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## QUANTITATIVE STUDY OF COMPOUNDS PRESENT IN THE SEED OILS OF WILD PEAR (*PYRUS GLABRA* BOISS.) IN BOYER AHMAD

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### ABSTRACT

Wild pear (*Pyrus glabra* Boiss.) is a perennial plant of the Rosaceae family. It is a native fruit in Iran. Also, the seeds have medicinal properties. The study was carried out to discover the oil content and fatty acids composition of *P. glabra* Boiss seeds. The present study is the first report of the oil extracted from *P. glabra* Boiss seeds in Boyer Ahmad. In order to discover the seeds oil percent and composition of fatty acids, the soxhlet method and gas chromatography (GC) were used. A quantity of oil obtained from *P. glabra* Boiss seeds was 45/81 percent. Based on the analysis of fatty acids by GC, major fatty acids in seeds of *P. glabra* Boiss were 11 compounds. Oleic acid (56/23 %) and linoleic acid (32/49 %) were recognized major fatty acids of oil. Other fatty acids identified were capric acid (C10:0), lauric acid (C12:0), myristic acid (C14:0), palmitic acid (C16:0), palmitoleic acid (C16:1), margaric acid (C17:0), stearic acid (C18:0), linolenic acid (C18:3) and eicosanoic acid (C20:1). Oleic acid, reverses inflammation related insulin dysfunctions that can contribute to diabetes. In a cell model, oleic acid enhanced insulin production, and the *Pyrus glabra* Boiss. seeds, represent a rich source of oleic acid.

**Keywords:** *Pyrus Glabra*, Seed, Oil, Fatty Acid

### INTRODUCTION

Wild Pear with scientific name of (*Pyrus glabra* Boiss.) is a perennial plant from the family (Rosaceae). It is native to Iran and since its seeds have oil and essential oils, it has medicinal and nutritional properties (Farhadi, 2009). There are two main forms of saturated fat (SFA) and unsaturated (UFA). If there was a double bond in one or more fatty acid, it is monounsaturated fat (MUFA). If there are two or more double bonds, it is polyunsaturated fat (PUFA). Saturated fats have no double bonds between the carbons and they are solid at room temperature. Saturated fatty acids increase LDL cholesterol levels (a lipoprotein that in high doses increases the risk of heart disease), while polyunsaturated fatty acids reduces the level of LDL cholesterol (Brown, 2011).

The Wild Pear seed oil has been reported to be 33%. The most common fatty acids in its seeds are oleic acid and linoleic acid (Hazrati Yadekori *et al.*, 2012). Oleic acid by reducing bad cholesterol (LDL) of blood and maintaining or increasing good cholesterol (HDL) is effective in the prevention of coronary artery and cardiovascular disease (Yukuia *et al.*, 2009). Oleic acid reduces blood pressure (Teres *et al.*, 2008; Ruiz-Gutierrez, 1996). It increases fat burning and helps weight loss (Lim *et al.*, 2013) and protects cells from free radical damage (Haug *et al.*, 2007).

Oleic acid returns inflammation associated with impaired insulin function to its default state. Chronic inflammation can be caused due to obesity. Fat cells produce TNF-a, which reduces the production of insulin and causes insulin resistance. In cellular models, oleic acid increases the production of insulin (Vassiliou *et al.*, 2009). Also, a diet rich in oleic acid decrease risk of ulcerative colitis by 89 percent (De-silva *et al.*, 2014). This study aimed to extract and determine oil content and fatty acid composition of wild pear seeds in Boyer Ahmad.

### MATERIALS AND METHODS

#### **Gathering and Preparing Seeds**

*Pyrus glabra* Boiss. in October 2014 was gathered randomly from distribution centers located in the city of Yasouj, Boyer Ahmad internal market and was prepared by separation of the sell and the core and making seeds powder.

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### Extracting and Measuring the Amount of Oil

In order to extract *Pyrus glabra* Boiss. oil, soxhlet and hexane solvent method was used using 10 g of sample. The results were expressed as the percentage of fat in dry weight.

### Supplying Oil Methyl Ester

From the oil samples obtained from 100 mg was weighed and mixed with 10 ml of methanol-acetyl chloride, after solving the oil in the solvent, the sample rested for 1 hour at 85 degrees Celsius. Then about 4 ml of distilled water was added to methylated oil, using a mixer mixture was mixed for 5 minutes, then 2 ml of hexane solvent containing (0.01 TBHQ) were added to the mixture and after mixing with stirring, was centrifuged for 5 minutes at a speed of 4000 rpm at 25 degrees Celsius with UV2100PC. Using a micropipette, centrifuge samples upper liquid carefully removed so as not dealing with the bottom, was poured in the container, and was refrigerated until use.

### Analysis of Fatty Acid Methyl Esters by Gas Chromatography (GC)

In order to analyze the methyl esters of fatty acids, gas chromatography model (A3420SP- with silica column) -length of 30 m, thickness of 25 mm and a diameter of 25 mm- and 1075FID detector were used. Before injecting the sample into the column, air, hydrogen and nitrogen generator was switched on. Switching gas chromatography on, nitrogen gas flew into column and air and hydrogen gas flew into the detector and the flame lighted up (prior to sample injection ensure that flame is lighted). Column, the injector and detector temperature was respectively 198, 250 and 300 degrees Celsius. In addition, standard sample was prepared in the same way and given the same amount was injected into the column. When the temperature of every three sections reached the set temperature, 3 ml of sample was removed with Hamilton syringe and was injected into the column.

### Statistical Analysis

To evaluate oil, Peak-ABC chromatography work station Ver. 2/24 was used. In addition to determine the percentage of each fatty acids in the oil, the calculation unit of software was used.

## RESULTS AND DISCUSSION

### Results

Average wild pear seed oil content was 45.81% (Table 1). Based on the results of fatty acid analysis by gas chromatography (GC), 11 major fatty acids in wild pear seeds were identified. Oleic acid and linoleic acid with 56.23 % and 32.49 % respectively were the major fatty acids known in the oil. Other fatty acids include capric acid, lauric acid, myristic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid, linolenic acid and eicosanoic acid (Table 2). The results of fatty acid methyl esters delay time indicated that fatty acids including oleic acid, linoleic acid and palmitic acid in emerged in the detector respectively in 56-57minutes, 62-63minutes, and 40 minutes.

**Table 1: The Results of Tests Conducted on the Seed**

Repetition 3	Repetition 2	Repetition 1	Parameter
47.29	46.62	43.52	Oil (%)

### Discussion

Average oil content of wild pear seed was 45.81%. Hazrati *et al.*, (2012) reported wild pear seed oil content to be 33 % (Hazrati Yadekori *et al.*, 2012). Comparison of wild pear seed oil content with other plants of the Rosaceae family, including the dog rose (8-11 %), pears (17%) and apple (29 %) indicate that wild pear seeds have a high percentage compared with other oilseed crops (Yukuia *et al.*, 2009; Saeedi *et al.*, 2009). Fatty acids included oleic acid and linoleic acid that are very similar to other plants in the Rosaceae family. The main groups of fatty acids obtained from wild pear seed oil contains were monounsaturated fatty acids (56.23 %) compared with polyunsaturated fatty acids (33.66 %) and saturated fatty acids (9.41 %). The results of Table 2 show that wild pear seed oil is rich in unsaturated fatty acids (oleic and linoleic) and total wild pear seed oil contains 9.41 % saturated fatty acids and 90.58 % unsaturated fatty acids.

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**Table 2: The *P. Glabra* oil fatty Acids**

The Fatty Acid (Percent)	The Fatty Acid
0.04172	Capric Acid
0.01721	Lauric Acid
0.1294	Myristic Acid
7.493	Palmitic Acid
0.1342	Palmitoleic Acid
0.06301	Margaric Acid
1.675	Stearic Acid
56.23	Oleic Acid
32.49	Linoleic Acid
1.172	Linolenic Acid
0.5594	Eicosanoic Acid

**Conclusion**

Oleic acid returns inflammation associated with impaired insulin function to its original state, which could help treat diabetes. Fat cells produce TNF-  $\alpha$ , which reduces the production of insulin and causes insulin resistance. In cellular models, oleic acid increases the production of insulin and oleic acid is the predominant fatty acid of wild pear seed oil.

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