

STUDIES ON THE SEEDS OF
Cydonia oblonga Miller

Cydonia oblonga Miller TOHUMLARI ÜZERİNDE ÇALIŞMALAR
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Cydonia oblonga Miller, (Rosaceae) is a tree cultivated for its fruits and known as "Quince" in English and "Ayva" in Turkish. Mucilage, in the testa epidermis of seeds, is one of ingredients in many cosmetic preparations is present as 11.2%. The quantity of fixed oil in the cotyledons was determined as 18.73%. The analysis of saponifiable part of the seed oil was performed on the methyl esters of the fatty acids by gas-chromatography. Fourteen fatty acids were detected, oleic, linoleic, capric and palmitic acids were the major constituents comprising 85.06% of the oil.

İngilizce'de "Quince" olarak bilinen *Cydonia oblonga* Miller (Rosaceae), Türkiye'de "Ayva" olarak tanınan ve meyvaları için kültüre alınan, ağaç şeklinde bir bitkidir. Tohumların testa epidermasında bulunan ve pek çok kozmetik preparatın bileşiminde yer alan, müsilaj miktarı %11.2 olarak bulunmuştur. Tohumlarda bulunan sabit yağ miktarı %18.73'dür. Tohum yağının sabunlaşan kısmında bulunan yağ asitlerinin metil esterleri hazırlanarak gaz kromatografisi yardımıyla tayin edilmiştir. Yağ bileşiminde bulunan ondört yağ asidi içerisindeki oleik, linoleik, karpik, palmitik asitler, ana bileşenlerdir ve yağın total miktarının %85.06 sini oluşturmaktadırlar.

Keywords : *Cydonia oblonga*, Quince, Rosaceae, mucilage, fixed oil, fatty acid

Anahtar kelimeler: *Cydonia oblonga*, Rosaceae, müsilaj, sabit yağ, yağ asidi

Introduction

Cydonia oblonga Miller (Quince) grows naturally in North-West Iran, Caucasia and North Anatolia, is also cultivated in America, Asia, Europe and South Africa(1). Fruit has powerful, characteristic sweet odor and astringent taste. It is widely used to prepare jam and marmalade (2). A fruit contains five loculi in each of which three are about twenty seeds closely packed in two vertical rows (3).

Seeds are surrounded by epidermis which contains a high proportion of mucilage (1,3,4). This mucilage contains cellulose microfibriles in addition to polysaccharides which include glucuronic acid and glucose containing methyl groups (5). Cytological investigations with electron microscope have shown that epidermal cells of quince seeds contain large paracrystalline deposits in the periplasm(6).

The seeds on account of their mucilage have soothing and demulcent properties and are used internally in the form of decoction. In folk medicine large quantities of the decoction is used in dysentery and diarrhea (2). The seeds of *C.oblonga* have been employed generally

as a demulcent and used for treatment wounded and burned skin and sorethroat. Quince mucilage has been also used in many cosmetic and medicinal preparations as well as in food industry. It is used as a suspending agent in pharmaceutical industry and it is one of the ingredients of hair setting lotions. Some cleaning agents such as soaps, moisturizing lotions and creams giving comfort and tenderness contain 0.01-5.0% Quince mucilage. Some dental coating ceramics also contain colloidal mucilage extract of the seed (2,5,7,8). The seeds also contain fixed oil in the cotyledones with proteins and a small amount of amygdalin and emulsin which yield the odor and taste resembling that of bitter almond when they are crushed with water.

The aim of this study was to investigate the chemistry of the seeds of *Cydonia oblonga* growing in Turkey. We determined the amount of the mucilage and fixed oil in the seeds. I addition the seed oil has been analyzed by Capillary Gas-Chromatography.

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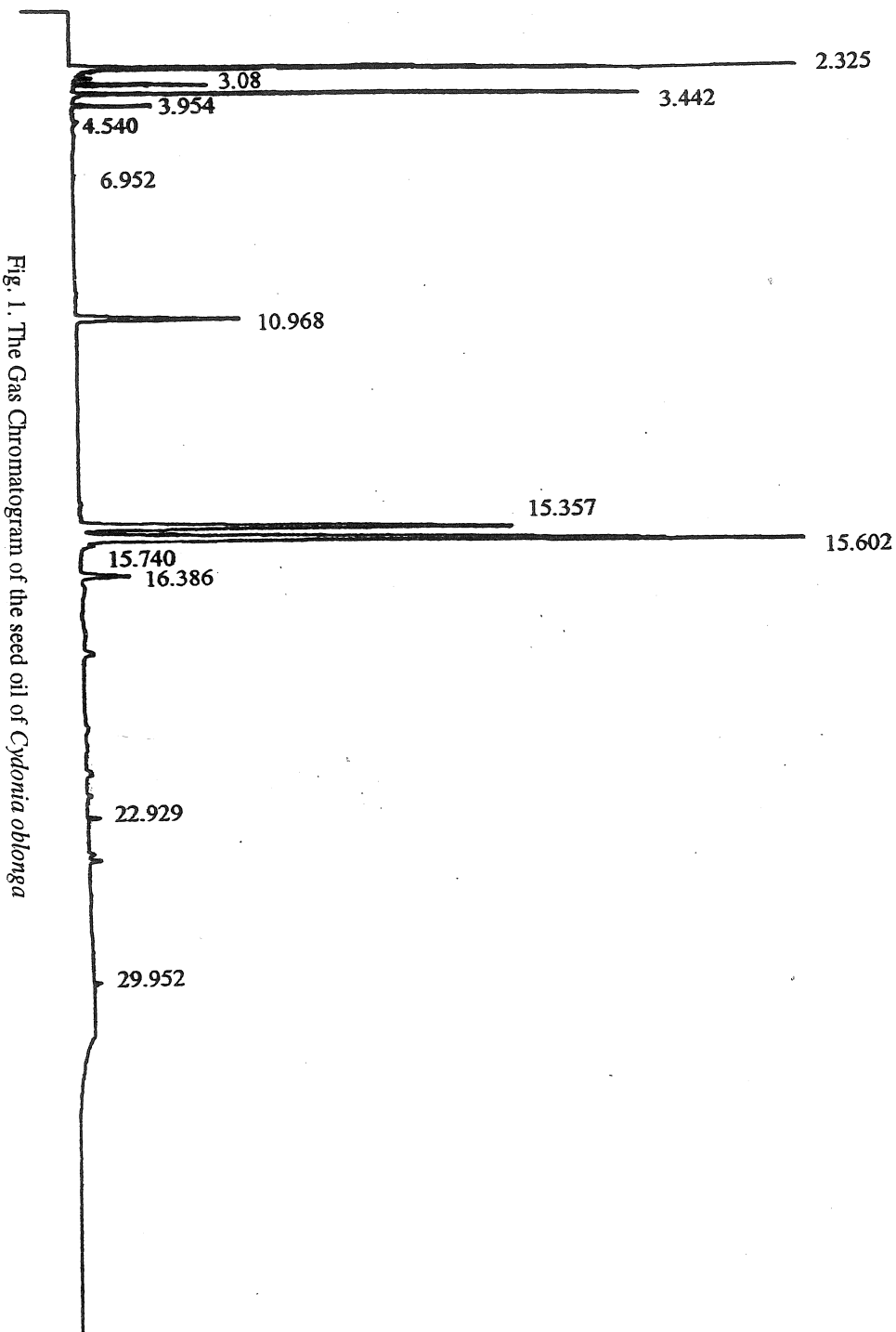


Fig. 1. The Gas Chromatogram of the seed oil of *Cydonia oblonga*

Material

The fruits of *Cydonia oblonga* were collected from cultivated trees in Kergah Vineyard, near Kayseri (TURKEY), in October 1994. The seeds were separated from the folicules. A voucher specimen deposited in the Herbarium of the Department of Pharmacognosy, Faculty of Pharmacy, Gazi University, Ankara.

Method I

20 g dried whole seeds were extracted four times with 20 ml distilled hot water by stirring on a steam bath for about 30 minutes. The mucilaginous extracts were filtered from a gauze by squeezing. The aqueous extracts were combined and precipitated by adding on one liter of 90° ethanol, left to stand for 20 hours. The floating crude mucilage was obtained by centrifugation and washed several times with ethanol, acetone and diethylether, respectively, then filtered and dried in a vacuum desiccator over anhydrous calcium chloride (9).

Method II

5 g seeds were crushed with 2.5 g anhydrous sodium sulfate and extracted with petroleum ether (bp. 40-60°C) in Soxhlet apparatus. The extract was distilled under vacuum at low temperature to yield 0.9365 g of oil. After saponification of the oil with 20% alcoholic KOH, the oil was mixed with BF₃-methanol reagent in order to transform fatty acid into the in corresponding methyl derivatives (10). The fatty acid composition was determined by gas chromatography, using a Hewlett-Packard Mode 5890 apparatus fitted with a hydrogen flame ionization detector and Ultra 1-cross linked methyl silicone gum phase (50 m x 0.2 mm x 0.33 µm). Temperature was programmed between 190-230°C and rate was 2°C per minute. Detector and injection temperatures were 250°C. Helium was used as carrier gas flow rate was fixed at 0.9 ml/min. Split ratio was 1/50 and chart speed was 0.5 cm/min for the first 9 minutes and 1 cm/min for the rest. Peaks were identified by comparing with standard samples and relative amounts of fatty acids were calculated by the integrator HP 3398-II.

Results and Discussion

In this study, the mucilage content of the seed of *Cydonia oblonga* was determined as 11.2%. According to our result the seeds of *Cydonia oblonga* growing in Turkey may be used the source of the commercially important mucilage.

The amount of the seed oil was found as 18.73%. The fatty acids in saponifiable parts of the oil were determined by gas chromatography. The identification of the components was carried out by comparing their retention

times with those of the authentic samples. The content of the fatty acids, their percentage and the retention times are shown in Table 1. The gas-chromatogram of the seed oil is given Figure 1.

Table 1. The fatty acids, their percentage and retention times in the seed oil of *Cydonia oblonga*

Fatty Acids	Percentage (%)	Retention Time (min)
caproic acid	0.54	2.55
caprylic acid	0.58	2.68
nonanoic acid	3.61	3.08
capric acid	15.87	3.44
undecanoic acid	2.33	3.95
lauric acid	0.11	4.54
myristic acid	0.16	6.95
palmitic acid	7.15	10.96
linoleic acid	22.57	15.35
oleic acid	39.47	15.60
elaidic acid	0.71	15.74
stearic acid	2.53	16.38
arachidic acid	0.74	22.92
lignoceric acid	trace	29.95

Oleic, linoleic, capric and palmitic acids are the major components of the oil with an amount of 85.06%. Caproic, caprylic, lauric, myristic, elaidic and arachidic acids are minor compounds of the oil.

There is not any study about the fatty oil of the seeds in detail. However it is reported that the yield of seed oil is 14-15% any fatty acids are 42.5% oleic acid, 39.2% linoleic acid, 3.9% linolenic acid, 11% oleic and myristic acid in "Hagers Handbuch der Pharmazeutischen Praxis" (11). According to our results, oleic acid is also present in high amount in the oil. But we determined the linoleic acid as 22.57%. The seed oil is rich in unsaturated fatty acids such as oleic and linoleic acids are main component, while elaidic acid is in less amount. Capric, palmitic, nonanoic and stearic acids are the main component of the saturated fatty acids in the oil.

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