

## **Triglycerides - Oil Preparation**

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This is the second in a series of three papers that deal with the cosmetic usage of triglycerides, sometimes referred to as oils. The first dealt with the composition of oils, this with the preparation and processing of cosmetic oils.

The process that allows for the transformation of a plant seed into clear low odor oil suitable for cosmetic use is a process that we generally take for granted. The plant chosen for use as well as the processing used determines the properties of the oil.

The oils covered in this article are referred to as "vegetable oil." This differentiates them from "essential oils" which are often good-smelling oil that are steamed out of 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. This operation would be 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 get more oil out. The oil from the seed oil press can also be called crude oil. Alternatively, oil can be dissolved in solvent, followed by evaporating of the solvent leaving the extracted oil.

Often, seeds are 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 things in the seed. The preheating is also called preconditioning. 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 can be good enough for chemical uses, usually. 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 require cold-pressed, virgin oil. On the other hand, some seeds are too low in oil to economically remove the oil by pressing. In any case, once you have the crude oil, you can move onto refining.

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 and some ingredients, especially fatty acids and one called “phospholipids” go into the water

or 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 components that are useful. For example olive oil can be processed to contain highly desirable tocopherols. Solvent extraction or steam distillation would remove much of this material. If the oil was in the formulation for the benefit derived from the tocopherols, the potential variations in the processing could have dramatic consequences. 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 preparation of an oil may be critical to functionality.