VAPORIZING BY TEMPERATURE

Vaporizing is the technique of raising the temperature of a material in order to release desirable components in the form of vapor without reaching combustion. Many different substances or blends can be vaporized to your benefit, but most of them are some form of plant material: leaves, flowers, seeds, bark, and roots of different plants have all been used. Some contain a single active component, while others can release several components, each at a different temperature.

This article is not intended to describe the various materials and their effects. Rather, we want to show you why controlling the temperature you use can be beneficial. The simple explanation is that temperature control allows you to alter the ratio of active components that you are vaporizing. The word “ratio” is important here, as we’ll explain.

Combustion releases everything at once. Its high temperatures can destroy some desirable components and causes pyrolysis of the material, which inevitably releases undesirables such as carbon monoxide and tars. Vaporization without temperature control doesn’t do this, but it often results in releasing all components simultaneously. Since this might not be the result you want, you can benefit from controlling the temperature when you are vaporizing.

Many vaporizers allow you to select a temperature. Some have a continuous scale, while others only allow you to choose one of a number of set temperatures. Some devices have a digital display, while others use one or more LEDs to indicate that you’ve reached the selected temperature. Vaporizers with temperature control often limit the highest temperature so that you can’t reach combustion accidentally, but this can’t be guaranteed. That’s because a lot of different materials can be vaporized, all with different combustion points, and the moisture content must be considered as well. Dry material obviously will burn first.

Regardless of how you select the temperature or how it is displayed to you, none of these vaporizers is actually measuring the temperature of the substance that you are vaporizing. In general, manufacturers try to get as close as possible, and might include a “fudge factor” in order to represent the actual vaporization temperature. You can safely assume that any display or set point isn’t completely accurate but is reasonably close to what the manufacturer claims. Most important to you, it provides a consistent setting that you can return to. The exception to this is the temperature control of a cheap “bargain” vaporizer. These are usually sold for $50 or less on eBay, and often have a wildly inaccurate digital display that might be consistent. (The key word here is “might”.)

Before we go further, we need to clear up some common misconceptions about vaporizing at a specific temperature. The web has many charts showing precise temperatures at which various components vaporize. There are some cautions, however. The temperatures listed are actually for the boiling point of the compound, that is, the temperature at which it is completely converted to a gas. Unfortunately, there has been little science done to verify exact temperatures, so these charts must be taken as guidelines. Additionally, the temperatures are for individual components but nature seldom presents them to us so simply. Multiple components can exist in a matrix, which will have a boiling point that is different from any of its constituents.

Also, these charts encourage the incorrect impression that vaporization is binary, in that nothing is vaporized until the listed temperature is reached, then the entire compound becomes vapor. This is why you sometimes see these temperatures referred to as “flash points”, which is actually a misuse of the term. (Flash points refer to explosive mixtures.)

What actually happens in vaporization is that some of the compound begins to off-gas at lower temperatures than the boiling point. For example, when you bring water to a boil you can see wisps of steam (water vapor) well before the boiling point is reached. The amount of the compound vaporized before the boiling point—and the point at which vaporization begins—is difficult to quantify and varies from one compound to another. What we do know is that the quantity of the compound that is vaporized increases more rapidly as the boiling point approaches. Of course, at or above the boiling point, all of the compound is being vaporized.

The first components of interest released when vaporizing most materials are the terpenoids, because they usually have the lowest boiling points. These are of particular interest in aromatherapy because they are responsible for aroma and taste. (Terpenoids are also suspected to have antibacterial and other properties.) If these are the characteristics that interest you, select the lowest temperature that produces vapor.

An aside: vapor is not always visible at low temperatures under normal lighting. You do not need to see vapor to get results. Judge your low temperature vapor production by smell, taste, and effects. Vapor becomes more visible as temperature rises, but visible vapor is also hotter, harsher, contains more potentially irritating particulates, and is less tasty because the heat destroys terpenoids quickly.

Be aware that even at the temperatures that release terpenoids, other active components can be vaporizing, but at a low ratio compared to what you obtain as you approach a particular component’s boiling point. Many individual materials and all blends contain multiple active components, so as you increase your vaporizing temperature, you are altering the ratio of the active components.

Assume that your material contains both a sleep aid that vaporizes at 160°C and a pain reliever that has a boiling point of 180°C. Clearly you can get both at 180°C, but what if you want only the pain reliever?

If you are using an assisted device (one that uses a fan or pump) then you can heat to 160°C to drive off the sleep aid before heating to 180°C and filling your bag or balloon with the pain reliever. Keep in mind, however, that some of your pain reliever will be released at the lower temperature. You need to experiment to determine whether this technique works for you.

If your convection vaporizer is unassisted, you’re limited to keeping any material that you vaporize at 160°C, and using that when you want just pain relief, although some of the pain reliever is now depleted. Just heating it for a while at 160°C won’t work, because air must flow through your material to cause vaporization.

Although temperature controlled conduction vaporizers are not common, some are beginning to appear. With these, as with assisted devices, you can drive off an undesired vapor by just heating at the

lower temperature until vapor no longer forms, but again remember that in doing this you lose some of the higher temperature compound.

The lesson here is that you can benefit from controlling your vaporizing temperature. Many users have learned to start with a low temperature to get maximum flavor and aroma, and to increase the temperature in stages in order to find the points that deliver the best ratio of the desired active component to vapor. This is not an exact science, however, because materials, vaporizers, and of course your needs are all unique. Experiment using the principles we've described here and find out what works for you.