chemical and nutritional properties of such products and to find out unique characteristics thereof.

Sugars, organic acids, phenolic compounds and carotenoids, are being natural components of many fruits and vegetables, play important roles in maintaining fruit quality and determining their nutritive value (Ashoor & Knox, 1984). Therefore, food analysts have been interested in the amounts of the various chemical components and the changes occurring in the edible parts of fruits, because of their impact on the shelf life, technological and nutritive quality of the food product (Glew et al., 2003).

Epidemiological and clinical studies indicate that a diet rich in fruits and vegetable consumption can reduce the risk of several chronic diseases such as cancer, cardiovascular disease, coronary heart disease, and hypertension. Possible health effects of fruits and vegetables have been reviewed extensively (Hu et al., 2000; Ness & Powles, 1997; Steinmetz & Potter, 1996; Southon & Faulks, 2002). Available evidence provides support for the health benefits of a wide variety of fruits and vegetables, however, specific claims are most prolific for many of the colored-fleshed fruits and vegetables. Such foods are particularly rich in vitamin C, pro- and non pro-vitamin A carotenoids, folates, phenolics, and a range of bioactive (so-called) phytonutrients (Southon & Faulks, 2002).

Although, different apricot varieties have been investigated by many researchers in the world (Sass-Kiss, Kiss, Milotay, Kerek, & Toth-Markus, 2005; Dragovic-Uzelac, Pospisil, Levaj, & Delonga, 2005; Radi, Mahrouz, Jaouad, & Amiot, 2004; Dolenc-Sturm, Stampar, & Usenik, 1999; Katona, Sass, & Monar-Perl, 1999; Ruiz, Egea, Tomás-Barberán, & Gil, 2005), an extensive and comparative research as to the chemical compositions of Malatya apricots have not been investigated in detail. Therefore, this research was aimed to determine some important compositional properties (dry matter, soluble solid content, water activity, ash, titratable acidity, pH, color, total phenolics, total carotenoids, β-carotene, sugars, organic acids, and minerals) of apricots from Malatya region of Turkey. In addition, apricot varieties from other regions of Turkey (İzmir, Ereğli, Bursa and Iğdır regions) were also analyzed in order to provide a comparative study and delineate the different and unique characteristics of Malatya apricots.

2. Materials and methods

2.1. Fruit sample

Apricots varieties (Hacıhaliloğlu, Hasanbey, Soğancı, Kabaaşı, Çöloğlu, Çataloğlu, and Hacıkız) from Malatya region, and Tokaloğlu and Alyanak apricot varieties (from Ereğli and İzmir region, respectively) were harvested at commercial maturity stage from the Malatya Fruit Research Institute among the first and third weeks of July 2005. At least 100 apricot fruits were harvested from at least four different trees in same garden for each cultivar and then they were pooled. In addition, Iğdır and Bursa varieties were purchased from wholesale food market in Ankara. Samples were placed into polyethylene bags and stored at 4 °C until the analysis (analyzed with in five days). Three replicates of each variety were selected and analyzed.

2.2. Chemicals

All the reagents and solvents used were obtained from Merck (Darmstadt, Germany) and were of HPLC or analytical grade. Folin–Ciocalteu phenol reagent and gallic acid monohydrate were purchased from Sigma (St. Louis, MO, USA). Sources of reference compounds were citric acid, malic acid, ascorbic acid, sucrose, glucose, fructose, sorbitol, and β-carotene (Sigma, St. Louis, MO, USA). ICP (Inductively Coupled Plasma) multi element standard was purchased from Merck (Darmstadt, Germany).

2.3. Quality parameters

Dry matter content was determined according to the AOAC (1990). Soluble solid content, expressed as percentage (%), was determined in the juice of each sample using Bausch & Lomb Abbe-3 L refractometer (Tokyo, Japan) at 20 °C. Water activity of the samples was measured with an Aqualab CX-2 (Decagon Devices Inc., WA, USA) to an accuracy of ±0.003 at 25 °C (Lenz, 2003). Ash content of samples was determined at 550 °C (AOAC, 1990). Titratable acidity was determined by titrating 5 mL of juice with 0.05 M NaOH and results were expressed as percentage of citric acid (Turkish Standard, 2002). The pH values were measured by using a pH-meter (Mettler-Toledo MP220). Fruit weight (g) of apricot fruits were measured in 40 randomly selected apricot fruits for each apricot cultivar. Color values were measured from the surface (ground skin color) and in the flesh (after peeling) with Minolta Chroma Meter (CM-3600d, Minolta, Ramsey, NJ) (Ruiz et al., 2005). The measurements were displayed in L^*, a^*, and b^* values. C^* (chroma) and h° (hue angle) were calculated by using the following equation:

$$C^* = \sqrt{a^{*2} + b^{*2}}$$
$$h^\circ = \arctan(b^*/a^*)$$

Color of the central region on both sides of ten apricots was measured for each treatment and average values were reported.

2.4. Measurement of total phenolics

Concentration of total phenolics was measured by using the Folin–Ciocalteu assay (Sponas & Wrolstad, 1990). At

Download English Version:

https://daneshyari.com/en/article/1189745

Download Persian Version:

https://daneshyari.com/article/1189745

Daneshyari.com