



Extraction of the Composition of Olive Pits with Various Solvents

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Abstract

We have studied samples obtained from olive pits of different dimensions, determined the method for obtaining powder from olive pits, and also studied the best suitable time for collection. Crushed to a powder of powder and to particles of hard bones, they were placed in test tubes and filled with solvents. The solutions obtained by extraction with several solvents from the crushed powder of olive pits, collected in October 2021 in the Surakhani district of Baku, showed the best result. The resulting concentrates were studied and the optical density of the solutions was determined by UV spectroscopy; a method based on the Lambert–Bouguer–Beers law was applied.

Keywords: olive pits; oils; UV-VIS.

1. Introduction

One of the most promising areas of the agricultural sector in our country is the cultivation of olives. Many domestic experts agree with this, since Azerbaijan has all the prerequisites for this, and the olives grown on our land are very saturated in their chemical composition. It is the cultivation of olive trees that can bring considerable profit to the state treasury. The olive has been cultivated for a very long time. This is confirmed by the remains of this plant found during the excavations of Absheron, Barda and on the other territory of present-day Azerbaijan.

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Unfortunately, the olive plantations of Azerbaijan were cut down and burned by numerous invaders, especially during the Mongol invasion. Currently, one of the oldest trees has been preserved in the village of Nardaran in the city of Baku, which is at least 180-200 years old. In Baku, in the Governor's Garden, there are about 100 trees aged 80-90 years, and six trees grow in Ganja [1, 2].

In Absheron, and particularly Baku, olive trees are a familiar part of the natural landscape, as olive trees are planted in all districts of the city. By the way, olive orchards have been growing on the Absheron Peninsula since 1860, and the age of some trees reaches 300 years. In 1939, olive state farms were established in the vicinity of Baku – Mashtaga, Zyk, Zira and Turkan. Then olives grew everywhere, including along the roads. These evergreen trees were actively planted because of their unpretentiousness. In those days, often whole families went to collect olives for the purpose of their further preservation. And today this culture is one of the most widespread in Absheron.

Today, olive kernel oil has a fairly high demand on the world market and is used in the food, cosmetic and pharmaceutical industries.

Many articles have been devoted to the healing properties of olive pits, and today the demand for medicinal substances based on olive oil and extract is increasing all over the world. It is recommended to swallow every day from 5 to 15 whole olive seeds for a month, which helps the body cope with ailments in breathing and the digestive system. In ancient times, there was a method of extracting oil exclusively from olive pits. Walnut contains a large amount of fatty acids – triglycerides (50% in green fruits, 70-80% in black) [3,4].

In the composition of the pits of olives there is a significant amount of polyphenols, tocopherols, squalene. Saturation with substances such as Omega 3, Omega 6, oleuropein, carotenoids, phenolic compounds hydroxytyrosol, verbascoside. Vitamins: PP, A, C, K, E. Proteins, carbohydrates, minerals (calcium, iron, phosphorus, potassium) are available. The seeds are rich in biologically active compounds that are not found in the berries themselves.

Oil is extracted from seeds in two ways: pressing and extraction. The cold pressing method is rarely used in practice due to the relatively low yield of the final product, although this method allows to save in it all the necessary biologically active substances (BAS), which determine its useful properties. The extraction method for obtaining oil can significantly increase its yield, but this method has disadvantages associated primarily with the use of toxic organic solvents. Based on the goal, the main task is to study the influence on the extraction process of such factors as the degree of crushing of stones, the choice of the state of the extractant, the multiplicity and duration of extraction, which play a major role in obtaining high oil yield [5].

2. Experimental part

The objects of the study are crushed olive pits into powder. To develop a technology for obtaining biologically active extracts with enhanced antioxidant properties, such parameters as drying of raw materials, the choice of solvent, extraction temperature, and extraction duration have an important influence on the extraction process.

The process of extraction with various solvents in the food industry of plant raw materials is a complex multifactorial process that must be carried out taking into account environmental safety. One of the most important factors is the nature of the solvent used for extraction, the relationship between the nature of the solvent for extraction and the anti-radical properties of raw material extracts was studied in order to determine the optimal solvent for obtaining olive seed extracts

3. Materials

Olive pits, ethyl alcohol, benzene, distilled water.

Equipments: UV-VIS detector (Shimadzu SPD-40) / 40V, Centrifuge (Eppendorf SE)

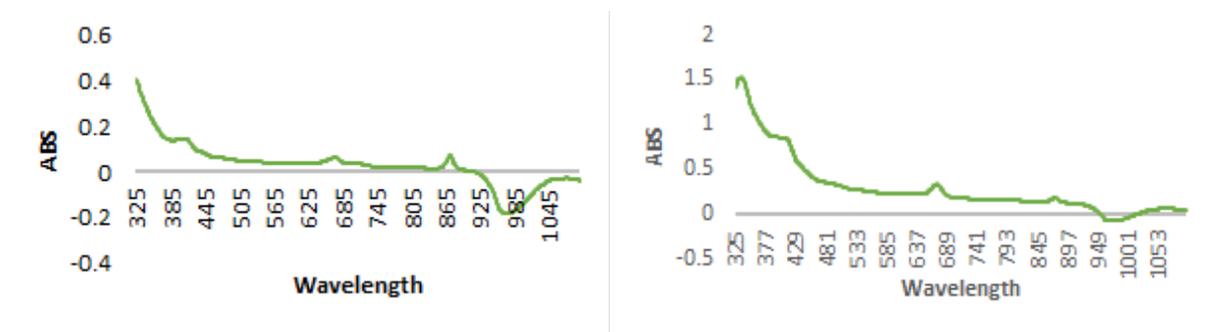


Figure 1: UV of 1g of bulk olive pits in benzene. **Figure 2:** UV of 1g of olive pits powder in benzene.

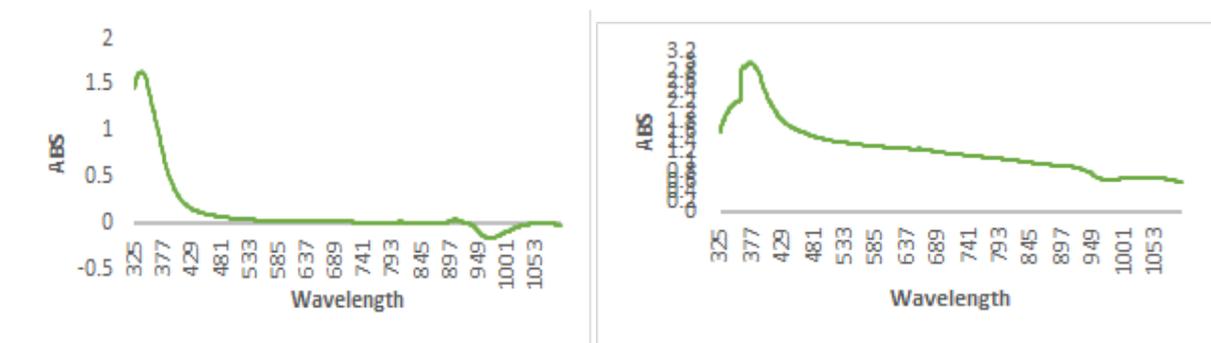


Figure 3: UV of 1 g of bulk olive pits in ethanol. **Figure 4:** UV of 1 g of olive pits powder in ethanol.

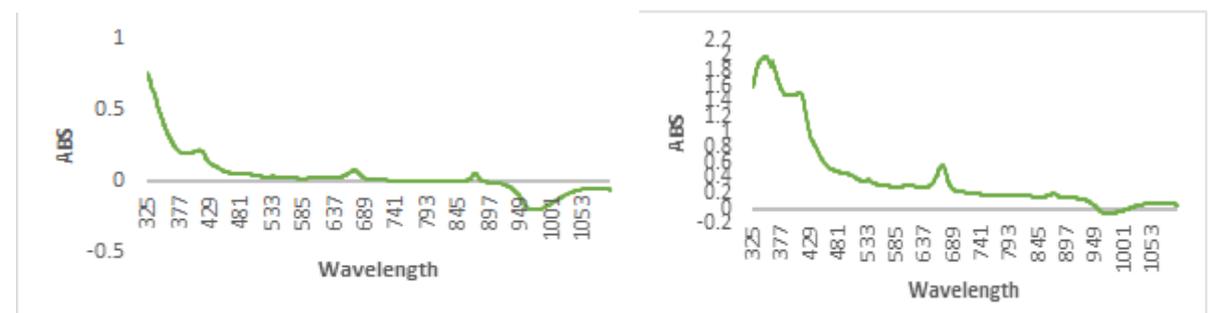


Figure 5: UV of 3 g of bulk olive pits in benzene. **Figure 6:** UV of 3 g of olive pits powder in benzene.

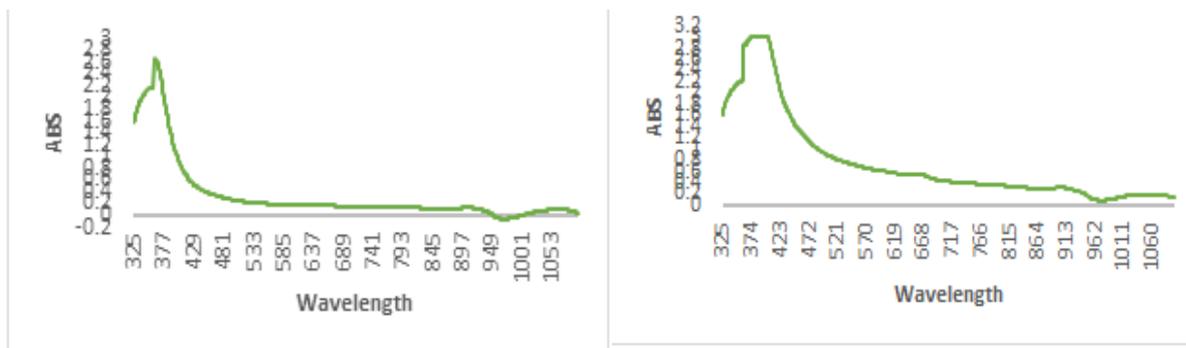


Figure 7: UV of 3 g of bulk olive pits in ethanol. **Figure 8:** UV of 3 g of olive pits powder in ethanol.

4. Results and discussion

Table 1: Concentration of obtained samples.

| Sample | Concentration |
|----------------------|---------------|
| 1 g, bulk, benzene | 0.10175 |
| 1 g, powder, benzene | 0.38 |
| 1 g, bulk, ethanol | 0.40675 |
| 1 g, powder, ethanol | 0.75 |
| 3 g, bulk, benzene | 0.1885 |
| 3 g, powder, benzene | 0.48525 |
| 3 g, bulk, ethanol | 0.66975 |
| 3 g, powder, ethanol | 1.3 |

As it can be seen from the obtained data, the best result is obtained by the powder of olive pits. Ethanol was found to be the best extractant in the extraction. This factor is very important for oil processing and oil producing companies. Also, based on our results, we tried to ultrasonicate powdered olive pits in distilled water to examine the consistency of the resulting solution. As a consequence, we observed the formation of an oily layer on the surface of the water, i.e, during sonification, oily substances can be isolated from the pits of olives.

5. Conclusion

Samples obtained from olive pits of different sizes have been studied and the results show that October is the most suitable time for harvesting. The best result was shown by the solutions obtained by extraction with several solvents from the crushed powder of olive pits, collected in October 2021 in the Surakhani district of Baku. The best result was shown by a sample with a composition of 3 g of powder olive pits using ethanol as a solvent. The concentration is 1.3

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