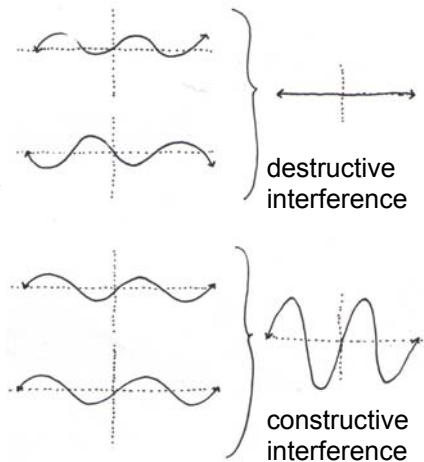


Medicine Making: Modern and Alchemical techniques for capturing the Vital Essence

Any process that seeks to produce medicine, and ultimately provide real healing, needs to take into account the *vis medicatrix naturae*, or healing power of nature, which is embodied in the Vital Essence, or Vital Force, that flows throughout our universe. Attuning medicine to this Essence means crafting an elixir that *communicates* with the world around it, rather than *dictating* its terms to it.

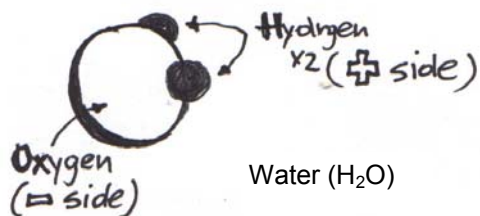
Nothing holds Vital Essence when it is alone. This elusive force exists in the relationships, and the interconnectedness, of all things, and is stored in associations, metaphors, and patterns of shared experience. Thus, to awaken it, we must focus on the gates of plant signatures, similes, poetry and aesthetics. These will define and refine our relationship to the plants we harvest and use.

If we think of the Essence as a force, or wave, present in a plant, we can see how that wave becomes stronger when a similar wave is added to it, and weaker when a contrasting one is added. In the same way, the specific vibrations of plants are strengthened by associating them, in our minds and hearts, to specific patterns of analogy, and by bringing those patterns to the forefront of our perception when we grow, harvest, and process botanical medicines. A plant's words are expressed in our mind's eye as symbols, feelings, and connection; disregarding this communication will only sacrifice the Vital Essence to whatever patterns we may be dwelling on at the time.



The Ingredients:

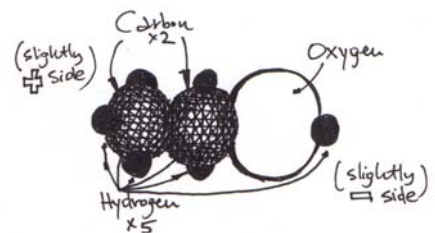
Science has given us a wealth of symbols and associative patterns to work with. These are very useful, as long as one does not take the symbol for the Vital Essence, and remembers that only whole, vibrant plants can produce whole, vibrant medicines!



Water (H₂O) is the universal solvent, the key to life. It has a *polar* structure, meaning that electrons move to one part of the molecule (the Oxygen), giving it a positive and a negative side, like a magnet. This is essential to its power to dissolve plant constituents, many of which are also polar and able to blend with the water by linking their + sides to the water's - side. However, substances that are oily (*non-polar*) cannot

mix with water: they act as insulators, and cannot form the + / - bonds required to dissolve.

Alcohol (Ethyl alcohol, C₂H₅OH) can extract non-polar constituents much better than water. It still dissolves in water because, overall, it has a slight polarity; but its Carbon section is much more able to mix with organic oils, resins, and alcohols. It is derived directly from fermented plant sugars. At a 33% concentration, it stops bacterial growth. At a 70% concentration, it can kill some bacteria. These properties make it useful to preserve medicinal extracts, which would otherwise require the heat of the canner to not spoil.



Alcohol (C₂H₅OH)

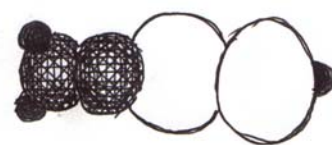
Water and Alcohol make up the basis of the medicinal tincture: the *solvent*. The constituents we attempt to extract come from the plant material, the *solute*. They vary in their degree of water-solubility.



Glucose ($C_6H_{12}O_6$)

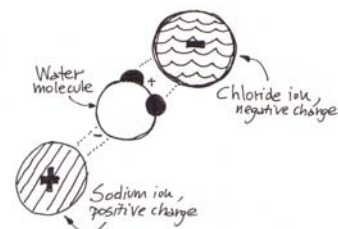
Sugars (with a $C=O$ *carbonyl* group) and **Mucilages** are one of the most common plant constituents. They are present everywhere because they are essential for a variety of body processes, from energy production to complex immune regulation. *Monosaccharides* like Glucose ($C_6H_{12}O_6$) can combine to form long chains of *polysaccharides*; both of these are fairly well soluble in water alone, and do very well in medium-low alcohol concentrations. Many are delicate, and will be lost if exposed to heat or too-high alcohol concentrations. Echinacea, for example, is extracted at 40% alcohol to ensure its sugars are preserved.

Organic Acids (with a $COOH$ *carboxyl* group) are another widely distributed class of molecules. They include fruit acids (citric, malic e.g.), vitamins (Vit. C = ascorbic acid, Vit. B5 = pantothenic acid), and by-products of fermentation (like vinegar, or acetic acid). They help as catalysts for every body process, and are very soluble in water. Rosehips, prized for their citric and ascorbic acid content, are extracted at low alcohol concentrations: 25% to 33%.



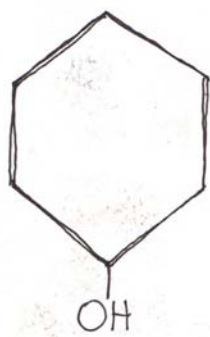
Acetic acid, CH_3COOH

Inorganic Salts and Acids are perhaps the easiest constituents to extract in water, because they break apart into positive and negative chunks, or *ions*. This breakup is encouraged by water's polar structure through a process called *ionization*. These salts of calcium, magnesium, sodium, potassium, iron and others are essential in fine-tuning the actions of the heart, kidneys and nervous systems, as well as providing building blocks for virtually every tissue. Again, because of their high water-solubility, they are extracted at 25% to 33% alcohol, although they will remain undamaged by any concentration.



Ionization of sodium chloride

Saponins are a unique class of plant compounds. They vary widely, but have similar extraction characteristics. Their name comes from the root word for 'soap', and they do have a good emulsifying power, dissolving well in water and helping other less-soluble constituents along too. Luckily, many plants have at least a little saponin in them to aid in a more complete extraction. Although still poorly understood, they have been linked to intestinal health, immune regulation, and metabolism. Ginseng is an herb prized for its saponins: since they are easy to extract in water, Ginseng is steeped in 25% to 40% alc.



Phenol

Phenolic compounds (featuring a Carbon ring and a *hydroxyl* group) vary widely in solubility. They are often found in plants, from Wintergreen to Oak, and form the basis of many more complex organic molecules. Some behave like alcohols, some like oils, others (tannins, for example) are very reactive and bind to other chemicals such as proteins, often precipitating them out of solution. Included in this family are molecules such as flavonoids. Most phenols extract well at slightly higher alcohol concentrations: Wintergreen would like 60%. The notable exception are the tannins, which dissolve well in water at first, but often 'lock up' and settle out of solution if over-exposed to light or oxygen (this is impossible to avoid).

Alkaloids (with a Nitrogen in a Carbon ring) are similar to the phenols in their basic ring structure, but the comparison ends there. They also range widely in structure and action, and can often be quite potent and shocking to the body systems. Fortunately, they are poorly soluble in water, so it is harder to get that deadly dose from just a cup of tea. They are best extracted at very high alcohol ranges (70% to 90%). Sometimes this alcohol is heated. An example is Lobelia, which usually is extracted at an incredible 85% alcohol.



Essential oils and resins are very hard to dissolve in water. To this end, we must rely on some of the other plant constituents to help them emulsify; but we are lucky that, in most plants, they are present in such low concentrations that they can be mostly dissolved, especially with a good shake of the tincture-bottle. They are a vital component to any tincture, giving it the aroma that makes it characteristic. If a plant is selected for extraction based on its essential oil or resin content, alcohol concentration should be high: at least 60% for a plant like Peppermint, or Thyme, and up to 90% for bee Propolis.

The Process:

When preparing medicinal tinctures, pay attention to the plant material you are using. Is it rich in volatile oils? Is it salty? Is it sweet? Sour? Astringent? These will provide quick indications of what constituents are in the forefront; just remember, the less obvious ones are just as important! If unsure, try the middle of the road—50% alcohol by volume. Be sure not to go ever go under 25% alcohol (for a dry herb) or 33% alcohol (for a fresh herb).

Obtain a good reference source (some listed at the end) describing some herbs by their constituents. Keep records of what herb was extracted at what alcohol range, and record your overall impression of the tincture: too watery? No taste? Only an 'alcohol bite'? Soon the analogies and patterns of basic chemistry will resonate more clearly, and you will notice you are better able to quickly guess what alcohol concentration would be best.

Once you have determined what percentage alcohol to use, there is a simple formula for calculating the amount of alcohol and water you will need for a given weight of herb. This is it:

$$A = \frac{WFS}{95}$$

Where *W* is the weight of the herb you are using; *F* is the number in the weigh-to-volume ratio (so, for a 1:3 tincture, *F* is 3. For a 1:5 tincture, *F* is 5. And so on); *S* is the desired percentage of alcohol (33, 60, 90, etc...) and *A* is the amount of pure grain alcohol you need. The amount of water needed to make up the rest of the solution is given by multiplying *W* x *F*, and then subtracting *A*.

The Alchemy:

Regardless of what plant is used, alchemists such as Paracelsus, Agrippa, and others recognized three basic elements to each living being: Mercury, Sulfur, and Salt. Mercury was considered universal to all plants, Sulfur and Salt were unique to each different one. Once a tincture has been set to steep, we can begin to look at some other processes to bring more analogy, poetry, and refinement to the medicine. Such a product becomes known as a *spagyric extract*.

Water is again central to alchemical processes. Not only can it dissolve various constituents, but it also has a certain impressionable quality, which gives it the ability to store patterns in itself much like a crystal can store and amplify energy. Subtle connections, identified by chemistry as *hydrogen bonds*, link water to itself much more tightly than its polarity alone could explain (witness surface tension), and can be rearranged constantly to provide infinite unique structures. As such, water takes on and holds much of the more subtle energetic vibrations of plants (this is referred to as the “memory of water” by homeopaths). This is only true for distilled water, for distillation resets the water memory by converting it to a gas.

Mercury, ☿, is alcohol in the alchemists’ minds. If there is one element that can be directly linked to the Vital Essence, this is it. Mercury functions as the universal messenger of alchemy, and is considered to be representative of the basic Life Force that unites all living creatures in mutual creation / destruction. It is derived from sugar, and shares many of its characteristics; after all, sugars are essential to life (right after water and oxygen) and also form the building blocks of our DNA and RNA. The life that sugars represent is preserved, in death, as the ferment alcohol. Since it is the most basic form of essence, it is universal in the plant world—the pure Mercury distilled from barley is the same as that distilled from corn, or any other plant.

Sulfur, ♁, carries the rest of the living essence of the plant. However, it is much more specific, and embodies the distillate of the ‘personality’, or soul, of the plant. It resides in the essential oil, or the non-watery distillate that rises, at very low temperatures, from a steam of the plant material. Essential oils, so aromatic, link directly to our most powerful associative sense: the sense of smell. Thus it is no wonder that the most unique Sulfur of an herb is also the most powerful connection to that herb: its fragrance. It is difficult to directly extract the Sulfur, requiring steam distillation equipment. But a good degree of extraction can occur right in the steeping mason jar, where the tincture only appears to be resting: if space is left at the top of the jar (at least 3 inches for a 1/2 gallon jar), convective loops become established that circulate alcohol and water vapor in the airspace. If, on the first day of steeping, the jar is placed in a warm, sunny window for just a few hours, the essential oils will separate and recombine by themselves.

Salt, ♁, is the body of the plant, the important essence of matter, needed to balance and provide grounding to the Vital Essence, captured in the Mercury and Sulfur. The Salt is, very simply, salt. More specifically, it is the combination of all the soluble salts of the plant, essential for remedy absorption and cellular nutrition. It is extracted from the marc of the tincture, the part that remains in the strainer after the tincture is poured off. To obtain it, the marc must be burned to a fine whitish-gray powder (in a flameproof pot!). This powder is then mixed with pure distilled water, and allowed to settle. After a few hours, the clear liquid is poured off, and the sediment discarded. The remaining liquid is then evaporated, and the salts collected are the Salt, the body of the plant. It will help the medicine reach every nook and cranny of our bodies.