

Natural Oil Preparation and Processing

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Oil extracted from the pressing of seeds contains many ingredients, some desirable and others undesirable. Crude oil is processed to separate the components. We generally take for granted the process that allows for the transformation of a plant seed into clear, low odor oil suitable for cosmetic use. The plant chosen for use, as well as the processing used, determines the properties of the oil. One must carefully consider if the desired ingredient, tocopherol, antioxidant or whatever else that is present in the starting oil is removed during subsequent processing and therefore does not provide a benefit in the finished product. Simply put just because the material is in the oil as expressed, does not mean it is present in the final refined oil added to the cosmetic.

The oils covered in this article are referred to as “vegetable oils”. This differentiates them from “essential oils,” which are often aromatic oils obtained by steam extraction from a variety of plant parts, including flowers, leaves, peels and some seeds. The essential oils are not triglycerides like the vegetable oils, but usually “isoprenoids”; that is, they come from a different chemical pathway in plants. Plants store vegetable oils (triglycerides) as energy sources for seeds when they germinate.

Steam works well to extract essential oils like coriander oil, but not for triglyceride oils. Triglyceride and wax ester oils can be squeezed out of seeds using a turning screw that presses the mashed up seed against a metal barrel with slits in the side. The oil and some fine particles squeeze out the narrow slits. The tool used for this operation is called an oil expeller, or seed oil press. The oil from the seed oil press can be filtered and called “virgin” oil, especially if it isn't heated up to obtain more oil. The oil from the seed oil press can also be called crude oil. The cold pressing process preserves most of the oil soluble actives in the resulting oil.

Almost every other process practiced on the oil removes some component. Odor and tocopherols are removed from soybean oil by steam distillation. The resulting distillate is used to deodorize the oil, but also leads to a major source of tocopherol that ends up in natural Vitamin E. This means the soybean oil that is treated by steam distillation is almost devoid of tocopherol.

Alternatively, oil is dissolved in solvent, extracted, and followed by evaporating of the solvent leaving the extracted oil. In this type of operation seeds are often flaked to increase surface area. The seeds are processed into thin flakes before pressing or solvent extraction. The flaking improves oil yield by breaking open the small oil pockets in the seeds. Sometimes the seeds are heated before flaking so that the proteins in the seed won't break down the oil or other parts of the seed. The pre-heating is also called pre-conditioning. The oil comes out more easily if it is hot, but too much heat damages the oil quality.

Sometimes the seeds are crushed and formed into pieces called "collets" that have lots of holes or openings. This step also is done before solvent extraction to make the oil easier to flow out. Solvent extracted oil with some solvent still in it is called the "miscella." Crude oil usually can be good enough for chemical uses. A well-filtered "virgin" oil can be kept cold to remove any solid waxes that might crystallize out in a process called "winterization." Many cosmetics applications, which retain the actives from the oil, are cold-pressed, virgin oil.

Refining is done by filtering the oil through clay or silica (like fine sand), which can remove color. In an operation called "degumming," alkali in water is added to the oil; some ingredients, especially fatty acids and one called "phospholipids," go into the water and settle out or are filtered out. Finally, steam can be passed through the oil to remove odor in an operation called deodorization. This step also breaks down oxygen attached to the oil, which might lower oil quality.

Hopefully, after all of this refining, the oil is light in color, has no odor, no oxygen breakdown products and no solid wax. The amount of oil you have left after refining is often related to the amount of crude oil you started with, or to the amount of oil in the seed by the “yield” of oil from each step in the process.

The oils that are commonly used in cosmetic products are complex mixtures of different triglycerides, but also contain various other useful components. For example, wheat germ oil can be processed to obtain highly desirable tocopherols. Solvent extraction or steam distillation would remove much of this material. The winterizing of oils, that is, cooling and filtration of solids from the liquid, results in a loss of the higher molecular weight fractions. Many times it is exactly these fractions that provide the unique skin feel or conditioning to the product. It should be clear that the different processes used in the oil preparation may be critical to its functionality.

Olive Oil



Olives on tree



Olive Cut

All production begins by transforming the olive fruit into olive paste by crushing or pressing. This paste is then malaxed (slowly churned or mixed) to allow the microscopic oil droplets to agglomerate. The oil is then separated from the watery matter and fruit pulp with the use of a press (traditional method) or centrifugation (modern method). After extraction the remnant solid substance, called pomace, still contains a small quantity of oil.

The grades of oil extracted from the olive fruit can be classified as:

Virgin means the oil was produced by the use of mechanical means only, with no chemical treatment. The term virgin oil with reference to production method includes all grades of virgin olive oil, including Extra Virgin, Virgin, Ordinary Virgin and Lampante Virgin olive oil products, depending on quality (see next section).

Lampante virgin oil is olive oil extracted by virgin (mechanical) methods but not suitable for human consumption without further refining; lampante is Italian for "glaring", referring to the earlier use of such oil for burning in lamps. Lampante virgin oil can be used for industrial purposes, or refined (see below) to make it edible.

Refined Olive Oil is the olive oil obtained from any grade of virgin olive oil by refining methods that do not lead to alterations in the initial glyceride structure. The refining process removes color, odor and flavor from the olive oil, and leaves behind a very pure form of olive oil that is tasteless, colorless and odorless and extremely low in free fatty acids. Olive oils sold as the grades extra-virgin olive oil and virgin olive oil therefore cannot contain any refined oil.

Crude Olive Pomace Oil is the oil obtained by treating olive pomace (the leftover paste after the pressing of olives for virgin olive oils) with solvents or other physical treatments, to the exclusion of oils obtained by re-esterification processes and of any mixture with oils of other kinds. It is then further refined into Refined Olive Pomace Oil and once re-blended with virgin olive oils for taste, is then known as Olive Pomace Oil.

The International Olive Council (IOC)¹ groups olive oil and olive pomace oil into four main designations:

Virgin Olive Oils – olive oils that are made only from cold extraction of oil from the olives;

Refined Olive Oils – olive oils made from refining Virgin Olive Oils;

Olive Oils – products made from blending Refined Olive Oil with Virgin Olive Oil; and

Olive Pomace Oil – not technically an “olive oil”, but a by-product made from the solid “pomace” that is leftover after Virgin Olive Oils are extracted.

1. <http://aooa.com.au/quality-standards/olive-oil-grading/>