DISCUSSION OF POLYPHENOLS IN OLIVE OIL

Gulyamova Mukaddamkhon
Tashkent Institute of Chemical Technology
Research Intern, Department of Technology of
Food and Perfumery and Cosmetic Products

Annotation: Extra virgin olive oil is an excellent source of antioxidants that help fight inflammation and chronic diseases. The oil's main antioxidants include the anti-inflammatory oleocanthal, as well as oleuropein, a substance that protects LDL (bad) cholesterol from oxidation. Some people criticize olive oil for its high content. the ratio of omega-6 and omega-3. The article provides the composition of olive oil grown in the Republic of Uzbekistan.

Keywords: antioxidants, flavonoids, olive oil, phenols, vegetable oils, polyphenols, oleo gel.

Olive oil, especially extra virgin olive oil, is known for its many health benefits, making it an essential part of a healthy diet. One of the main components responsible for these benefits are polyphenols, natural antioxidants that have a positive effect on the body. However, the total amount of polyunsaturated fats in it is still relatively small.

Besides extra virgin olive oil, there are many other popular cooking oils, including regular olive oil, canola oil, vegetable oil, avocado oil, and coconut oil.

A closer look at how extra virgin olive oil compares to other types of oils - polyphenols in olive oil are compounds with antioxidant activity. It contains various substances of this group - tocopherols (vitamin E), phenolic acids, flavonoids, and other, rarer ones. Secoyridoids give olive oil its specific bitterness and pungency. Polyphenols are plant compounds that help protect the body’s cells from damage caused by free radicals. Olive oil contains several types of polyphenols, including hydroxytyrosol and oleuropein, which play a key role in maintaining health. These substances not only help protect cells, but also improve the overall health of the body, reducing the risk of cardiovascular disease and inflammation. Polyphenols are a group of more than 800 different compounds found in plants and are responsible for their color, flavor, and aroma. The bitterness in olive oil, often found in high-quality extra virgin oils, is a sign of the presence of polyphenols, which provide many of the health benefits. While many people may perceive this bitterness as a negative, it is actually an indication of the quality of the oil and its potential health benefits.

Health benefits of polyphenols. The antioxidant action of polyphenols neutralizes free radicals, preventing oxidative stress - a process that can lead to the development of chronic diseases and aging.

Anti-inflammatory action - polyphenols help reduce inflammation in the body, which is especially important for the prevention of chronic conditions such as arthritis and diabetes.

Supports the heart - polyphenols found in olive oil help improve cardiovascular health. They help lower "bad" cholesterol and normalize blood pressure, which reduces the risk of heart disease.

For brain health - antioxidants contained in polyphenols protect brain cells, supporting cognitive function and reducing the likelihood of developing neurodegenerative diseases such as Alzheimer's. The maximum amount of polyphenols is found in extra virgin olive oil due to minimal processing. The growing popularity of olive oil is mainly due to its high oleic acid content, which can influence plasma lipid/lipoprotein profiles, and its rich content of phenolic compounds, which act as natural antioxidants and may contribute to the prevention of human diseases.

A review of analytical methods for measuring the polyphenol content of olive oil is presented.

The analytical procedure for the determination of individual phenolic compounds in extra virgin olive oil includes three main steps: extraction from the oil sample, analytical separation and quantification.

A large number of procedures have been included for the isolation of the polar phenolic fraction of extra virgin olive oil using two main extraction methods, LLE or SPE. The methods reviewed are based on spectrophotometric methods as well as analytical separation.

The nutritional profile of extra virgin olive oil is rich in heart-healthy fats, as well as vitamin E and vitamin K.

About a tablespoon (about 14 grams) of olive oil contains the following nutrients:

- calories: 119
- saturated fat: 14% of total calories
- monounsaturated fat: 73% of total calories (mostly oleic acid)
- polyunsaturated fat (PUFA): 11% of total calories.
- vitamin E: 13% of the Daily Value (DV)
- vitamin K: 71TP3T DV

Extra virgin olive oil is an excellent source of antioxidants, which help fight inflammation and chronic disease.

The oil's key antioxidants include the anti-inflammatory oleocanthal, as well as oleuropein, a substance that protects LDL (bad) cholesterol from oxidation.

Some people criticize olive oil for its high omega-6 to omega-3 ratio. However, the total amount of polyunsaturated fats in it is still relatively low, so it is probably nothing to worry about.

Besides extra virgin olive oil, there are many other popular cooking oils, including regular olive oil, canola oil, vegetable oil, avocado oil, and coconut oil.

Here is a closer look at how extra virgin olive oil compares to other types of oils:

Olive oil is naturally gluten-free when we talk about the main classes (types) of olive oil (pure olive oil, extra virgin olive oil, virgin olive oil). For all olive oils, the only real ingredient in olive oil is olive fruit extract.

There are two exceptions, situations where you need to be a little careful:

1) When you are dealing with infused or flavored olive oil.

2) When the olive oil is produced in a facility that also produces gluten-containing products.

When olive oil is produced in a shared facility where gluten-containing products are produced, there may be a small chance of cross-contamination, and although the amount of gluten present in the olive oil in these cases will be extremely low, it could potentially be a concern for someone with celiac disease. It is recommended to look for olive oil that is certified gluten-free or produced in an allergen-free facility.

The only time you might actually have a problem is when you are dealing with smoky-flavored olive oil - whether it is olive oil or any other cooking oil such as canola oil or vegetable oil. Some "natural smoke flavors" use barley grain, which contains gluten, as an ingredient. Therefore, you should avoid using these oils unless the oil is certified gluten-free or you are sure that the manufacturer uses a gluten-free version of the smoke flavoring.

Olive oil is a single-ingredient plant product, and no animal products are added during the olive oil production process.

So even for the strictest vegans, olive oil is perfectly acceptable. In addition, olive oil is also an excellent source of nutrient-rich fats, which can sometimes be lacking in poorly formulated vegan diets.

The main active components of olive oil include oleic acid, phenolic compounds, and squalene.

Olive oil consists primarily of mixed triglyceride esters of oleic acid, linoleic acid, palmitic acid, and other fatty acids, as well as traces of squalene (up to 0.7%) and sterols (about 0.2%, phytosterols, and tocosterols).

Table 1 presents the chemical composition of olive oil grown in the Republic of Uzbekistan.

Table -1

Fatty acid	Type	% Percentage
Oleic acid	Monounsaturated	(m/m methyl esters)

Linoleic acid	Polyunsaturated (Omega-6)	from 55 to 831TP3T
Palmitic acid	Saturated	3.5 to 211TP3T
Stearic acid	Saturated	7.5 to 201TP3T
α-linolenic acid	Polyunsaturated (Omega 3)	0.5 to 51TP3T

The composition of olive oil varies by variety, region, altitude, harvest time, and extraction process.

Thanks to its status as a staple of the Mediterranean diet (and the Greek/Cretan diet in particular), and the extensive research into its unique phytonutrient composition, olive oil has become a legendary cooking oil whose health benefits are hard to match by other edible oils. Among the extensive list of phytonutrients, no single category of olive oil nutrient is more important than its polyphenol content. The polyphenol content of this delicious oil is truly astounding!

Olive oil is very rich in monounsaturated fats and contains small amounts of vitamins E and K. Extra virgin olive oil is also rich in antioxidants, some of which have significant health benefits. Olive fruit and olive oil, in addition to their culinary uses in human nutrition, have a wide range of therapeutic properties. The list below shows some of the key polyphenols found in olive oil, grouped by their chemical categories.

Most of the polyphenols on this list have been shown to act as antioxidants as well as anti-inflammatory nutrients in the body. The sheer amount and variety of polyphenols in olive oil helps explain the unique health benefits of this culinary oil.

The exact chemical composition of olive oil can vary depending on factors such as the olive variety, the climate and soil of the olive grove, growing conditions, harvesting methods, and the processing methods used to extract the olive oil from the olive fruit. Extra Virgin Olive Oil Ingredients - (EVOO).

Antioxidants are thought to be responsible for a number of olive oil's biological activities. Oleic acid, a monounsaturated fatty acid, has demonstrated cancer-preventive activity, and squalene also has anti-cancer effects. Olive oil consumption is beneficial in preventing colon and breast cancer.

The oil has been extensively studied for its effects on coronary heart disease (CHD), particularly its ability to lower blood pressure and low-density lipoprotein (LDL) cholesterol.

Reference.

1. Willett WC, Sacks F, Trichopoulou A, Drescher G, Ferro-Luzzi A, Helsing E, Trichopoulos D: Mediterranean diet pyramid: a cultural model for healthy eating. Am J Clin Nutr 1995, 61(Suppl 6):1402S–1406S.

2. Tripoli E, Giammanco M, Tabacchi G, Di Majo D, Giammanco S, La Guardia M: The phenolic compounds of olive oil: structure, biological activity and beneficial effects on human health. Nutr Res Rev 2005, 18:98–112.

3. Huang C, Sumpio B: Olive oil, the mediterranean diet, and cardiovascularhealth. J Am Coll Surg 2008, 207:407–416.

4. https://www.healthline.com/nutrition/extra-virgin-olive-oil

5. Bendini A, Cerretani L, Carrasco-Pancorbo A, Gómez-Caravaca AM, Segura-Carretero A, Fernández-Gutiérrez A, Lercker G: Phenolic molecules in virgin olive oils: a survey of their sensory properties, health effects, antioxidant activity and analytical methods: an overview of the last decade. Molecules 2007, 12:1679–1719.

6. Carluccio MA, Massaro M, Scoditti E, De Caterina R: Vasculoprotective potential of olive oil components. Mol Nutr Food Res 2007, 51:1225–1234.

7. Servili M, Montedoro G: Contribution of phenolic compound to virgin olive oil quality. Eur J Lipid Sci Technol 2002, 104:602–613.

8. Morello JR, Motilva MJ, Tovar MJ, Romero MP: Changes in commercial virgin olive oil (cv. Arbequina) during storage, with special emphasis on the phenolic fraction. Food Chem 2004, 85:357–364.

9. Servili M, Taticchi A, Esposto S, Urbani S, Selvaggini R, Montedoro G: Influence of the decrease in oxygen during malaxation of olive paste on the composition of volatiles and phenolic compounds in virgin olive oil. J Agric Food Chem 2008, 56:10048–10055.

10. Angerosa F: Sensory Quality of Olive Oils. In Handbook of Olive Oil: Analysis and Properties. Edited by Harwood J, Aparicio R. Gaithenburg: Aspen Publication; 2000:355–392.

11. Brenes M, García A, García P, Garrido A: Acid hydrolysis of secoiridoid aglycons during storage of virgin olive oil. J Agric Food Chem 2001, 49:5609–5614.

12. Servili M, Selvaggini R, Esposto S, Taticchi A, Montedoro G, Morozzi G: Health and sensory properties of virgin olive oil hydrophilic phenols: agronomic and technological aspect of production that affect their occurence in the oil. J Chromatogr 2004, 1054:113–127.

13. Servili M, Taticchi A, Esposto S, Urbani S, Selvaggini R, Montedoro G: Effect of olive stoning on the volatile and phenolic composition of virgin olive oil. J Agric Food Chem 2007, 55:7028–7035

14.Ahmatovich R. A. et al. In biocenosis the degree of appearing entomophagous types of vermins which suck tomatoey sowings //Austrian Journal of Technical and Natural Sciences. – 2018. – №. 9-10. – С. 3-5.

15.Сулаймонов Б. А. и др. Фитофаги и виды энтомофагов, встречающиеся в лесном биоценозе //Актуальные проблемы современной науки. – 2021. – №. 1. – С. 64-69.

16.Кимсанбаев Х. Х., Жумаев Р. А. К вопросу размножения Trichograma evanescens для биологической защиты растений //Международна научна школа" Парадигма". Лято-2015. – 2015. – С. 34-41.

17.Жумаев Р. А. Биолабораторияда трихограммани in vitro усулида ўстириш технологияси. Трихограммани сунъий озиқада ўстириш курси (1)(Hymenoptera: Trichogrammatidae). – 2016.

18.Sulaymonov B. A. et al. Effectiveness of Application of Parasitic Entomophages against Plant Bits in Vegetable Agrobiotensenosis //Solid State Technology. – 2020. – Т. 63. – №. 4. – С. 355-363.

19.Kimsanbaev X. X., Jumaev R. A., Abduvosiqova L. A. Determination Of Effective Parasite-Entomofag Species In The Management Of The Number Of Family Representatives In Pieridae //The American Journal of Agriculture and Biomedical Engineering. – 2021. – Т. 3. – №. 06. – С. 135-143.

20.Jumaev R. Invitro rearing of parasitoids //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 371.

21.Кимсанбаев Х. Х. и др. Биоценозда ўсимлик зараркунандалари паразит энтомофагларини ривожланиши.« //O'zbekiston» НМИУ,–Тошкент. – 2016.

22.Сулаймонов Б. А. и др. Ўрмон биоценозида фитофаг турлари ва улар миқдорини бошқариш //O'zbekiston» НМИУ,–Тошкент. – 2018.

23.Jumaev R., Rakhimova A. Analysis of scientific research on reproduction of species of Trichograms in Biolaboratory //The American Journal of Agriculture and Biomedical Engineering. – 2020. – Т. 2. – №. 08. – С. 148-152.

24.Axmatovich J. R. In vitro rearing of trichogramma (Hymenoptera: Trichogrammatidae) //European science review. – 2016. – №. 9-10. – С. 11-13.

25.Jumaev R. A. et al. The technology of rearing Braconidae in vitro in biolaboratory //European Science Review. – 2017. – №. 3-4. – С. 3-5.

26.Жумаев Р. А. Массовое размножение трихограммы на яйцах хлопковой совки в условиях биолаборатории и ее применение в агробиоценозах //Халқаро илмий-амалий конфренция "Ўзбекистон мева-сабзавот маҳсулотларининг устунлиги" мақолалар тўплами. Тошкент. – 2016. – С. 193-196.

27.Жумаев Р. А. Значение представителей семейства BRACONIDAE в регулировании численности совок в агробиоценозах //ЎзМУ Хабарлари. – 2017. – Т. 3. – №. 1.

28.Жумаев Р. А. РАЗМНОЖЕНИЯ ИН ВИТРО BACON HABETOR SAY И BRACON GREENI ASHMEAD //Актуальные проблемы современной науки. – 2017. – №. 3. – С. 215-218.

29.Axmatovich J. R. In Vitro Rearing of Parasitoids (Hymenoptera: Trichogrammatidae and Braconidae) //Texas Journal of Agriculture and Biological Sciences. – 2022. – Т. 4. – С. 33-37.

30.Suleymanov B. A., Jumaev R. A., Abduvosiqova L. A. Lepidoptera Found In Cabbage Agrobiocenosis The Dominant Types Of Representatives Of The Category Are Bioecology //The American Journal of Agriculture and Biomedical Engineering. – 2021. – Т. 3. – №. 06. – С. 125-134.