

Perfume Polytechnic

Exploring olfaction in perfume, art, science & life.

Perfume 101: Fragrance Materials and How They Are Extracted – Part 1

Posted on [February 10, 2015](#) by [FeministConfessional](#)

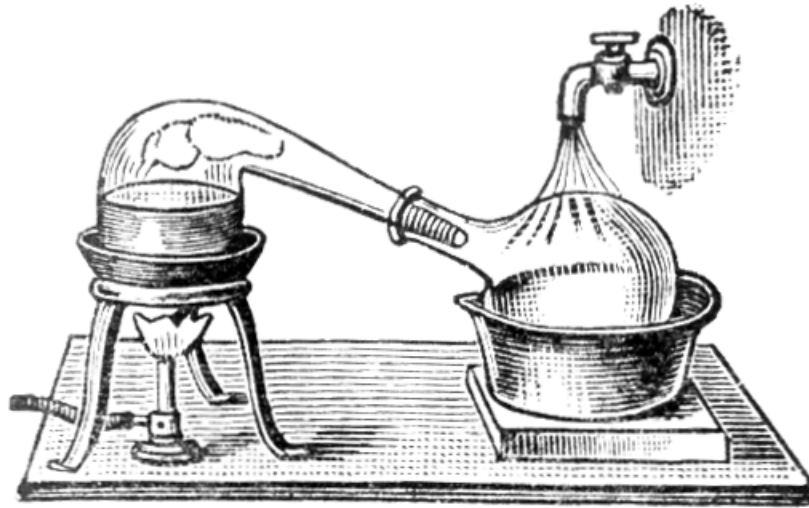


(https://perfumepolytechnic.files.wordpress.com/2015/02/hieronymus_brunschwig_liber_de_arte_distillandi_chf_aq13x3.jpg)

A fanciful depiction of distillation equipment from Hieronymus Brunschwig's "Liber de Arte Distillandi de Compositis", 1512.

Essential oils, absolutes, concretes, resins, hydrosols, balsams. I've heard and seen these words so many times when perfumers or fragrance aficionados talk or write about scent, but did not know what all of them actually meant, until yesterday, when I started reading perfumer Mandy Aftel's book *Aroma: The Magic of Essential Oils in Food and Fragrance* (http://www.amazon.com/gp/product/1579652646/ref=as_li_qf_sp_asin_il_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=1579652646&linkCode=as2&tag=perfumpolyte-20&linkId=7ZLHW4Z5LXJHA4PJ), co-authored with chef Daniel Patterson. Aftel's chapter "The Perfumer's Pantry" has such a succinct and easy-to-understand summary of these various fragrance materials and processes, or "building blocks" of perfumery, as she calls them, that suddenly I felt much more informed, inspired to do some further research, and share some definitions of these things with you.

Today's post will define the following terms: essential oils, hydrosols, concretes, absolutes, resins and balsams, and will describe how each of these substances is produced and/or harvested. In future posts I will explore other extraction techniques including CO2 extraction, headspace technologies, floralsols/phytols and other methods as I come across them.



(https://perfumepolytechnic.files.wordpress.com/2015/02/distillation_by_retort.png)
Vintage engraving of a still

Essential Oils

Essential oils are highly concentrated aromatic oils extracted from certain plant materials, mostly through distillation. Citrus essential oils are one exception to this: while some citrus can be steam distilled to produce an essential oil, the best, most vibrant results are produced by using pressing techniques to extract the oil. Cold-pressed citrus oils are produced by machines that puncture or cut the rind and capture the oil that escapes. Essential oils also differ from the plant oils that we cook with and use for cosmetic purposes, which are extracted by pressing nuts and seeds, olives, and so on.

A few different kinds of distillation are used. In most of them, plant material is placed in a still, water is heated, which produces steam inside the still and helps to break down the plant material to release the aromatic oils. The aromatic steam vapour is then passed through a condenser, returning the steam to a liquid state, which is collected. As oil and water do not mix, the essential oil will normally float on top of (but occasionally below) the watery substance that remains, which is called *hydrosol*.

There are a few different types of distillation used, including steam distillation, hydrodistillation, water and steam distillation, dry / destructive distillation (no water or steam is used), and fractionation distillation. You can read more about some of these methods [here](https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/) (<https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/>) and [here](http://en.wikipedia.org/wiki/Fragrance_extraction#Distillation) (http://en.wikipedia.org/wiki/Fragrance_extraction#Distillation).

Hydrosols

This is the “water” left over after the distillation process, once the essential oil is separated off. Hydrosols retain a small amount of essential oil, up to 0.2 milliliter of dissolved essential oil per litre of hydrosol (source: <https://www.naha.org/explore-aromatherapy/about-aromatherapy/how-are-essential-oils-extracted> (<https://www.naha.org/explore-aromatherapy/about-aromatherapy/how-are-essential-oils-extracted>)). According to Mandy Aftel, even though the hydrosols contain these tiny amounts of oil, “they [also] have [other] plant-based properties and nutrients, which make them very different from regular water to which a few drops of essential oil has been added. Hydrosols are lighter and evaporate faster than essential oils and offer a different, more subtle olfactory experience” (Aftel & Patterson (2004), p. 20).

Concretes

Some flowers and plant material, such as jasmine, linden blossoms, violet leaves, tuberose and mimosa are simply too fragile to be subjected to the heat of the steam in the distillation process, so their aromas are instead extracted using solvents. The solvent (hexane and dimethyl ether are commonly used) flows through or repeatedly “washes” the plant material or flowers, which are placed on grills or perforated trays inside extracting units. The solvent dissolves the aromatic components of the plant along with non-aromatic plant waxes and pigments. The solution that results is filtered to remove the solvent, and the resulting substance is called a concrete, which has a semi-solid, waxy texture. Concretes can contain as much as 55% aromatic oil (source: <https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/> (<https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/>)). Solvent extraction is just one of the more modern and efficient techniques to have replaced the very old technique of *enfleurage* (<http://en.wikipedia.org/wiki/Enfleurage>), which used to be the best method for extracting fragrance essence from delicate materials. According to Aftel, concretes have great staying power and a “softness to their aroma that makes them perfect for use in solid perfume” (Aftel & Patterson (2004), p. 20).

Absolutes

Absolutes are extracted from the concrete, via a process that removes all wax and solid material. Aftel describes concretes as highly concentrated with a refined olfactory quality, and they are “much longer lasting than essential oils.” They also tend to be the most expensive essences to buy (Aftel & Patterson (2004), p. 20).

The following passage, quoted from *Nature’s Gift Aromatherapy Products’ website* (<https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/>), describes the extraction process for absolutes:

The concentrated concretes are processed further to remove the waxy materials which dilute the pure essential oil. To separate the absolute from the concrete, the waxy concrete is warmed and stirred with alcohol (usually ethanol). During the heating and stirring process the concrete breaks up into minute globules. Since the aromatic molecules are more soluble in alcohol than in the wax an efficient separation of the two takes place. But along with the aromatic molecules a certain amount of wax also becomes dissolved and this can only be removed by agitating and freezing the solution at very low temperatures (around -30 degrees F). In this way most of the wax precipitates out. As a final precaution the purified solution is cold filtered leaving only the wax-free material (the absolute).

Resins and Balsams

There is some confusion within the fragrance community about what resins and balsams are, and how they differ from one another, so I’ve decided to resort to Mandy Aftel’s definitions, and the entries in the Encyclopedia Britannica.

Aftel defines resins as “the viscous, solid, or semisolid gums derived from trees, particularly pine and other evergreens” (Aftel & Patterson (2004), p. 20). The *Encyclopedia Britannica* (<http://www.britannica.com/EBchecked/topic/499227/resin>) adds that “resin formation occurs as a result of injury to the bark from wind, fire, lightning, or other cause.”

Balsams also come from trees. The Encyclopedia Britannica defines as balsam as an “aromatic resinous substance that flows from a plant, either spontaneously or from an incision; it consists of a resin dispersed in benzoic or cinnamic acid esters and is used chiefly in medicinal preparations. Certain of the more aromatic varieties of balsam have been incorporated into incense.” And, as we know, perfumery too!

In perfumery, resins and balsams include ingredients such as benzoin, styrax, Peru balsam, frankincense and pine. Aftel says that resins have “tremendous staying power” and that they act as fixatives in perfume making, which means that they help the scent last longer on the skin (Aftel & Patterson (2004), p. 20). As this is such a broad category of materials to discuss, I won’t go into all of the harvesting and extraction techniques used for resins and balsams, as there are many. I do know however that frankincense is harvested periodically by hand from the tree (the resinous “tears” are removed with a special knife), and that it can be used in its raw state as incense, or subjected to the distillation process to create an essential oil.

Sources and further reading:

Aftel & Patterson (2004), *Aroma: The Magic of Essential Oils in Food and Fragrance*, Artisan, New York.

Nature's Gift Aromatherapy Products: [How Are Essential Oils Made?](https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/) (<https://www.naturesgift.com/aromatherapy-information/what-is-aromatherapy/how-are-essential-oils-made/>).

National Association for Holistic Aromatherapy: [How Are Essential Oils Extracted?](https://www.naha.org/explore-aromatherapy/about-aromatherapy/how-are-essential-oils-extracted/) (<https://www.naha.org/explore-aromatherapy/about-aromatherapy/how-are-essential-oils-extracted/>).

Ça Fleur Bon's [Perfumer's Workshop: The Art of Enfleurage "From 19th Century to 21st Century Headspace Technology" + The Art of Flowers Draw](http://www.cafleurebon.com/perfumers-workshop-the-art-of-enfleurage-from-19th-century-to-21st-century-headspace-technology-the-art-of-flowers-draw/) (<http://www.cafleurebon.com/perfumers-workshop-the-art-of-enfleurage-from-19th-century-to-21st-century-headspace-technology-the-art-of-flowers-draw/>).

Encyclopedia Britannica: [Resins](http://www.britannica.com/EBchecked/topic/499227/resin) (<http://www.britannica.com/EBchecked/topic/499227/resin>) and [Balsams](http://www.britannica.com/EBchecked/topic/50870/balsam) (<http://www.britannica.com/EBchecked/topic/50870/balsam>).

Bois de Jasmin: [Tolu Balsam, Benzoin, Styrax and Other Oriental Balsamic Notes](http://boisdejasmmin.com/2011/02/perfume-vocabulary-tolu-balsam-benzoin-styrax-and-other-oriental-balsamic-notes.html) (<http://boisdejasmmin.com/2011/02/perfume-vocabulary-tolu-balsam-benzoin-styrax-and-other-oriental-balsamic-notes.html>).

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3 thoughts on “Perfume 101: Fragrance Materials and How They Are Extracted – Part 1”

1. [Undina](#)

[MARCH 21, 2015 AT 6:17 PM](#)

It's a perfect post! You give just about enough information to cover the topic but do not dive too deep into it. It's informative without being too specialized or boring. Thank you!

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[MARCH 22, 2015 AT 12:40 PM](#)

Thank you kindly Undina! It's often a fine balance, finding the right tone and degree of depth for a blog post! 😊

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