

# **KPZ – SEMINAR FOR EDUCATION DEPARTMENT**

## **NOTES 001**

### **Topic 1: Nutrient Composition**

#### **1. What are the nutritional facts for Extra Virgin Olive Oil?**

One tablespoon of Extra Virgin Olive Oil contains 120 calories, 14 grams of fat, zero cholesterol, and zero sodium.

77% of the fat in extra virgin olive oil is monounsaturated (more depending on the varietal of the olive), 9% is polyunsaturated fat, and 14% is vegetable-derived saturated fat. Studies show that when substituted for saturated fats, monounsaturated fats lower blood cholesterol, especially the harmful, low-density lipoproteins (LDL), while protecting the good, high-density lipoproteins (HDL).

Extra Virgin Olive Oil also contains the antioxidants beta-carotene and Vitamin E, as well as phenolic compounds tyrosol and hydroxytyrosol. EVOO contains no salt and is naturally cholesterol free.

## **Topic 2: Type of Olive Oil**

### **2. Types Of Olive Oil**

In very general terms, Olive Oil is the fruit juice extracted by the pressing or crushing of olives. The different varieties or classifications of Olive Oil are a result of the type of pressing, acidity levels, and the extent of processing the oil has undergone. When buying Olive Oil you will want to obtain the highest possible quality Extra Virgin Olive Oil to take advantage of the recognized health benefits associated with it, and for its fresh flavours. Some of the more common types or classifications of Olive Oil and their meanings include the following:

#### **Ultra Premium™ Extra Virgin Olive Oil**

Building on the Extra Virgin category from below, the Ultra Premium standard raises the bar and exceeds ALL current standards for the Extra Virgin category. Free Fatty acids cannot exceed 0.3% (0.3 grams per 100 grams, expressed as oleic acid), the oleic acid monounsaturated fat content must be greater than 65% (current IOC standard is 55%), the peroxide value must not exceed 9 mEq O<sub>2</sub>/kg oil (current IOC standard is 20), lower K-values which measure UV absorption rates, the "Fresh Pack" test which measures DAGs (diacylglycerols) and PPPs (pyropheophytins). All UP oils will also have a minimum Polyphenol measured content (at time of crush) of not less than 130 ppm (mg caffeic acid/kg).

#### **High Phenolic Olive Oil**

Within the "Extra Virgin" category and with superior chemistry of Ultra Premium designations - HPOO or High Phenolic Olive Oil (High Polyphenol Olive Oil) refers to a special category of olive oils that are the result of crushing early harvest green olives which yield the highest levels of phenolic compounds. These olive oils are high in the desirable healthful phenolic compounds, and they stay fresh and vital for longer periods of time.

#### **Extra Virgin Olive Oil**

The oil that comes from the first "pressing" of the olive solely by mechanical or other physical means, and is extracted without using heat (a cold press) or chemicals. The oil must not be altered in any way. It can only be treated by washing, decanting, centrifuging and filtering. Extra Virgin Olive Oil contains no more than 0.8% acidity (0.8 grams per 100 grams, expressed as oleic acid), and is judged to have a superior taste. The less the Olive Oil is handled, and the closer it is to its natural state, the better the oil. If the Olive Oil meets all the criteria, it can be designated as "extra virgin". It must have no flavour or aroma faults. NOTE: All of our extra virgin olive oils registered an acidity of less than 0.3% at the time of crush, and the majority falling between 0.1 and 0.2%.

### **Virgin Olive Oil**

Virgin Olive Oil which has a free acidity of not more than 2.0% (2 grams per 100 grams expressed as oleic acid) and the other characteristics which correspond to the extra virgin category above.

### **Ordinary Virgin Olive Oil**

Virgin Olive Oil which has a free acidity, expressed as oleic acid, of not more than 3.3 grams per 100 grams (3.3%) and the other characteristics of which correspond to the extra virgin category above. Ordinary oil may still be fine for frying or where flavour is not wanted or needed.

### **Lampante Oil**

This is Olive Oil that not fit for human consumption as it is. It will have a free acidity, expressed as oleic acid, of more than 3.3 grams per 100 grams (3.3%). Used for many years in oil-burning lamps.

### **Pure Olive Oil or Refined Olive Oil**

Oils labelled as Pure Olive Oil or Olive Oil are usually a blend of refined and virgin production oils. This is obtained by refining virgin Olive Oils that have a high acidity level and/or organoleptic defects that are eliminated after refining. No solvents have been used to extract the oil but it has been refined with the use of charcoal and other chemical and physical filters

### **Olive Oil**

This is a blend of virgin and refined production oil, of no more than 1.0% acidity (1 gram per 100 grams expressed as oleic acid). It commonly lacks a strong flavour. The cheap refined oil is mixed with flavourful virgin Olive Oil.

### **Olive-Pomace Oil**

Pomace is the ground flesh and pits after pressing. It has a free acidity of not more than 1.0% (1 gram per 100 grams). It is considered an inferior grade and is used for soap making or industrial purposes.

### **Olive Cake**

Olive cake is the solid phase that's remained after pressing olives. Also called pomace.

### **Light Olive Oil**

"Light" Olive Oil is a marketing concept and not a true classification of Olive Oil grades. It is not a regulated designation so there are no real parameters for what its content should be. Sometimes, the Olive Oil is blended with other vegetable oils. It is important to note that this designation refers to flavour only, not caloric content, as all types of Olive Oil have the same number of calories. This oil is often flavourless and of low quality. It is a refined oil.

### **Blended Olive Oil**

This refers to the combining of Olive Oils from different groves, varieties, and qualities (sometimes from different countries also) to create a blend that offers a desired taste. Changes in weather and other conditions will impact the same olive variety in the same region differently every year. Since large supermarket brands must taste the same year over year, “master blenders” are employed to create a recipe that combines these different oils from different sources to create the same finished product consumers associate with a particular brand. Another reason for blending is to increase an oil’s shelf life. This is achieved by blending an oil high in polyphenols with one that does not. Sometimes Olive Oil is blended with canola or other vegetable oils. This is legal ONLY IF STATED on the label. Illegal blending of cheaper hazelnut oil can be profitable for the dishonest producer and is difficult to detect.

### **Organic Olive Oil**

Olive Oil produced in a holistic, ecologically-balanced approach to farming, without the use of any pesticides or chemicals. It is important to note that many Olive Oils may be organically produced, however the high cost of certification is often prohibitive for small independent producers. For this reason very few oils will actually be certified organic. Some of the more common certification agencies granting the organic designation include BIOHELLAS, ECOCERT, USDA ORGANIC, DEMETER, ICEA, and DIO, although there are many more.

### **Unfiltered Olive Oil**

Unfiltered oil will contain small particles of olive flesh. While some claim this adds additional flavour, it often causes sediment to form at the bottom of the bottle. There are varying degrees of filtration (partially filtered, lightly filtered, etc), but this sediment may become rancid. This will over time deteriorate the oil’s flavour and shelf life. Unfiltered oil should be properly stored and used within 6 months of bottling. We recommend that unfiltered oils are best enjoyed drizzled over salads or grilled vegetables, and not for cooking.

### **Early Harvest Olive Oil or Fall Harvest Olive Oil**

Olives reach their full size in the fall but may not fully ripen from green to black until late winter. Green olives have slightly less oil, more bitterness and can be higher in polyphenols. The oil tends to be more expensive because it takes more olives to make a bottle of oil. Many people like the peppery and bitter quality of early harvest oil. Flavour notes of grass, green, green leaf, pungent, astringent are used to describe early harvest fall oils. Because of the higher polyphenols and antioxidants, early harvest oils often have a longer shelf life and may be blended with late harvest oils to improve the shelf life of those late harvest oils.

### **Late Harvest Olive Oil or Winter Harvest Olive Oil**

The fruit is picked black and ripe. The fruit may have a little more oil but it is risky because waiting longer into the winter increases the risk the fruit will be damaged by frost. Late harvest or "Winter" fruit is more ripe so like other ripe fruit it has a light, mellow taste with little bitterness and more floral flavours. Flavour notes of peach, melon, perfumy, apple, banana, buttery, fruity, rotund, soave and sweet are often used.

### **Flavoured Olive Oil**

These Olive Oils of increasing popularity have been infused or fused with herbs or fruits. Typically flavoured olive oils use a lower quality of olive oil or with blends including sunflower or canola oil, so you must be cautious about these and ALWAYS read the label. The Flavoured / Infused Olive Oils found in our site are all made from a base oil of ONLY ULTRA PREMIUM™ certified Extra Virgin Olive Oil. Our Fused olive oils are made by crushing early harvest olives **together** with fresh herbs or whole citrus fruit.

### **Hand Picked**

This refers to olives that are literally individually picked by hand directly from the tree. The argument is that mechanical harvesting can bruise the fruit, which will result in a higher acidity, so to avoid this, olives are carefully picked by hand. Also referred to as "Hand Harvested".

### **Estate Olive Oil or Single Estate Olive Oil**

Oil labelled "Estate Olive Oil" means that all olives were harvested, crushed, and bottled in the same olive grove. These oils are usually produced in small batches and are sought after by consumers for their uniqueness in flavour and profile. Occasionally the term "Single Estate" will be used instead and means the same thing. These oils tend to be more expensive and can be of a higher quality.

### **Mono Varietal Olive Oil**

Oil labelled "Mono-Varietal" or "Single Varietal" means that only one type of olive was used to produce that Olive Oil. These oils are often desired for the enjoyment of the most "pure" characteristics and flavours of an individual olive type.

### **Designations: PDO, PGI, TSG**

Some Olive Oils may also have additional designations that certify their growing area of origin. These areas or zones, are determined by the European Union in 1992 to promote and protect regional food products within the EU. This has helped to encourage diverse agricultural production, protect product names from misuse and imitation, and has helped consumers by giving them information concerning

the specific character of the products. Similar systems and designations exist in the world of cheese, and wine, (eg VQA wines in Canada).

### **PDO**

Protected Denomination of Origin – The Olive Oil must be produced, processed and prepared in a specific region using the area's traditional production methods. For Spanish Olive Oils you may see DO or "Denominación de Origin". For French Olive Oils you will see AOC or "Appellation d'Origine Contrôlée".

### **PGI**

Protected Geographical Indication – This designation is slightly less stringent than PDO, but still requires that the product be produced in the specified geographical region. The geographical connection must exist for at least one stage of production, processing or preparation. If only one of the stages of production has taken place in the defined area, it still qualifies as PGI. As an example, the olives may come from another region. This allows for a more flexible connection to the region and can focus on a specific quality, reputation or other characteristic attributable to that geographical origin. In Italy, you may also see these oils labelled as IGP.

### **TSG**

Traditional Speciality Guaranteed – This designation highlights traditional character, either in the Olive Oil's composition or in its means of production.

**Topic**

## **Topic 3: Looking for Quality**

### **3.1. How to identify a High-Quality Extra Virgin Olive Oil (EVOO)**

Extra Virgin Olive Oil, or EVOO is one of the most used foods for gourmet dishes around the world. Therefore, it's essential to learn how to recognize a high-quality one or, what's better, an authentic and certified one. The quality of genuine extra virgin olive oil depends on several factors, especially the extraction process. The production and even the bottling can change the flavor, color, texture, and scent of genuine extra virgin olive oil.

It may seem complicated. However, recognizing a superb product only requires looking at the most essential things (product quality, extraction, and bottling). You will be surprised how interesting but simple it can be finding the best version of your favorite product, in addition to other factors that can help you trust the quality of a certified EVOO.

In this article, you will learn an uncomplicated way to know if you are paying a fair price for extra virgin olive oil. In addition, you will enrich your knowledge about this spectacular food and use the best one for your meals, snacks, and dishes whenever you want. First of all, you need to know more about it; keep reading!

#### **WHAT IS EXTRA VIRGIN OLIVE OIL?**

Its name says a lot about the product. "Extra virgin" gives us the idea of wholesomeness, and that's precisely what followed during its production. During the process, artisan producers use only organic pressed olives, and heat, chemicals, or other factors that could alter the quality are completely avoided, including the flavor, texture, and aroma. Thus, it's crucial to keep in mind that not all of the so-called "olive oils" are necessarily authentic.

Another factor to consider is, of course, the bottling. That is essential due to the abovementioned factors and to keep its authentic and superior flavor. When extra virgin olive oil is inside a plastic bottle, that is a clear sign to remove it from your options immediately. A perfect EVOO will always be in a dark-colored glass bottle. The color and the glass are so helpful for conserving the properties of extra virgin olive oil. Plastic bottles use numerous chemical processes for their production, so the pureness of the product inside could be significantly affected.



The first thing to consider is bottling. If you see a so-called olive oil in a glass bottle, it's a good start. Then read the label. If it includes the phrase "certified extra virgin," it's a good signal. Many brands only say "olive oil", "pure olive oil" or just "virgin olive oil", but that's no guarantee.

The specifications in the bottle need to include the extraction mode. A "cold-pressed extraction" ensures the flavor and authenticity of true extra virginity.

Furthermore, make sure the brand you are about to buy has the necessary certifications. Such a certification awards only brands that follow the highest international standards.

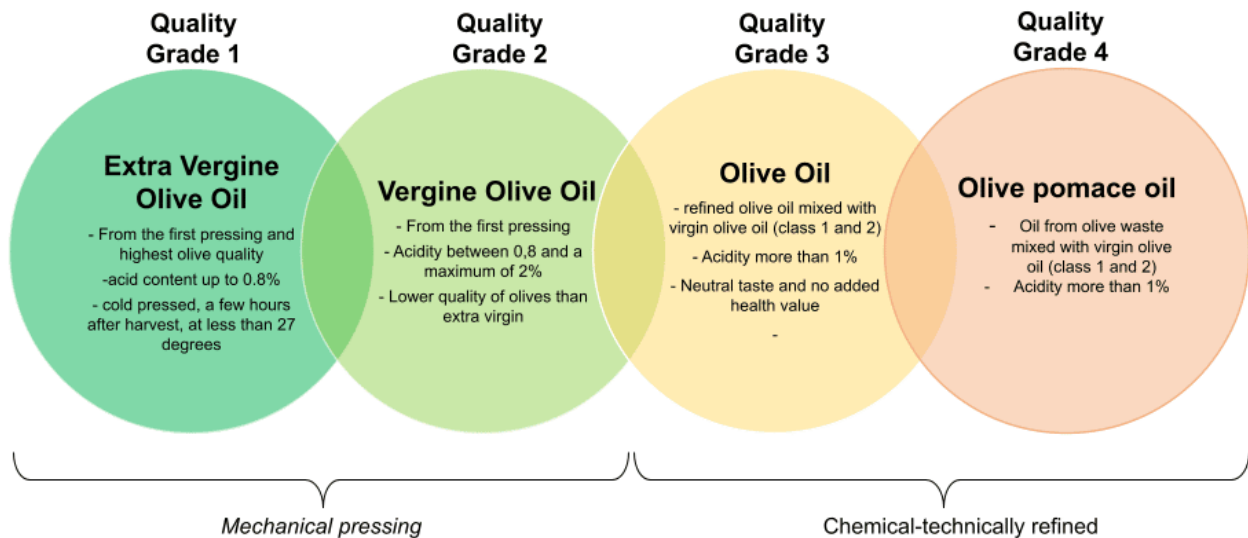
### **3.2. 6 things that indicate good extra virgin olive oil**

The variety and price differences of the olive oils on offer do not make it easy to choose a good olive oil. Even though one can usually rely on the reviews of institutions when buying, their assessments of extra virgin are sharply criticised. Contrary to what is often suggested, it is not about individual brands. Rather, you should pay attention to a few simple things when buying. We give you a few simple tips that will help you find good extra virgin olive oil.

#### **What is extra virgin olive oil?**

Literally translated, extra virgin means that the olive oil is natural (virgin) and of a particularly high quality (extra). An olive oil of the highest quality, i.e. "extra virgin olive oil", must bear the following information on the label: "First quality – obtained directly and exclusively by machine from olives". For this highest quality grade, the olives must be processed within a few hours of harvesting and the acidity must not exceed 0.8%. In addition, the olives must be pressed "cold", i.e. at a temperature of less than 27 degrees Celsius. Furthermore, the olive oil may only be extracted from the olives by machine. A chemical process for extracting olive oil is not permitted. We advise everyone not to settle for lower quality. Your body and the dishes you prepare deserve the best.

# Quality Classes of Olive Oil



## What should you look for?

### 1. Good extra virgin olive oil often has a seal

Although the term ‘extra virgin’ is already a good indicator of higher quality than, say, virgin olive oil, there are still miles of difference between the various extra virgin olive oils. So to make a choice for a particularly good olive oil, you can look for other labels, such as the DOP or EU organic label.

- The D.O.P. (Denominazione di Origine Protetta) seal states that the product is produced, processed and prepared from a specific region according to recognised and controlled procedures. The seal is a more significant indication of the origin of the olive oil than the so-called “bottled in ...” as the latter only indicates where the oil was bottled, but not where the olives were grown.
- The organic seal according to the EU regulation states that the product was produced according to the regulations of organic farming. Thus, neither fertilisers nor pesticides have been used and therefore there are no chemical residues in the olive oil.

## **2. You don't buy good olive oil in the supermarket**

Good olive oil can be bought (online) directly from the producer or from a gourmet or specialist shop. Olive oil sold in supermarkets cannot really be compared in taste and quality. The reason for this is that supermarkets buy from wholesalers or producers who often produce on a large scale to guarantee delivery to the supermarkets. Websites of olive oil producers or specialised shops often provide important information on production and inform about other relevant criteria. Thus, when looking for a great extra virgin olive oil, it is recommended to go to producers or specialised shops.



## **3. Good extra virgin olive oil is fresh**

The harvest date must be indicated on the label of extra virgin olive oil. Properly stored, olive oil will keep for 1-1.5 years without losing much of its flavour and good qualities. Nevertheless, the fresher the oil, the more aromatic it is. Therefore, when buying, make sure that you always buy olive oil from the last harvest season.

## **4. A high price is no guarantee of high quality, but a low price guarantees low quality**

An extra virgin olive oil of really high quality, produced sustainably and fairly, can hardly cost less than 10 euros per litre. Therefore, the low prices for olive oil in the supermarket should raise many questions. Have people and the environment been exploited for this? Am I doing something good for my body and health with this oil?

## **5. Good olive oil has a strong taste and smell**

A good and fresh olive oil smells fruity and tastes pleasantly sharp and bitter (pure, not necessarily as an ingredient). These are signs of freshness and a high polyphenol content (antioxidants). Olive oil changes with time, loses pungency and

bitterness and becomes flat. Many have never tasted good fresh olive oil and are often surprised when they do.

#### **6. Good olive oil names the olive varieties, or is even from a single variety**

The more information the producer gives about the olive varieties used, the more likely it is that the origin of the olive oil can be traced. Many connoisseurs describe a single-varietal (mono cultivar) extra virgin olive oil as particularly aromatic, and indeed each olive variety has its own flavour. Some single-varietal olive oils therefore go particularly well with certain dishes.

## Topic 4: Health Benefits

### 4.1. What are the health benefits of olive oil?

Extra virgin olive oil has been used throughout the history of civilization as food, but also as an ointment thanks to its medicinal properties, for example.

In recent years, and thanks to the rise of the Mediterranean Diet and the consumption of real food, the health benefits of olive oil have been discovered. Currently, its effects continue to be studied, since it has been scientifically proven that it helps improve our cardiovascular health and is considered an ally against the development of certain types of cancer, such as breast cancer. In addition, *olive oil takes care of our skin*, the largest organ in our body, and also our hair.

Olive oil is, without a doubt, an ingredient that should not be missing in our daily lives, whether to take care of ourselves on the outside, as well as on the inside! Discover what olive oil is good for and include it in your daily life starting today.

#### Cardiovascular health

Thanks to its high content of monounsaturated fatty acids (in the picual variety, for example, it can reach up to 80% of its composition), **extra virgin olive oil is capable of raising HDL cholesterol levels** (good cholesterol) and reduce LDL cholesterol or bad cholesterol.

In this way, it benefits the control of high blood pressure and reduces the chances of suffering from certain coronary diseases, such as the appearance of thrombosis, myocardial infarctions, atherosclerosis or even strokes.

#### Antioxidant

Olive oil is largely composed of polyphenols; *the natural antioxidants par excellence*. Tyrosols are found in olive oil, such as Tyrosol and Hydroxytyrosol, but we also find some that are exclusive to olive oil, such as Oleuropein and Oleocanthal.

**These protect our body against oxidative processes**, thus preventing premature aging of our cells and organs. Although these oxidative processes are natural and cannot be avoided, they can be slowed down. Certain external factors, such as tobacco, alcohol or pollution, can accelerate these processes.

## **Neuroprotective**

Biophenols in olive oil are known for their biological activities in preventing diseases and maintaining health. In this way, **they provide neuroprotection and could play an important role in slowing down cognitive dysfunction and the neurodegenerative process.**

The phenolic compounds in extra virgin olive oil are responsible for these neuroprotective properties. Oleuropein reduces the formation of beta-amyloid plaques (one of those responsible for the development of Alzheimer's); Oleocanthal, for its part, increases the enzymes that degrade beta-amyloid.

Olive oil improves cognitive status, slows cognitive decline and, in this way, may help reduce the risk of dementia, of which Alzheimer's disease is the most common type.

## **Diabetes**

Healthy fats, such as those in olive oil, **help maintain blood sugar and insulin levels.**

Hydroxytyrosol is capable of reducing and/or preventing vascular problems derived from diabetes mellitus. In this disease, triglycerides can damage blood vessels, which can lead to arteriosclerosis. That is, in people with diabetes mellitus, the indicator of triglycerides takes on greater importance, since they are responsible for major complications that diabetic people usually suffer.

On the other hand, EVOO not only helps control, but also **helps use glucose more efficiently**, thus preventing the onset of diabetes in healthy people.

A study by the Sapienza University of Rome reveals that Oleuropein is capable of reducing postprandial glycemia, that is, reducing blood glucose levels after meals. Controlling postprandial blood glucose is crucial, since it stimulates insulin production.

## **Overweight and weight loss**

Despite being a fat in itself, extra virgin olive oil is a great ally for losing weight thanks to its high content of healthy fats, which promote the burning of calories.

Oleylethanolamide **provides a satiating effect in meals, helps accelerate metabolism and eliminates saturated and trans fats**, present in ultra-processed products. The properties of olive oil promote intestinal transit, facilitating the expulsion of fats, promoting digestion and avoiding constipation.

Likewise, oleic acid works to prevent the accumulation of fat in our body.

## **Strengthens defenses**

The antioxidant substances in olive oil, such as **vitamin E and oleic acid, are essential to protect our immune system**, helping to strengthen its activity.

Additionally, olive oil has antibacterial properties. Olive oil increases the cells involved in our body's defensive system, presents greater resistance to pathogens and offers a better defense against viruses, bacteria and parasites.

## **Anti-inflammatory**

The consumption of olive oil is related to the production of certain neuronal substances called enkephalins, which reduce pain.

Oleocanthal is **one of the best natural anti-inflammatories**, which helps reduce pain associated with joints and muscles. In fact, rheumatoid arthritis reduces its symptoms thanks, in part, to the consumption of olive oil.

In the case of rheumatoid arthritis, extra virgin olive oil reduces inflammation and oxidative stress in individuals with this condition.

## **Cancer prevention**

Extra virgin olive oil, always in the context of a healthy and balanced diet, provides Omega 3, antioxidants and vitamins.

The compounds in olive oil, such as monounsaturated fats, vitamin E, beta-carotenes and polyphenols, provide antioxidant properties that act against

premature aging and intervene in the development of cells, which is decisive for the development of some types of cancers.

Simplifying the concept, the compounds in olive oil decrease the expression of the gene that promotes the appearance of certain tumors, such as breast cancer. In fact, *olive oil is considered an ally against breast cancer.*

### **It improves life expectancy**

In general, the consumption of extra virgin olive oil improves the life expectancy of all those who use it as their main fat. Several studies around the world have shown that those who consume EVOO, as in the Mediterranean Diet, are likely to live longer than those who consume other types of fats.

In order to benefit from its excellent properties, it is necessary to *consume a recommended daily amount of olive oil.* Don't forget to follow a balanced and healthy diet and do physical exercise daily to enjoy good health.

Now that we know what health benefits olive oil provides, it is essential to remember that olive oil is not a substitute for any medical treatment and that, if you suffer from any type of illness, it is always advisable to consult with your doctor before starting any parallel treatment at home.

## **4.2. Olive Oil as an ally against Breast Cancer**

Nowadays, we cannot deny the protective role that extra virgin olive oil plays against some types of cancer, especially against breast cancer.

But why are olive oil and breast cancer so related? Extra virgin olive oil, always in the context of a healthy and balanced diet (such as the Mediterranean Diet, for example), provides us with Omega 3, antioxidants and vitamins.

### **Breast cancer in Spain**

Currently, and according to the latest data collected by the Spanish Society of Medical Oncology (SEOM), **in 2022 a total of 34,750 new cases of breast cancer were diagnosed in Spain.** This is the most common type of cancer in Spanish women, ahead of lung, colorectal, uterine and ovarian cancer.



About 30% of diagnosed cases of cancer in women originate in the breast. In fact, **it is the most diagnosed type of cancer in the world**, surpassing lung cancer and colorectal cancer.

The incidence indicates that one in 8 women suffers from breast cancer. This type of tumor usually appears between 35 and 80 years, although it is between 45-65, coinciding with hormonal changes, the age range with the highest incidence.

In 2020, according to data provided by the European Cancer Information System, breast cancer was responsible for 6.9% of all cancer deaths. In Spain, a total of 6,572 died that year from breast cancer. **However, breast cancer survival in 2020 was 86%.**

### **Compounds that help reduce the probability of developing breast cancer**

Extra virgin olive oil is a vegetable fat rich in oleic acid, a fatty acid belonging to the family of **monounsaturated fatty acids**. In addition, extra virgin olive oil is **rich in numerous bioactive compounds**, such as vitamin E, beta-carotene and polyphenols, which provide antioxidant properties that act against premature aging and are involved in cell development, a determining factor in the formation of cancer.

Most scientific researches revolve around the study of polyphenols, which are key in slowing down the development of cancer cells in breast cancer. One of them is pinoresinol, a polyphenol found in olive oil. Hydroxytyrosol, another powerful polyphenol that has antitumor properties.

In medical terms, olive oil and its compounds, especially Omega-9 oleic acid and polyphenols, **decrease the expression of the Her-2/neu gene**, which promotes the appearance of the tumor. As the compounds in olive oil reduce this gene, we can say that extra virgin olive oil protects against the appearance of breast cancer, an affirmation that is supported by numerous scientific studies around the world.

### **Research on Olive Oil and the Mediterranean diet carried out around the world: Multidisciplinary Group for the Study of Breast Cancer, Barcelona**

Eduard Escrich\*, director of the Multidisciplinary Group for the Study of Breast Cancer, already confirmed in 2015 in Barcelona that **olive oil is one of the tools to reduce the risk of breast cancer**, as long as it is in the context of a balanced diet.

According to Escrich, all fats have an important influence on cancer, although not all of them have the same effect on people with this disease. Those who consume extra virgin olive oil as their main fat find that their tumors have a lower degree of malignancy. The consumption of olive oil improves the diagnosis, since it helps to make the tumors smaller and less aggressive.

Pere Gascón, head of the Medical Oncology Service at the Hospital Clínico Universitario de Barcelona, stresses **the importance of early prevention** as a fundamental instrument for controlling the disease. According to the renowned oncologist, the behavior of this disease can be changed with diet and exercise.

Gascón affirms that *'with adequate prevention, consumption of extra virgin olive oil as part of a Mediterranean diet and frequent sports activities, we would cure 80% of cancers within 50 years.'*

### **Houston Methodist Hospital, USA**

A clinical study carried out by the Houston Methodist Hospital, USA, confirms the therapeutic potential of **extra virgin olive oil to reduce the density of breast tissue** and, therefore, reduce the risk of breast cancer.

Tejal Patel, an oncologist at the Methodist Hospital Cancer Center, validates this American study since, in words by the doctor, *'a 1% reduction in breast density has the potential to translate into almost a 2% reduction in the risk of developing this type of cancer'*, referring to breast cancer.

### **PREDIMED Study**

The PREDIMED Study began in 2003, lasted ten years and obtained the participation of 7,447 participants from different Spanish autonomous communities. Although it was carried out to verify the cardiovascular benefits of the Mediterranean diet, this study also revealed **the important role that EVOO plays in the prevention of breast cancer.**

The results they presented show that the women who participated in the study and who consumed about four tablespoons of extra virgin olive oil daily, reduced their risk of developing breast cancer by up to two thirds.

Study participants were divided into three groups: a Mediterranean diet rich in olive oil, a Mediterranean diet rich in nuts, and a low-fat diet. Taking into account that one in eight women develops breast cancer, it turned out that, in the case of olive oil, a 68% reduction in the risk of suffering from this type of cancer was observed.

## **European studies**

In Spain, Italy and Greece, countries of the Mediterranean basin and in which extra virgin olive oil is the first fat, the potential role of olive oil in the fight against breast cancer has been studied over the years :

- In Italy, a study from 1987 studied until 1992 10,000 Italian women and their involvement in a diet rich in vegetables and extra virgin olive oil. Women who ate this type of diet significantly reduced their risk of breast cancer.

### **4.3. Olive Oil and Cardiovascular Diseases**

Cardiovascular diseases are one of the main causes of death worldwide. With a healthy lifestyle, these can be largely prevented.

Olive oil can protect our heart against cardiovascular diseases. Let's see why.

#### **Healthy properties of olive oil**

Considering virgin olive oil as the oils made by mechanical procedures, such as extra virgin and virgin, we can say that virgin olive oil is an ingredient with a high content of antioxidant substances and vitamins, as well as carotenoids and polyphenols. The latter are known to be **antioxidant compounds** that help prevent the onset of chronic diseases, such as certain cardiovascular diseases.

Polyphenols have **anti-inflammatory and antithrombotic power**, which exert a cardioprotective effect against arteriosclerosis (a process of narrowing and hardening of the arteries due to the natural loss of elasticity associated with aging). Atherosclerosis is responsible for a large number of cardiovascular diseases, such as myocardial infarction or arterial hypertension, among others.

The **oleic acid** in virgin olive oil is responsible for reducing LDL cholesterol levels (bad cholesterol) in the blood, while increasing HDL cholesterol (good

cholesterol). In addition, the fatty acids in virgin olive oil lower triglycerides, which reduces the hardening of the arteries.

Virgin olive oil is rich in **Omega3 fatty acids**. These have been shown to have heart-healthy properties, being considered in the prevention of arrhythmias, lowering triglyceride levels, reducing the risk of thrombosis, etc.

Thus, according to the Spanish Heart Foundation (FCE), it recognizes that the daily intake of virgin olive oil helps us protect cardiovascular health thanks to its composition of fatty acids and its antioxidant components.

### **Benefits of olive oil for cardiovascular diseases**

A great number of scientific studies have confirmed the important role that virgin olive oil plays in maintaining good cardiovascular health, with other factors such as a healthy diet and daily physical exercise, among others, coming into play.

Therefore, the benefits of olive oil for cardiovascular diseases are:

- Virgin olive oil **modulates lipid values**. This means that it reduces LDL cholesterol levels, increasing HDL cholesterol levels, essential for the proper functioning of our body.
- Thanks to the antioxidant and anti-inflammatory properties of virgin olive oil, it **generates a less prothrombotic environment** and increase endothelium-dependent vasodilation. The endothelium is the last layer that covers the veins and arteries in our body. Over the years, the walls of the endothelium lose flexibility. Virgin olive oil favors vasodilation and the function of the endothelium.
- Virgin olive oil **inhibits the formation of platelet aggregations** that can lead to thrombosis, which can cause stroke or heart attacks.
- It is a powerful ally against **dyslipidemia**. Virgin olive oil has protective effects against dyslipidemia (high concentrations of lipids in the blood) and atherosclerosis. It also reduces the risk of heart attack and hypertension and can slow down premature aging. In addition, it has antidiabetic and antitumor properties.

- Olive oil is **hypocholesterolemic**, that is, it reduces the intestinal absorption of cholesterol contained in food and due to its high content of polyphenols, it is capable of 'cleaning' the blood and blood vessels.

## TOPIC 5: ROLE IN MEDITERRANEAN DIET

### 5. EXTRA VIRGIN OLIVE OIL: THE CORE OF THE MEDITERRANEAN DIET

Research from Spain backs up what your taste buds have known all along: sautéing vegetables in a little olive oil is preferable to boiling them. Scientists who cooked a variety of vegetables by different methods and then measured the vegetables' antioxidants and phenols (health-promoting compounds) found that “the presence of EVOO (Extra Virgin Olive Oil) in cooking increased the phenolics...in the raw foods.” Interestingly, adding olive oil to the water when boiling didn't offer the same benefits as frying or sautéing in EVOO.

EVOO plays a key role in getting the most out of uncooked foods, too. Top your salad with fat-free dressing and your body won't be able to access key fat-soluble vitamins like Vitamin A. A simple vinaigrette made with olive oil helps unlock all the goodness in your salad. Bonus: When your vegetables—raw or cooked—taste better, you're more likely to want to fill up on them.

But why limit your enjoyment of EVOO simply to vegetables? On an Oldways trip to Puglia, in the heel of the boot of Italy, we once had a multi-course tasting meal where every dish featured olive oil. We started with a fennel-citrus salad lightly dressed in olive oil, continued through soup, beans, meat, seafood, pasta, and greens, then finished with house-made ice cream drizzled with olive oil, paired with a delicate olive-oil cookie. Everything was delicious.

Olive oil is at the core of the Mediterranean Diet. In fact, some food historians define the Mediterranean Diet as the “traditional eating patterns in areas around the Mediterranean Sea where olives are grown.” Although study after study finds that the Med Diet's health benefits come from the interplay of many food groups, olive oil is always part of the picture.

When it comes to choosing olive oils at the store, make sure to look for EVOO. EVOO is produced by mechanically crushing olives to separate the liquids from the solids, then further separating the liquids into water and oil. No heat or chemicals are used in this process, which is the starting point for EVOO.

EVOO then goes through testing. Global standards from the International Olive Council (IOC) include several lab tests for a certain level of acidity and other metrics, along with two sensory tests, performed by a trained olive oil taster.

Various seals and certification programs attest that the oil has met these standards at the time it's bottled

Oil that doesn't qualify as EVOO—either because it didn't meet the standards, or because it was further refined with heat and chemicals—can still be found on store shelves, with names like light, extra light, classic, pure, or just plain olive oil. These choices will be less expensive than EVOO, but will likely have lower levels of the healthy compounds found in EVOO.

Even bottles labeled as EVOO can sometimes fall short of the standards. Olive oil is in fact a fruit juice—the juice of the olive fruit—and as such has a limited shelf life. Since exposure to heat, air, and light will degrade the quality of any olive oil over time, follow these tips for buying and storing your EVOO:

- Look for a “best by” date at least a year in the future. Most producers label their EVOO with a date that's about two years after bottling; quality will be even better in the first year after bottling.
- Some brands also include a harvest date, providing an extra clue for freshness.
- Choose oils in dark bottles or tins, since light degrades the quality of EVOO.
- Buy only as much as you'll use in about two months.
- Keep your EVOO in a dark cupboard away from the stove.

## Topic 6: Cooking Uses

### 6. What is the maximum temperature in the use of olive oil?

We all know that heat and oil is a bad combination. So, what is the maximum temperature in the use of olive oil?

We all know that heat and oil is a bad combination. In our kitchen, we often use olive oil to cook, subjecting it to high temperatures; even exceeding its smoke temperature.

But, what is the maximum temperature in the use of olive oil? What happens when we put the oil under too high temperatures?

#### Smoke temperature

The smoke point of olive oil is the **temperature at which olive oil begins to degenerate and lose part of its initial properties**. We can verify this when subjecting the oil to a heat source, it begins to give off smoke. This means that it has exceeded its smoking temperature and that it can be harmful to our health.

It is important to bear in mind that when the oil reaches its smoking point, **it begins to degrade** and release compounds that are harmful to health, so it should be avoided to exceed these temperatures when cooking with any type of oil.

Thus, depending on the smoking point of each type of oil, we can establish the following limits to which an olive oil can be subjected without being harmful:

- **Extra virgin olive oil: 160°C**

- Virgin olive oil: 215°C

- Olive pomace oil: 230°C

- Olive oil: 240°C

Whether an oil has a higher or lower smoking temperature basically depends on its chemical composition: the fatty acids it contains and impurities, such as proteins, carbohydrates, salts and water.



As we can see, **the fresher and more natural an oil is, the lower its smoking temperature will be.** Extra virgin olive oil, having a greater amount of non-hydrogenated compounds, degrades more quickly when heated at high temperatures. For this reason, it is advisable to avoid cooking with extra virgin olive oil at high temperatures. It is better to cook at low and medium temperatures and use other types of oils, such as *olive pomace oil, for frying*, for example.

### **What happens if the oil boils?**

Olive oil is one of the most popular vegetable oils used in cooking. However, if olive oil gets hot enough, it can reach its boiling point and begin to boil. Unlike water, oil does not evaporate.

When it reaches a certain temperature (smoke point), the oil begins to bubble and smoke. This is an indicator that the proper temperature for use has been exceeded and we must remove it from the heat source.

Exceeding the smoking temperature means that **the oil loses all the components that make it beneficial for our health.** The same happens when we often use olive oil to fry. In addition to losing all its properties, the oil keeps in its composition compounds that are not beneficial to health.

In short, olive oil is the best option when cooking and also the healthiest. When choosing an olive oil, we must take into account its smoking temperature to prevent the oil from losing its properties and, therefore, its benefits for our health.

## **Topic 7: Storage**

### **7. Storage**

Store olive oil in a cool, dark, dry place away from heat, light, and moisture.

Always buy oil that's in a dark glass bottle or metal tin, to help prevent photo-oxidation. In addition, make sure the bottle has a screw cap, this allows you to tightly close the top and prevent new exposure to oxygen.

#### **Heat Damage**

Store olive oil away from heat because it accelerates the process at which the product becomes rancid.

Appliances such as the stove, oven, microwave, dishwasher, and refrigerator can give off heat quite regularly. Storing a high-quality extra virgin olive oil directly next to these appliances can expose it to constant or repeated heat which essentially homogenizes the product, which is a process used to produce commercially refined olive oil.

The keywords here are constant and/or repeated. This does not mean stop cooking with olive oil, it means stop storing it in a place where it's exposed to constant or repeated heat.

Would you cook your steak or vegetables 3 times in a row and then eat them? No way!

#### **Can I Store Olive Oil in the Fridge or Freezer?**

No, exposure to cold temperatures deteriorates the product and causes it to solidify and lose flavor.

#### **Light (Photo-oxidation) Damage**

Always store olive oil in a dark glass bottle or tin. Light deteriorates the product at an alarming rate.

In addition, store bottles or tins in a dark place away from both natural and artificial light. A lot of people believe that only natural light can deteriorate the product, but constant artificial light can be just as damaging over time.

This is why it's so important to purchase product that's in a dark glass bottle or tin.

### **Air (Oxidation) Damage**

Olive oil begins to oxidize the moment it comes in contact with air. Therefore, it's best to consume open bottles within 60 days to enjoy peak flavor profiles.

After a few months, an open bottle begins to lose some of its zing. The flavors don't disappear, but, they do start to fade away. You may notice that the oil doesn't have quite the same punch.

It's also important to properly close bottles and tins after each use. The best tops are DOP screw tops because they make it more difficult for air to enter the nozzle. These types of tops are popular for European brands because the EU requires them.

Do not replace a regular top, stopper, or nozzle with a pourer (or spout). As beautiful as they are, pourers cannot close properly which exposes the product to oxygen and damages the product.

### **Damage of Time**

Olive oil should be consumed within 24 of the harvest date or it can become rancid. Rancid oil can smell of crayons or plastic and is not pleasant to eat.

### **Best Storage Practices**

Store olive oil in a cool, dark, dry place away from appliances. We realize it's not convenient to store your favorite cooking fat far away from your stove, however, this is the best way to preserve the product. We store ours in a closed cabinet in the kitchen away from all heat and moisture. It's also best to practice first in, first out so you don't forget about product.

If you live in a place with extreme temperatures and/or humidity throughout the year try storing bottles in a box under the stairs or a closet in another room.

Apartment dwellers, it may be difficult to find space for multiple bottles or tins, maybe try a storage cabinet in the living room that has doors. Be sure to label the boxes with the harvest year.

### **Conclusion**

For many home cooks, olive oil is one of the most expensive ingredients in their kitchens so we want to make sure you're storing the product properly. This allows you to get the most use and enjoyment from each bottle!

## Topic 8: Portion Control

### 8. What is the recommended amount of olive oil per day?

According to experts, you need to consume a minimum amount of olive oil per day to benefit from its properties.

Extra virgin olive oil is, par excellence, the main ingredient of the Mediterranean Diet, UNESCO Intangible Cultural Heritage.

However, there are still a number of myths regarding extra virgin olive oil, such as whether it is good to have it every day, whether it is fattening because it is a fat or how much should be consumed to take advantage of its benefits.

On this matter, the PREDIMED study acquires great relevance, since it determined that the Mediterranean Diet, with extra virgin olive oil as the main fat, is associated with a lower number of cardiovascular problems, even in people with a higher risk of suffering from them, among many other benefits.

#### Is it good to take olive oil daily if it is a fat?

We will start from the basis that **fats are necessary to provide energy** to our body. Without them, our body cannot function properly. The crux of the matter comes when we decide what type of fats we contribute to our body.

Monounsaturated fats are called healthy fats and our body processes them and transforms them into energy. On the other hand, polyunsaturated or saturated fats pass directly into the blood without being processed, accumulating in the arterial walls and increasing the risk of certain diseases.

Extra virgin olive oil is a fat and, as such, provides our body with about 9 calories per gram ingested. But let us not be alarmed. The main difference between extra virgin olive oil and other vegetable fats lies in its composition: **extra virgin olive oil is rich in monounsaturated fatty acids**, especially oleic acid. In addition, it can also boast of having a rich composition of vitamin E and polyphenols.

## **Recommended amount of daily intake**

According to PREDIMED, and according to the indications of the study doctors, **the recommended daily intake of extra virgin olive oil is 40 milliliters**, that is, about four or five tablespoons daily.

This intake includes the extra virgin olive oil that we can drink in the morning, the one we use to dress salads or the one we use to fry and cook food. That is, 40 milliliters distributed in all the uses that we give to extra virgin olive oil throughout the day.

However, it is useless to take the recommended daily amount of extra virgin olive oil if we have habits that are harmful to our health. For this reason, **it is always recommended to have a healthy and balanced diet and practice physical exercise** on a daily basis. In fact, the effect of the oil on breast cancer and its key role in cardiovascular diseases are being studied.

## **Benefits of taking olive oil every day**

Taking the daily amount of extra virgin olive oil, you can take advantage of all its beneficial effects. In addition to having a **lower chance of cardiovascular disease**, it includes lower blood pressure, improved cognitive function and a lower risk of diabetes and depression. Even, and despite being a fat, extra virgin olive oil is also indicated for weight loss.

A special feature of extra virgin olive oil is found in the polyphenols, natural antioxidants by nature. Above all, there is a particular polyphenol that is mainly responsible for the antioxidant character of extra virgin olive oil: Hydroxytyrosol.

Thanks to Hydroxytyrosol, and other polyphenols such as Oleuropein, Oleocanthal and Oleacein, **the antiatherogenic (blood fat), cardioprotective, anti-inflammatory, neuroprotective and anticancer properties** of extra virgin olive oil stand out.

The EFSA (European Food Safety Authority) emphasizes the importance of polyphenols in extra virgin olive oil, since they contribute to the protection of cells and blood against oxidative damage.

## **Minimum and maximum quantity**

Regulation 432/2012 of the European Commission, on 'healthy properties of food', establishes that the beneficial effect of olive oils is obtained with **a minimum daily intake of 20 grams of extra virgin olive oil**. With this amount, we obtain a minimum of 5 milligrams of Hydroxytyrosol and its derivatives, an amount from which we benefit from its properties.

So, if extra virgin olive oil is so healthy, why do you have to put a maximum amount? The moderate consumption of extra virgin olive oil, with its four or five daily tablespoons, does **not have any negative effect**. However, extra virgin olive oil has a high caloric value, which can cause an extra supply of calories in our diet if eaten in large quantities.

## **Topic 9: Sensitivities**

### **9. Sensitivities**

#### **Overview**

Olives are a type of tree fruit. They're an excellent source of healthy fats, vitamins, minerals, and antioxidants. Olives have been found to be a good source of vitamins E, K, D, and A. Black olives contain lots of iron, while both green and black olives are a source of copper and calcium.

Some other benefits include:

- maintaining heart health
- fighting inflammation
- reducing the growth of bad bacteria in the body
- protecting against osteoporosis and cancer

Most olives aren't eaten fresh because of their bitterness. They're usually cured and fermented or pressed into olive oil. The fat of olives is extracted to make extra virgin olive oil, which is known as an excellent oil for cooking. Olive oil also has many documented skin benefits.

Olive fruit and olive oil allergies are rare but can occur. In fact, your body can develop an allergy to any food.

Food allergies have increased over the past decade, and children with food allergies have a higher likelihood of having asthma, eczema, and other types of allergies.

A food allergy is a negative response to a food from the body's immune system. The body creates the immunoglobulin E (IgE) antibody in response to a food. If you eat the food, it binds to the IgE antibody. Chemicals such as histamine are released and an allergic response occurs.

#### **Olive allergy**

Olive fruit allergy does occur but it's rare.



The most common allergy associated with olives is a seasonal pollen allergy. Those who live in places that cultivate olive trees may develop a seasonal respiratory allergy to olive pollen. While pollen allergy is the most common allergic response, there have also been reported cases of contact dermatitis and food allergies.

This may be because there are 12 reported allergens [Trusted Source](#) associated with pollen, while only one allergen associated with the fruit.

The olive fruit is more likely to create an allergic response than olive oil, because olive oil contains fewer proteins. However, allergies to the oil can also develop. Serious allergic reactions to olive fruit are rare, and skin reactions aren't common but have been documented.

### **Olive oil allergy symptoms**

There are many symptoms that can result from an allergic reaction to food. Most symptoms of food allergies appear within about an hour.

You can experience skin reactions, gastrointestinal effects, or respiratory symptoms. The most common food allergy symptoms are respiratory and include:

- swelling of the sinus cavity
- increased head pressure
- postnasal drip
- sneezing
- congestion
- sinus headaches
- asthma
- excessive coughing
- wheezing

It's not uncommon to experience skin irritation. Symptoms include:

- redness
- itching
- tingling
- swelling
- hives

- rash
- eczema

Gastrointestinal symptoms include stomach pain, diarrhea, nausea, and vomiting. In severe cases, anaphylaxis can result.

## **MEDICAL EMERGENCY**

Seek emergency medical care if you experience:

- throat swelling
- drop in blood pressure
- shock
- loss of consciousness

## **When to see a doctor**

If you suspect you have an allergy to olives or olive oil, avoid consuming olive products and speak with a doctor. If you experience a severe allergic reaction such as difficulty breathing or anaphylaxis, it's important to seek emergency medical assistance.

## **Diagnosis and treatment**

A common way to determine if you have an olive allergy, or any other food allergy, is with a skin prick test. The best way to avoid an allergic reaction to the olive fruit or olive oil is to avoid consuming the substance completely.

## **Takeaway**

While an olive fruit or olive oil allergy is rare, it's possible. You're more likely to have an allergic reaction to olive tree pollen than from the fruit itself.

If you develop a food allergy to olives, it's best to avoid the fruit. Those particularly sensitive to olives may also be allergic to olive oil. Substitutes for olive oil are available.

## Topic 10: Olive Oil Tests

### 10. What are the factors K232 and K270 in olive oil?

Factors such as the degree of acidity, its peroxide value and/or the K232 and K270 factors of olive oil.

The chemical analysis of the olive oil, together with the organoleptic tasting, is carried out in order to obtain its classification in one of the existing commercial categories: extra virgin, virgin or lampante.

Just as a doctor can know through an analysis if we have followed a healthy lifestyle, through the chemical analysis of the oil we can determine its quality.

Factors such as the degree of acidity, its peroxide value and/or the K232 and K270 factors of olive oil, allow us to know the *final quality of the oil* and under which category it should be labelled.

### What values indicate the quality of the oils in a chemical analysis?

In the chemical analysis of olive oil, 3 tests come into play:

1. **Degree of acidity.** It measures the percentage of free fatty acids related to oleic acid and determines the quality of the fruit (olive) used. The degree of acidity is often confused with the flavor of the oil. However, they are not related, since acidity can only be determined in a laboratory and not through taste.
2. **Peroxide index (PI).** It determines the degree of rancidity or initial oxidation of olive oil and the deterioration that natural antioxidants may have suffered. Measures the quality of the production of virgin olive oil.
3. **UV spectrometry.** Here the K232 and K270 factors come into play, together with the Delta-K. It measures the absorbance of the oil at different wavelengths and determines the quality of an oil and its conservation status.

**For an olive oil to be extra virgin, it must not exceed 0.8% acidity. Following the established values, an extra virgin olive oil will never be higher than 20 in the peroxide index, it does not exceed 2.50 for K232 or 0.22 for K270.**

## **Peroxide index**

As we previously explained, **the peroxide index measures the quality of oil production**. When an extra virgin olive oil becomes rancid, it not only acquires bad odors and flavors, but its antioxidants are also destroyed, which are very beneficial for our health.

Oxidation is a natural process that occurs over time. However, it can be accelerated due to certain errors when making olive oil, such as the temperature of the production process or excessive milling time, as well as poor subsequent conservation.

Therefore, **the lower the IP, the higher quality the olive oil examined will have**.

## **UV spectrometry**

The **factors K232 and K270** are those that are measured in this test. These compounds are **the result of the state of conservation of the oil**, of modifications suffered by technological processes, of contaminations or adulterations.

In this test, ultraviolet light is transmitted through a mixture of oil and solvent, measuring its absorption capacity. Some compounds generated by oxidation are absorbed at wavelengths of 232 nanometers and others at 270. These are the parameters known as K232 and K270.

Therefore, **a higher value of K232 or K270 implies greater oxidation of the oil**, so its quality will be worse.

## **Are these values related?**

The three previous tests (degree of acidity, peroxide index and UV spectrometry) are **essential to determine the quality of an oil in a chemical analysis**. However, the peroxide value and UV spectrometry are related. Although the three tests measure the degree of deterioration of an oil, the degree of acidity does not give rise to confusion.

However, it is important to know that oxidation occurs in two phases: primary and secondary. The values obtained in the peroxide index can mean two things, that we are dealing with a very fresh oil or a very rancid one, since the peroxide values of the oil oscillate depending on the moment of analysis.

Therefore, and to make sure that we are dealing with a virgin olive oil, it is necessary to carry out the UV spectrometry test. If we have a low IP and low K values, there is no doubt: olive oil is a quality virgin oil.