

Natural Scent Extraction

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The 2007 annual conference was, in my humble opinion, the best HSMG conference to date! As usual, a variety of speakers shared their expertise with the attendees. Although I did not attend the session on “Scenting Soap,” I did listen to two members debating some scenting terminology during lunch. During their discussion, I thought it might be helpful (or at least interesting) to write a quick reference guide of scenting materials and an explanation of extraction processes for publication in the HSMG Journal.

Extraction Processes

There are four common methods for extracting aromatic compounds from plant material: Distillation, solvent extraction, expression, and enfleurage. All four methods intend the final product to be used in perfumery or scenting, however; none of these extraction methods produces an exact replica of the scent of a fresh plant. The reason for this inability to exactly replicate the scent of a fresh plant is due to the fact that these extraction methods denature the aromatic compounds by either exposure to heat, oxygen, or chemical solvents.

Steam Distillation

Steam Distillation is a common method for extracting aromatic compounds from lavender, rosemary, eucalyptus, and other fresh flowers, stems, leaves, roots, barks, and seeds. Steam distillation involves passing steam through fresh plant material for over an hour, so the plant material will reach temperatures over 212 degrees and some of the aromatic compounds are “denatured” or altered by the exposure to high heat. The aromatic volatile oils from the plant material are trapped with the steam and then cooled. During condensation, the two separate and appear as a bottom layer of water and a top layer of oils. Very simply, the bottom layer is most often considered a waste product but may be used as a hydrosol (such as lavender water or rose water) and the top layer is bottled as essential oil.

Ylang ylang is fractionally steam distilled, where a wide range of aromatic compounds are removed by steam at different temperatures. The lowest temperature for the steam distillation of ylang-ylang is about 212 degrees and does not yield much essential oil but it is often considered the best and most expensive; this grade is referred to as “extra.” After the “extra” grade essential oils are removed, the same plant matter is re-used and distilled for a second time at a higher temperature of steam and a larger quantity of essential oil is produced and is called, “ylang ylang I.” Distillers find it profitable to continue the process to yield a greater quantity from higher temperatures and also produce ylang ylang in grades II and III, where each grade is considered more inferior and less expensive than the previous distillation. When the distillation of ylang ylang is run as an un-interrupted process, for a total of 22 hours, the resulting product naturally contains all grade levels of the oil and is called “complete.”

Dry Distillation

Dry distillation is also called, “destructive” distillation. This method is very similar to steam distillation but no water is used. The raw plant material is heated, by itself without water, and the volatile oils are condensed as essential oils. Without the steam, the plant materials become slightly toasted, which is detectable in the finished essential oil. A slightly burned scent is desired when distilling certain fragrant woods and fossil amber.

Solvent Extraction

When a specific plant is very sensitive to heat and cannot be distilled (such as jasmine or tuberose), the scent is extracted by a chemical solvent. Either hexane or diethyl ether is used to remove the aromatic lipids and waxes (and other hydrophobic material) from the plant matter. Then, a vacuum is used to remove the chemical solvents (hexane or diethyl ether), which are recycled for re-use. The aromatic plant waxes and lipids remain as a solid waxy “concrete.”

Concretes are extremely fragrant but they are solid at room temperature and difficult to use. When ethyl alcohol, a different chemical solvent, is used to further extract exclusively the low-molecular weight fragrance material from the concrete, the result is an “absolute.” Absolutes are also extremely fragrant but they are less viscous (more liquid) at room temperature and more expensive than concretes.

Expression

Expression can only be done when the plant material has a naturally high content of oil. Therefore, usually only citrus peels are expressed or mechanically pressed. Citrus peels are cold pressed and the oil squeezed from the peel is collected. Expressed essential oils are highly susceptible to oxidation and should be refrigerated and kept out of direct light.

Enfleurage

Enfleurage extraction is fairly expensive and somewhat uncommon; it is rather primitive and labor-intensive. During the enfleurage process, a layer of fat (animal fat or solid plant oil, such as coconut oil) is spread on a plate of glass. Delicate petals or flowers are placed on top of the layer of fat; they are placed as close together as possible, without touching one another. Then, another plate of glass is placed on top of the flower material and the process is repeated. The glass-fat-flower sandwich may have up to ten layers and must set at room temperature for three days. At the end of three days, the sandwich is carefully dismantled and the used flowers are removed. Fresh flower are then placed where the previous flowers had been and the sandwich is re-assembled. In this manner, the fats are impregnated with the concentrated scent of the flowers. Finally, after about a month and up to twelve changes of flower layers, the fat is scraped from the glass plates to yield waxy enfleurage pomade. An example of enfleurage pomade is the solid coconut oil that has been impregnated with the scent of Tahitian Monoi flowers.

Anyone with an ample supply of flowers (especially gardenias), storage space, and patience can make enfleurage pomade, which contains traces of botanical matter, including botanical pigments and moisture. Due to the moisture content, enfleurage pomades promote and sustain bacterial growth. When ethyl alcohol is added to the enfleurage pomade to dissolve the fragrant oils and the ethyl alcohol is then evaporated off, only the essential oils remain.

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