

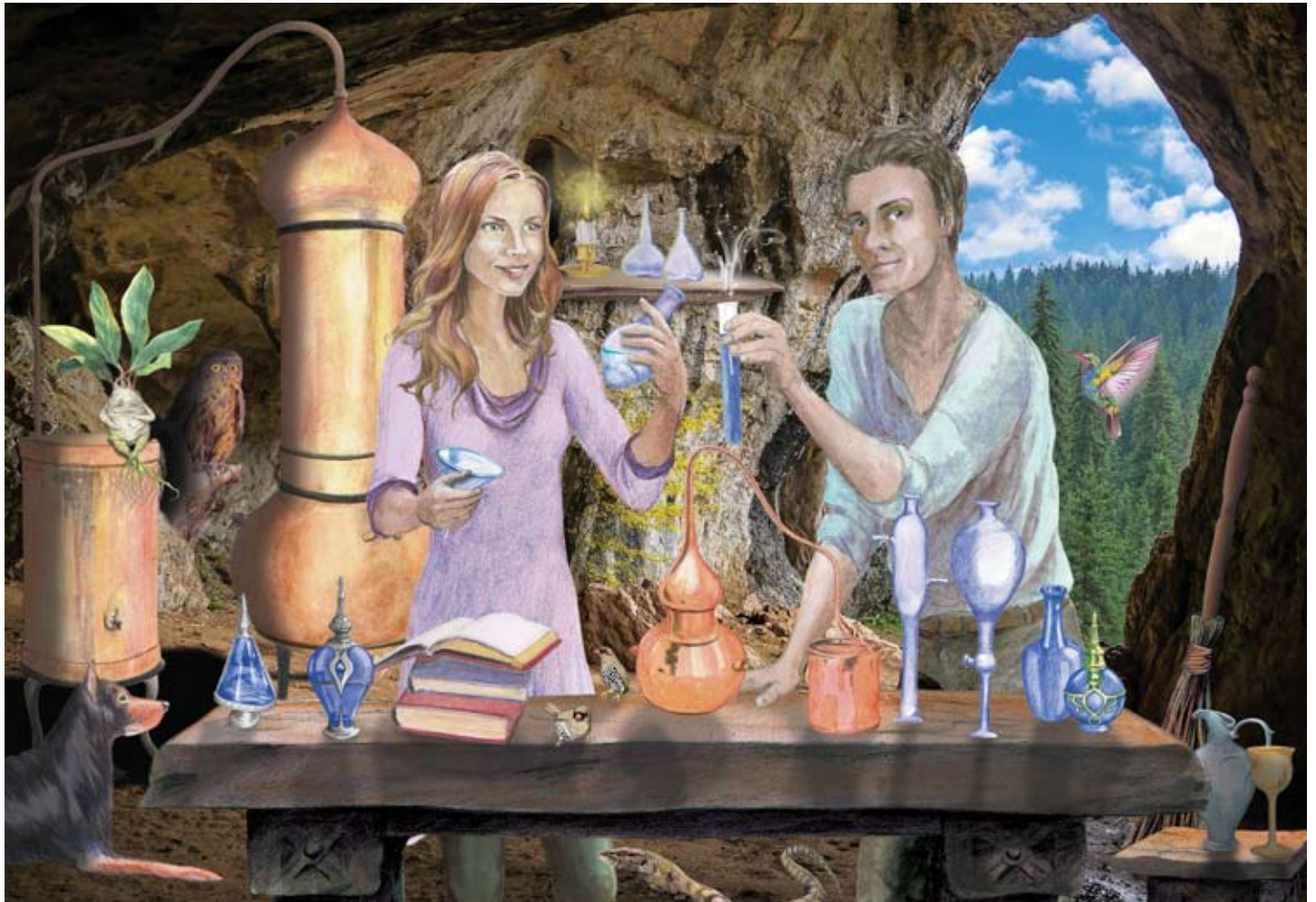
TINDERBOX

SPIRITUAL BEINGS BEING HUMAN

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Don't know the difference between a cut, complete or rectified essential oil? Read on . . .



New methods to old ways

THE ESSENTIAL oil industry has grown exponentially during the past decade and this surge in popularity has also brought an increased demand for education and transparency.

Once a secret only known to the apothecary, the complex process of extracting the life force of a plant - its essential oil - is now readily available to herbal practitioners and home aromatherapists alike.

Of course a little knowledge can also lead to assumptions, presumptions and misinformation. Combine this with industrialisation, commercialism and consumerism and the veil again starts to shadow an industry that should remain pure and open, not shrouded in smoke and mirrors.

So how is an essential oil extracted? Is a 'first distillation' different to a 'complete' oil? When does natural not mean natural at all? And should you trust your own nose or the chromatograph that you don't really understand but a sales rep is waving under it?

ESSENTIAL OIL EXTRACTION

Several ways to get the oils

Distillation is a very old process that has been practised in one form or another in many cultures and is still today the mainstay of essential oil production.

There are several methods of extracting the essential oil from raw plant material such as solvent extraction, cold-press (for fruit rinds, expression) and CO₂ extraction; however it is steam distillation that is the most common and works in three ways.

Firstly, there is distillation that uses just water, where plant material is placed in boiling water, the rising steam and oils are captured and then separated. Clove bud, for example, is

extracted this way. The second method involves a combination of water and steam where boiling water and steam are pushed through and around the plant matter. Nutmeg is distilled this way.

In the third method, straight steam is used, where it is pushed through the plant mass and picks up the essential oils; like with lavender.

In each of these methods, as the steam rises it ruptures the oil membranes in the plant and releases the essential oil.

Vertical steam offers the greatest potential for protecting the therapeutic integrity of essential oils.

The human hand in the process counts

A quality essential oil is defined by how well a rich tapestry of chemical components is preserved through appropriate methods suited to the individual plant's natural profile.

The complex chemistry of essential

oils varies during the day and throughout the year and even the temperature and pressure levels during distillation can create variance in oil quality.

Such factors as cultivation and harvesting, methods of preparing materials for distillation, special characteristics of the equipment used, the duration of distillation and many others influence the quality of the final product and significant differences in oils.

An essential oil is not simply the calculated product of a precisely quantifiable process, rather the product of the people making it and their intention.

Distilling essential oils is more closely related to producing a fine wine than making a standardised fragrance.

Variance in oils

The market is quite confusing to navigate, because different companies present conflicting and often incorrect

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Enquiry into oil extraction

FROM PAGE 1

information about types of essential oils.

There are some interesting differences in distillation techniques that produce the myriad choice of essential oils on the market, that often confound the public in their diversity of price and quality.

A broad-spectrum enquiry is helpful to navigate a complex and sometimes spurious marketplace.

Each plant contains thousands of different natural chemical constituents.

Some of these constituents contain the best therapeutic qualities, or actions of the essential oil, while others have little to no therapeutic qualities; however they all do play a role and work synergistically together.

Essential oils do not exist in plants as free-moving substances, as they are stored in microscopic cellular containers.

Once liberated by steam distillation, they bind with some constituents and split with others. For example, chamazulene, a blue-tinted hydrocarbon, does not exist in the chamomile plant, but is created by the extraction process.

Phases of the distillation

Generally speaking an essential oil is distilled for a length of time from one to 16 hours, depending on the oil.

The most potent part of the oil is extracted during the first 1-4 hours.

After these first few hours, the essential oil changes in constituents based on what is being extracted from the plant.

While one essential oil would need every single constituent, others work better with a higher percentage of a particular, more volatile constituent.

Each one of the constituents within the plant material has a different boil rate. The most volatile constituents always boil at a faster rate, meaning they will boil first (during the first part of the distillation).

As more time is added to the distillation, different constituents are extracted and included in the final product.

When you get to the final stage of distillation, at the longest point, the final essential oil will often smell more fragrant because those sweeter constituents boil last.

As a bonus, the distillery gets far more out of that plant material than if they only used the first part of the distillation, commonly referred to as the 'first distil', but actually it is the first phase of the process.

All essential oils are considered complete

Technically, in the essential oil industry, all oils would be considered 'complete distils'.

In theory this means they are all distilled for the full amount of time that particular single species needs to be distilled in the proper manner.

For instance, Cypress must go through a minimum distillation time of

THE STORY OF A TINDERBOX ESSENTIAL OIL

TINDERBOX has been sourcing essential oils from trusted suppliers since 1982. A Tinderbox essential oil is pure in the most original meaning of the word - natural, uncut and undiluted.

Quality has always been the first priority of our operation, as these essential oils are used as ingredients in our own bespoke range of skin care, perfumery and aromatherapy products.

We travel the world to improve our partnerships - leaders in their field with an eye for quality as keen as our own.

We know that even a quality essential oil smells slightly different from batch to batch. From supplier to supplier. From field to field - that's the 'side effect' of not containing standardising chemicals. And when an essential oil is delivered to Tinderbox, it is not just the data sheets that are noted but one of our trained noses actually smells the oil. You know it's quality, because we know it's quality.

24 hours to get all the active constituents into the final product, while Geranium should only be distilled for 1-3 hours. Distillation requires a specific length of time to get the optimal amount of volatile constituents out of a plant material or highest yield.

Ylang is the exception

One exception is ylang ylang, the essential oil with the most grades, because it is highly prized in the perfume industry where varying aromatic compounds are desired dependent upon their molecular weight and aroma.

A disrupted distillation process is often used whereby five grades of essential oil are collected called: 'extra', I, II, III (in descending order of price) and lastly 'complete'.

'Extra' is the most expensive oil from the first hour of distillation, 'First' is the next 3 hours, 'Second' is the next 5 hours, and 'Third' is the last 9 hours.

'Complete' indicates that the oil is the total result of an uninterrupted 20-24 hour water and steam distillation of the fresh flowers, rendering a genuine, full-spectrum or complete oil instead of the usual shorter distillation time in which Ylang Ylang Extra, I, II, and III fractions are kept completely separate.

Each grade is a pure oil with its own distinct aroma to fulfil differing requirements and budgets.

It shouldn't be all about profit

Much depends on the precise temperature and pressure used in the distillation process, which greatly affects the essential oil smell and potency.

Some oil producers raise the temperature and pressure during distillation to hasten the process and generate a larger batch.

The oil is still pure and nice smelling, however some of the volatile compounds are absent that would otherwise be therapeutically useful.

Essential oils used in aromatherapy should be of a grade suitable for the task; there is no independent, industry standard that is known as 'therapeutic grade'.

One form of 'cutting' that is quite widespread in the fragrance industry is the total reconstruction of essential oils, in which the main components of an oil are simply mixed together.

Often the substances used in this process are of natural origin so that the finished product can justifiably be called 'natural'.

Adding small substances of true essential oils or synthetic fragrances may intensify the scent of these oils, which is often weak and insipid. In this way, one litre of pure distilled rosemary oil can be converted to twenty litres to sell for increased profit.

Some large commercial operations add chemicals into the steam distillation process to increase the volume of oil produced.

The chemicals leach into the distilling water and mix with the essential oil, fracturing the natural molecular structure and altering the smell and healing efficacy of the oil.

What do you want from an oil?

The individual's needs and preferences really are the determining factor when deciding what grade of oil is appropriate.

Many perfume companies will use the second or third distil in their final products because it has the most pleasantly mild and sweet smell.

If someone prefers the milder smell of a supposed 'lesser' grade essential oil then it has fulfilled its task. There is no good or bad, just what is liked by the individual at the end of the day.

The plant matter is spent post-distillation

Contrary to a common public misconception, there is no such thing as plant matter being 're-distilled'.

It is the essential oil itself that is re-distilled, the biomass of the plant is never redistilled; each distil process refers to the number of total hours something is distilled, not how many times the plant has been distilled.

The amount of energy required to boil massive amounts of water and generate enough steam to liberate the oil from large vats of biomass is quite extensive and costly.

So the distillation process just keeps going and producers start collecting the oil produced, including the tail end of the distillation in a separate container.

With the exception of ylang ylang, almost all essential oil distillations are collected in one combined lot.

When simple distillation is not enough

Different types of essential oils are produced by batch distillation (the batch evaporates), fractionation and rectification, which all vary the chemical composition of the mixture.

Many essential oils, when distilled from the plant material, are contaminated with volatile products arising from the decomposition of complex plant substances, under the influence of hot water or steam.

Some of these decomposition products are gaseous, for example hydrogen sulphide and ammonia; others such as methyl alcohol, acetaldehyde, acetone and acetic acid are very soluble in water.

Occasionally the main oil also contains normal constituents that have a somewhat objectionable odour; for example certain aldehydes or sulphur compounds.

In order to improve the odour of such oils, they are freed from these undesirable compounds by processes called rectification and fractionation.

Although maligned by aromatherapy purists, sometimes they can have their justified place in the essential oil industry.

What is rectification?

There are a few essential oils that are 'rectified', a process often mistakenly described as 're-distilled'.

Rectification involves fractional distillation in order to remove unwanted constituents or impurities.

The essential oil (not the plant which has no oil left in it) is put through a second process using a tall, narrow column.

In the case of bitter almond oil, hydrocyanic acid (cyanide) is removed, as it is highly toxic.

In peppermint, for example, minor sulphur constituents are removed as they impart a slightly unpleasant taste and most peppermint oils are used in food flavouring.

Rectification aims at the separation of volatile and non-volatile compounds if a lighter coloured oil is desired; the colouring matter remains as residue in the still.

Hydro-distillation can also be carried out at reduced pressure.

Commonly rectified essential oils include eucalyptus, clove, mint, turpentine, peppermint and patchouli.

In the case of patchouli and clove, rectification is undertaken to improve what is perceived as their unacceptably dark colour.

Camphor and ylang-ylang undergo a separation process during distillation, resulting in five grades of ylang-ylang oil as previously discussed, and four colours of camphor oil (white, blue, yellow, brown) but none of this involves re-distillation.

Rectification is sometimes used to enrich the essential oil in a particular component lacking, such as 1,8-cineole in low-grade eucalyptus oil.

reveals a complex industry



What is fractionation?

Fractionation or fractional distillation aims at separating the volatile oil into various fractions, according to their boiling points and odour. In most cases this is achieved by dry distillation in vacuo.

Fractionation is carried out at reduced pressure (partial vacuum) and usually by distilling the oil alone, without leading water into the retort or injecting live steam into the oil.

This process of dry distillation in vacuo is widely applied in the essential oil industry today and by its means, pressure can be so far lowered that temperature has no longer any marked influence upon quality.

Fractionated essential oils are sometimes called 'folded' oils.

Terpenes are usually removed in these essential oils because the processor does not consider terpenes to have value; however for therapeutic aromatherapy practice, removing or altering these valuable chemicals within the natural composition of the essential oil can be counterproductive.

Terpenes are removed usually for the food and flavour industry because they are bitter and insoluble.

Cut and dried it is not

Diehard purists will avoid these modified oils, yet there are some essential oils that are rendered more useful by these processes.

An example of this is cold-pressed bergamot oil, which contains the photosensitising constituent bergaptene (a furocoumarin, not a terpene).

Rectified bergamot oil removes this

reactive component, which makes the oil safer to use on the skin everyday in the sunlight, especially for the young and sensitive.

Some aromatherapists prefer to use bergamot essential oil with the compound bergaptene removed.

Refining your choices is not cut and dried and once again it always depends on what the person wants from the oil, so we are fortunate to have such a broad range from which to choose.

To successfully navigate the complex and tricky essential oil market to purchase a high quality essential oil, it is pertinent to be aware of the market language. One needs to know the oil's botanical name, its country of origin and its method of extraction to understand its nature.

A reputable company can supply this information with the appropriate spec sheets. It is worth noting however that just by determining the concentration of a specific component in an essential oil is not sufficient for determining the quality of a particular oil (such as linalool in marjoram or lavender oil for example). Otherwise synthetic oils would be just as effective as natural oils, which is not the case.

Some terms with which to be circumspect

Fragrance oil

This description of an essential oil is strictly used for those that are mixed with chemicals or for straight blends of synthetics. Always look for the correct term: 'essential oil' which should be botanical. It is wise to avoid the word synthetic in all cases.

Pure

Sadly this word has lost its original incorruptible meaning, because many products sold are labelled as pure when perhaps they contain only a fraction of real botanical material and are in fact a chemical cocktail.

A number of substances can be added to a genuine essential oil.

They include a cheaper oil (for example orange added to bergamot), or essential oil from a different part of the plant added to the desired oil (for example clove leaf or stem added to clove bud).

Nature-identical oil

Such a label means the product is not botanical from nature and usually contains adulterating additives such as extenders or dilutants.

Reconstructed oil (RCO) is used to describe laboratory-produced oils. They are synthetics made up entirely from chemicals produced in the laboratory from various sources including plant material.

They are not suitable for aromatherapy. For example, synthetic methyl salicylate may be sold as wintergreen. Sometimes it can be quite difficult to distinguish synthetic oils from the genuine plant essential oil. The perfume industry makes perfumes that will contain 50 to 100 per cent synthetic ingredients.

Extenders

These are bulking additives that can be synthetic or natural and even contain chemical fragrance constituents that smell similar to the real essential oil, however they possess none of the real oil's therapeutic qualities.

Sometimes, extenders help to make very viscous oil easier to pour.

Dilutants

These are usually the synthetic, colourless and odourless additives (such as propylene glycol) that increase the volume of a product to increase profit.

Certain diluting agents can be carcinogenic and thus unsuitable for topical or inhalation applications.

Cutting

Cutting is a term used for methods of making the original oil go farther and of course make more money.

Odourless solvents can be added to dilute an essential oil.

Alcohol is commonly used for a wide variety of essential oils. Diethyl phthalate (DEP) is added to sandalwood and dipropyl glycol (DPG) or phenylethyl alcohol (PEA), which is a natural component of rose otto, is often added to the essential oil.

Therapeutic grade

This term has been appropriated and popularised. It is simply a brand name and marketing trademark and not a standard recognised officially in the world aromatherapy industry.

Testing for quality

The best quality essential oils are subject to rigorous quality control.

Qualitative and quantitative information

Qualitative information identifies the components present in a substance, showing what it is made up of.

Essential oils have about 50 readily assessable compounds, with the total number present as high as 350. For an essential oil such as lavender, the same components will be present; these are linalool, linalyl acetate and 1,8-cineole.

A quantitative analysis shows the amounts of components present in a substance and is needed to help identify different types of oil as well as distinguishing chemo-types.

The different types of lavender essential oils will contain different amounts of constituent compounds. Spike lavender (*Lavandula latifolia*) has high amounts of 1,8-cineole (25-37 per cent), while true lavender or *Lavandula angustifolia* has very small amounts (0-5 per cent). *Latifolia* may have up to 60 per cent camphor, while *angustifolia* has up to 12 per cent.

Specific gravity

This is the density of an oil compared with that of water. The density of essential oils is fairly consistent within a small range, so any additions may affect the density of an oil.

Optical rotation

This is the property of some essential oils to bend polarised light off a straight line by a certain number of degrees. Any additions that are optically active may alter the overall optical rotation of an oil.

Refractive index

This is the amount by which the oil deflects normal light from a straight path, in a similar way to the prism, and this also changes if the ratio of compounds alters.

Gas chromatography and mass spectroscopy

These two analytical processes are carried out by specific machines to identify types and percentages of chemicals in an essential oil. Together, the two machines can be used to determine the exact nature of each chemical.

The nose versus chromatography

Chromatography refers to a range of closely related techniques used for separating mixtures.

Chromatography is used extensively in the analysis of essential oils in a wide range of applications.

Essential oils are made up of a mixture of compounds, so chromatography can be used for separating and identifying them.

It can also detect any impurities, making it a very useful tool for defining purity.

The gas chromatograph can be sensitive enough to detect a picogram (1/1000,000,000,000 g) of a substance, yet the nose can sometimes do better than this and detect components present in amounts too small to register on a GC chart recorder.