

Mineral and Some Physico-Chemical Composition of 'Karayemis' (*Prunus laurocerasus* L.) Fruits Grown in Northeast Turkey

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Abstract—Some physico-chemical characteristics and mineral composition of 'Karayemis' (*Prunus laurocerasus* L.) fruits which grown naturally in Northeast Turkey was studied. 28 minerals (Al, Mg, B, Mn, Co, Na, Ca, Ni, Cd, P, Cr, Pb, Cu, S, Fe, Zn, K, Sr, Li, As, V, Ag, Ba, Br, Ga, In, Se, Ti) were analyzed and 19 minerals were present at ascertainable levels. Karayemis fruit was richest in potassium (7938.711 ppm), magnesium (1242.186 ppm) and calcium (1158.853 ppm). And some physico-chemical characteristics of Karayemis fruit was investigated. Fruit length, fruit width, fruit thickness, fruit weight, total soluble solids, colour, protein, crude ash, crude fiber, crude oil values were determined as 2.334 cm, 1.884 cm, 2.112 cm, 5.35 g, 20.1 %, S99M99Y99, 0.29 %, 0.22 %, 6.63 % and 0.001 %, respectively. The seed of fruit mean weight, length, width and thickness were found to be 0.41 g, 1.303 cm, 0.921 cm and 0.803, respectively.

Keywords—*Prunus laurocerasus* L., physico-chemical properties, nutritional properties.

I. INTRODUCTION

KARAYEMIS or Taflan (local names of *Prunus laurocerasus* L.) is a member of *Rosaceae* family and grown in eastern Black Sea, Marmara and Aegean regions in Turkey [1, 2, 3]. Karayemis (Cherry laurel) is a type of evergreen tree (which is 5-15 m long) and prefers growing in the moisture and shade. Karayemis has a small white-colored flowers which are hermaphrodite (have both pistile and stamen) and are pollinated bees, lepidoptera. Its leaves are short-stalked, oval, dark green and leather shiny. Karayemis has been used as traditional medicine for many years [4, 5, 6, 7]. Karayemis's juice, obtained from fresh leaves, has the effect of relieving abdominal pain, cough, nausea. Karayemis is also used as drug material in pharmacology [8, 9, 10].

Recently, Karayemis become more popular and more research is being done about it. Pomological and physical (weight, colour, firmness etc.), physiological and physico-

chemical (pH, soluble solid etc.) [11, 12, 13, 14, 15, 16], chemical properties (moisture, soluble sugars, starch etc.) [4, 5, 6], medicinal effects [10] have been reported. The aim of present investigation was to determine some physico-chemical characteristics and mineral composition of 'Karayemis'.

II. MATERIALS AND METHODS

A. Sampling

50 fruits of each treatment were used for analyses.

B. Determination of Size

From the samples, 50 fruits were selected at random for determining the physical characteristics. For each fruit and seed, 3 linear dimensions were measured, that is (a) length, (b) width and (c) thickness, using a vernier caliper reading to 0.01 mm. Hence measurement of all size indices was replicated 10 times for fruit. The weight of individual fruit and seed for Karayemis were determined by using an electronic balance to an accuracy of 0.001 g. Each measurement was replicated 10 times.

C. Total Soluble Solids

The content of total soluble solids was determined using samples of fruit pulp with a hand refractometer, at room temperature (range from 18 to 23°C) [17].

D. Protein

The nitrogen content estimated by the Kjeldahl method and was converted to protein content by using the conversion factor 6.25 [18].

E. Colour

The colour scale was employed for determination of the fruit juice colour [19].

F. Crude Ash

Crude ash was determined in a muffle furnace at 850 °C for 8 h [20].

G. Crude Fiber

Crude fibre was determined in the sample using the standard methods of analysis of the [20].

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H. Crude Oil

Samples were homogenized and subjected to extraction for 6 h with petroleum ether (boiling range 30–60 °C) in a Soxhlet apparatus. The extracted oil was dried over anhydrous sodium sulphate and the solvent was removed under reduced pressure in a rotary film evaporator. Oil percentages were determined by weight difference [20].

I. Determination of Mineral Contents

About 0.5 g dried and ground sample was put into burning cup and 10 ml pure HNO₃ was added. The sample was incinerated in MARS 5 microwave oven under the 170 psi at 200°C temperature and solution diluted to the certain volume (25 ml) with water. Samples were filtered in filter paper and were determined with an ICP-AES [21].

J. Working Conditions of ICP-AES

Instrument: ICP-AES (Varian-Vista; Australia)

RF power: 0.7 - 1.5 kW (1.2 - 1.3 kW for axial)

Plazma gas flow rate (Ar): 10.5 - 15 L/min (radial), 15 L/min (axial)

Auxiliary gas flow rate (Ar): 1.5 L/min

Viewing height: 5 - 12 mm

Copy and reading time: 1 - 5 s (max. 60 s)

Copy time: 3 s (max. 100 s)

III. RESULTS AND DISCUSSION

Some nutritional and physico-chemical characteristics of 'Karayemis' (*Prunus laurocerasus* L.) fruit were given Table I and II. Potassium (7938.711 ppm) was present in the highest concentration (Table I), followed by Mg (1242.186 ppm), Ca (1158.853 ppm), P (882.574 ppm), S (137.995 ppm), Na (72.407 ppm) and B (39.164 ppm); and Fe, Zn, Li, Se, Al, Ni, V, Cr, As, Sr, Mn, Cu, were also detected. Adiloglu [22] reported that Fe, Cu, Zn, Mn, B and Mo contents of leaf samples were determined between 50 to 130, 2 to 8, 27 to 56, 950 to 1032, 36 to 52 and 0.05 to 0.32 mg.kg⁻¹, respectively. As far as we know there are not enough studies on chemical composition of Karayemis fruit.

TABLE I
SOME NUTRITIONAL CHARACTERISTICS OF KARAYEMIS (*PRUNUS LAUROCERASUS* L.) FRUIT

Parameters	Values (ppm)
K	7938.711
P	882.574
Ca	1158.853
Na	72.407
Mg	1242.186
S	137.995
Pb	0.000
Ba	0.000
Ga	0.000
As	1.128
Fe	15.120
Mn	6.872
Zn	7.312
Cu	4.325

Co	0.000
B	39.164
Cd	0.000
Se	0.211
In	0.000
Li	1.587
Sr	6.905
Al	3.082
Ni	0.990
Ag	0.000
V	4.141
Cr	0.315
Bi	0.000
Ti	0.000

TABLE II
SOME PHYSICO-CHEMICAL CHARACTERISTICS OF KARAYEMIS (*PRUNUS LAUROCERASUS* L.)

Traits	Mean
Fruit length (cm)	2.334
Fruit width (cm)	1.884
Fruit thickness (cm)	2.112
Fruit weight (g)	5.35
Total Soluble Solids (%)	20,1
Colour	S99M99Y99
Seed length (cm)	1.303
Seed width (cm)	0.921
Seed thickness (cm)	0.803
Seed weight (g)	0.41
Protein (%)	0,29
Crude Ash (%)	0,22
Crude Oil (%)	0,001
Crude Fiber (%)	6,63

Some physico-chemical characteristics of 'Karayemis' (*Prunus laurocerasus* L.) fruit were given Table II. Fruit length, fruit width, fruit thickness, fruit weight, total soluble solids, colour, protein, crude ash, crude fiber, crude oil values were determined as 2.334cm, 1.884cm, 2.112cm, 5.35 g, 20.1%, S₉₉M₉₉Y₉₉, 0.29%, 0.22%, 6.63% and 0.001%, respectively. The seed of fruit mean weight, length, width and thickness were found to be 0.41g, 1.303cm, 0.921cm and 0.803, respectively.

Islam and Deligoz [23] reported that their study was investigated the pomological properties of local Cherry laurel genotypes (82 types) which are grown in the center of Ordu, Gülyali, Ulubey, Persembe, Fatsa, Kabaduz, Unye, and Ikiyce provinces. And the same researchers determined that fruit weight, fruit width, fruit length, fruit shape index, soluble solids, pH, acidity and total soluble solids were found to be 1,47-6,24 g (avarage 4.3 g), 11.95 -20.54 mm,12,15 -23,13 mm, 0,80-1,10 (avarage 0.95), 13-29%, 3.94-7.10, 0,14-0,50 and 12,26-34,92% respectively. Also, researchers recorded that seed weight, seed width, seed length and seed shape index

were 0.09-0.61g, 6.12-10.39 mm, 8.56-17.48 mm and 0.56-0.91 respectively. Beyhan [11], reported that Cherry laurel fruits weight, length, width and the soluble solid content were ranged between 1.08 to 5.33 g, 12.09 to 20.95 mm, 10.58 to 21.94 mm. and 16.00 to 22.00 %, respectively, in Sakarya region (Turkey). Islam and Odabas [12] averagely determined 12 mm fruit width and 16 mm fruit length for Cherry laurel types grown in the Black Sea Region, Turkey. Cherry laurel types contain 17.6% soluble solids In Turkey [24].

Islam and Vardal [25] (2009), determined local Karayemis types in Pazar and Rize province in 2005-2006. Researchers reported that fruit weight, soluble solids and fruit number per cluster were 2,63-5,56 g, %15,7-23,1 and 7-16 ,respectively. In addition, they defined that the fruits are consumed fresh fruit, dried and pickled fruit. Akbulut et al. [26] investigated 28 Karayemis types which are grown in Black Sea Agricultural Research Institute in Samsun. They reported that cluster weight, fruit number per cluster, fruit weight, fruit/seed, total soluble solids, acidity were ranged between 5,84 to 57,82 g, 3,6 to 18,3; 1,40 to 5,39g, 1,08 to 1,43; 8,6 to 21,3% and 0,36 to 1,21%, respectively. They also reported that the shape of fruits were orbicular (14 types), conical (8 types), stuffy (3 types) and ovoid (3 types), and the colour of fruit was dark red (15 types), black (9 types) and red (4 types). Kolayli et al. [6] determined that Karayemis fruit appeared to have high mineral content. They found that the concentrations of macro elements K, Mg, Ca, and Na were high at 2215 ± 10.5 , 179 ± 11 , 153 ± 0.8 , and 55 ± 0.3 mg/kg, respectively, and the concentrations of trace elements Mn, Fe, Zn, and Cu were 24.2 ± 1.3 , 8.3 ± 0.8 , 1.9 ± 0.2 , and 0.8 ± 0.1 mg/kg, respectively. In addition, the fruit showed very low contents of Pb, Ni, Co, and Cr, below the detection limits, which is considered to be a good food quality. As it is a rich source of crude protein (2.1 ± 0.2 %), total sugar (1.3 ± 0.2 %), ascorbic acid (mg/100g of wet fruit) (204 ± 35), minerals and antioxidants.

Bostan and Islam [27] reported that their study was aim to determined pomological properties of 17 Karayemis types's fruits which grown in centre of Trabzon. In this study, cluster weight, fruit number per cluster, fruit weight, seed weight, total soluble solids and total acidity were found to be 19,79-103,28 g, 7,80-22,85, 2,06-6,79 g, 0,27-0,52 g, 13,50-26,67 % and 0,127-0,291%, respectively. Another investigation was carried out by Islam [2] in Trabzon. In this study, cluster weight, fruit number per cluster, fruit weight, total soluble solids and pH were determined 67,9 g, 18,9 g, 4,8 g, 15,4 % and 4,8, respectively. Bostan [15] researched on Su (a variety of Cherry laurel), for determine pomological properties. He reported that cluster weight, fruit weight, fruit number per cluster, seed weight, total acidity, pH and total soluble solids were found to be 46,75 g; 4,89 g; 9,85; 0,37 g; 0,29 %; 4,55 and 15,92 % respectively. Our results show that physico-chemical characteristics of Karayemis fruits were found to be compatible with previous studies.

IV. CONCLUSION

Prunus laurocerasus L. fruit processing, storage and marketing facilities remain unknown and the trees grown in their own cases, any cultivation is not performing. If suitable cultivation techniques are determined for Karayemis, fruit quality and quantity will be increased. Karayemis grows in the natural plant population in Turkey. Karayemis should be important in the future because of crop variety and alternatively taste feature. It is important that the studies on Karayemis should be continued increasingly and cultivation of Karayemis should be widespread.

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