DISCUSSION OF THE OXIDATION STABILITY OF OLIVE OIL VARIETIES.

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Abstract: Olive oil is a plant product consisting of a single ingredient, and, in addition, no animal products are added during the production of olive oil. The article examines the change and oxystability of olive oil of local origin.

Key words: olive, oil, oxystability, storage, acid value.

Factors that affect the increase in the amount of free acids in oil are pollution, a delay between the collection of olives and their processing (especially if the olives were damaged during harvesting), fungal diseases of olives, too long contact of oil with plant water (after extraction). Storage of freshly picked olives in piles or silos, leading to deformation and disruption of cellular integrity and the release of enzymes, leading to premature release of oil (which is a tradition in Portugal and some other countries), does not add quality to such oil and also increases its acidity. The "acidity" of olive oil (often shown on the label) is the result of the breakdown of triglycerides in a chemical reaction called hydrolysis or lipolysis. The acidity of an oil is generally an indicator of its quality - oil that is extracted carelessly or from poor quality olives often suffers from the breakdown of triglycerides and their conversion into free fatty acids. Sometimes the triglyceride molecule is not completely broken down, but only partially: for example, one or two of the three

acid chains are broken, forming diacylglycerol or monoacylglycerol. If all three chains are broken, only glycerol remains. However, even in oil made according to all the rules, the acidity can be quite high - usually caused by abnormal conditions during the ripening of the olives.

The level of free fatty acids is a direct measure of the quality of olive oil and reflects the correctness of the production process, from the cultivation of olives to the technology of extraction, bottling and storage of the oil. Measuring the free acid content is a very simple procedure and can be done either in a laboratory or with a special tester. The result is usually presented as the amount of oleic acid per 100 g of oil - it is often displayed as a percentage. Freshly obtained olive oil, made according to all quality standards from healthy olives, usually has a very low acidity - below 0.5%. According to European standards, Extra Virgin olive oil should have an acidity of no more than 0.8%. Flavonoid polyphenols in olive oil are natural antioxidants and the reason for the bitter taste of the oil, its astringency and resistance to oxidation. They have been proven to be an important positive factor for human health - from the effect of healing wounds from burns to lowering cholesterol levels, blood pressure and the risk of heart disease.

Hydroxytyrosol and tyrosol (not an anti-steroid drug) are two of the many phenolic compounds in olive oil. Each 100 grams of olive oil contains about 50 mg of polyphenols. Many other vegetable oils do not have polyphenols at all. The polyphenol content is determined by various factors, including:

According to the literature, the Koroneiki olive variety has very high levels of polyphenols, while Arbequina has relatively low levels. Frantoglio and Lechino varieties contain medium amounts of polyphenols.

Harvesting time: Oil made from unripe (green) olives will contain more polyphenols than oil from ripe olives. As in grapes, the polyphenol content increases from the time the olives emerge until they begin to turn black (verison). Naturally, environmental factors also play a role: altitude, cultivation technology, amount of

irrigation. During production, extraction conditions and technologies aimed at increasing oil yield using temperature or chemicals greatly reduce the number of polyphenols. Storage conditions also affect the quality of the oil - the longer the oil is in containers or bottles, the more the polyphenols oxidize. Oil stored in stainless steel tanks or dark bottles and at cool temperatures is much better protected from polyphenol degradation.Refined oil - made from low-quality olives, with defects, heavily filtered, overheated or chemically treated, contains very few polyphenols.

Peroxides are the primary products of olive oil oxidation. Olive oil oxidizes when it comes into contact with oxygen, which may be present in the space above the oil in a closed bottle, gradually the oxygen will dissolve in the oil. The products of oil oxidation have an unpleasant odor and can seriously affect its beneficial properties. Particularly sensitive are the "essential" fatty acids - linoleic and linolenic, they suffer first, after which some vitamins disappear from the oil.

Auto-oxidation occurs in the absence of air by reactive oxygen molecules or free radicals. This process is inhibited by the natural antioxidant properties of the oil, for some time this oil absorbs free radicals. When the antioxidants in the oil run out, the oil oxidizes and ages very quickly.

Photo-oxidation of oil occurs if the oil is exposed to light rays. It is noteworthy that the oil also suffers from artificial light, including halogen lamps. When exposed to light, the oil can oxidize 30 thousand times faster than with autooxidation. Olive oil owes its unique color to pigments such as chlorophyll, pheophytin, and carotenoids. The presence of certain pigments is associated with the level of maturity, olive cultivation methods, soil, climate conditions, and extraction methods.

According to Apostolos Kyritsakis, one of the leading researchers of olive oil components, fresh oil contains from 1 to 10 parts per million of chlorophyll. This is a tiny amount compared to, for example, spinach. Olives are often crushed together

with some of the leaves, from which some of the chlorophyll comes. Some producers deliberately add more leaves to give the oil a green color.

In the light, the chlorophyll contained in the oil will increase the formation of free oxygen radicals and promote its rapid oxidation, but in the dark it acts as an antioxidant. According to recent studies, chlorophyll is quickly destroyed in the human body and has neither effect.

The color of olive oil can vary from light golden to deep green. Green olives give green oil due to the higher chlorophyll content. Ripe olives produce golden oil due to carotenoids, a yellow-red pigment. The combination of these pigments gives the final color of the oil.

Vitamins are divided into water-soluble and fat-soluble. Fat-soluble vitamins (A, D, E and K) are present in olive oil (especially E and K) and do not need to be replenished daily - they tend to accumulate in the body's fatty tissues and in the liver.

Vitamin E (a natural antioxidant) - one tablespoon of olive oil contains about 1.6 mg of the vitamin, which is about 8% of the daily recommended intake of this vitamin.

Vitamin K - the richest source of vitamin are green vegetables with a lot of leaves. For example, one serving of spinach or kale, or two servings of broccoli give five times the daily requirement. The greener the vegetable, the higher the vitamin content, as it is closely associated with chlorophyll. According to the USDA, oils obtained from vegetables, including olive oil, are the second most important source of vitamin K.

Linolenic acid is polyunsaturated. The content of such acids in olive oil is acceptable in a fairly wide range, but it is by linolenic acid that the International Olive Oil Council determines its naturalness and authenticity. Therefore, the maximum content of this acid in oil is set - no more than 0.9%.

From the above information it is possible to say about the beneficial effects of individual components of the phenolic fraction of olive oil that have a beneficial effect on the human body.

Although some of these effects may be the result of the interaction of various components formed by enzymatic hydrolysis of phenolic extracts.

List of references.

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 cardiovascular health. J Am Coll Surg 2008, 207:407–416

4García-González DL, Aparicio-Ruiz R, Aparicio R: Virgin olive oil – chemical implications on quality and health. Eur J Lipid Sci Technol 2008, 110:602–607.

5. Omar SH: Oleuropein in olive and its pharmacological effects. Sci Pharm 2010, 78:133–154.

6. Sofi F, Macchi C, Abbate R, Gensini GF, Casini A: Mediterranean diet and health. Biofactors 2013, 39(4):335–342.

7. Harper CR, Edwards MC, Jacobson TA: Flaxseed oil supplementation does not affect plasma lipoprotein concentration or particle size in human subjects. J Nutr 2006, 136:2844–2848

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