



Home Coffee Roasting Guide

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Home Coffee Roasting is fun and easy. For a modest price, you can turn green coffee beans into a spectacular cup of coffee. The green coffee beans themselves sell for less than half the price of store bought roasted coffee, and compared to the gourmet roasts, the savings are dramatic. It only takes a little practice and you can create freshly roasted coffee that will rival even the best commercially produced coffees. Green coffee beans, unlike roasted coffee beans, are a stable product that can be easily stored until you are ready to use them.

Basic Requirements for Home Coffee Roasting:

- Green Coffee beans need to be subjected to temperatures between 460°F-530°F(240°C-275°C)
- Either the beans or the air around the beans must keep moving to prevent uneven roasting and scorching.
- Once roasted, the coffee beans need to be cooled immediately. This is key to consistently producing a quality roast.
- There will be smoke and Chaff; different varieties produce varying quantities, but you must have a way to deal with the smoke and chaff.
- Once roasted the beans need to be cooled quickly. This can be accomplished a number of ways, the most common being placing the beans in a large colander and stirring or shaking them until cool.

Home Coffee Roasting methods:

Fluid Bed Roasting

- Fluid bed roasting is the most common technique that home coffee roasters utilize. This method uses a fluid bed of hot air to both heat the green coffee beans as well as agitate them. The “popcorn popper” method is a prime example, and probably the most widely used. Fresh Roast’s [SR300](#) & [SR500](#) and [Hearthware’s I Roast II](#) are examples of fluid bed coffee roasters that have been specifically designed for the home coffee roaster. Nesco’s [Coffee Bean Roaster Pro](#) is a hybrid, it uses a

fluid bed of hot air to roast the beans but it relies on an auger to keep the beans moving.

Radiant Heat Roasting

- Radiant heat roasters rely on the coffee beans coming into contact with or passing close to a surface that has been heated. Keeping the beans moving to assure an even roast is usually accomplished by a rotating drum. The [Gene Cafe](#), [Behmor 1600](#), and [Hot Top](#) coffee roasters all use the radiant heat method.

Conduction Roasting

- Roasting green coffee beans by conduction relies on the coffee beans being in contact with a surface that is hot. Roasting your beans in a frying pan would be roasting by conduction. This is probably one of the oldest ways to roast coffee and is very effective. The downfall is in the quality and ability to achieve consistent results. I highly recommend trying the “frying pan method” if for no other reason than to gain respect for modern convenience.

Coffee Roasting Process

Since many of us start our home roasting experience using a hot air popper that is the baseline I will use for explaining the roasting process. For home roasters, especially beginners, the easiest way to judge the roasting process is by sight, sounds and smells. As you gain experience you may choose to add the more challenging “temperature” to your roast process, but this takes some time to discuss, so I’ll save it for another time. Once subjected to heat, the coffee beans will begin to change. These changes are documented by the sounds and smells they emit and the visual changes that occur. Below is a basic breakdown of the changes that occur and where along the process they occur.

After placing your beans inside the roaster and turning it on there is a period of time where no apparent changes are occurring. At this stage the beans are being brought up to temperature and moisture is beginning to be released. As the temperature of the beans increases the changes become more apparent and more rapid.

Opening Stages

- Green – Light Brown
- Internal bean temperature – less than 400° F
- Beans are dry (no oil droplets present)
- Very humid hay-like smell
- Not palatable

Cinnamon Roast:

- Light brown to cinnamon color
- Beans are dry (no oil droplets present) internal bean temperature – less than 400° F
- Roast stopped before first crack is completed
- First toasted smells, toasted seeds and grains or bread
- Low body and light acidity

American Roast:

- Medium light brown color
- The beans are still dry
- Internal bean temperature – 400-415°
- This is the stage where “first crack” begins
- Aromas start to change to caramels and smoke
- Profile – The acidity brightens and body increases slightly

City Roast:

- Medium brown
- The beans are mostly still dry
- The acidity continues to increase and the body becomes more potent
- Internal bean temperature – 415-435°
- First crack stage is finished
- Profile – 50% of the sugar is caramelized, acidity is developed and the varietal character of a bean can be clearly tasted

City +:

- A more developed stage of City Roast, well beyond first crack. This roast level definition is from a well-known supplier of green coffee.

Full City:

- Rich brown color
- Beans may show tiny droplets of oil
- Good balance between sweetness, body and acidity

- Internal bean temperature – 435-445°
- Just into the first snaps of second crack
- Varietal character is present with decreased acidity and slightly bittersweet “roast taste”

Full City +:

- More developed version of Full City well into second crack. This definition is also from a well-known supplier of green coffee.

Vienna Roast:

- Moderate dark brown color
- Beans have oil on them
- Internal bean temperature – 445-455°
- Second crack at or near completion
- Acidity muted. Cup quality is bittersweet with heavier body

French Roast (some call this Italian and some also call the next stage, Italian):

- Dark brown color
- Beans covered with oil
- Acids are radically decreased
- Internal bean temperature – 455-465°
- Subtle nuances are mostly gone. Body dominates with burnt undertones

Green Coffee Beans

Green coffee beans are literally green, and are the seed of the coffee tree’s cherry. When the coffee cherry is ripe, it is picked and processed to remove the pulp. What is left is a pale green coffee bean. All green coffee beans look very similar, they may vary in size and shape to a degree, but in general they look the same. The looks, in this case are very deceiving. Like many fruits the variety of plant and the location where the tree is grown has a huge impact on the flavor of the coffee it will eventually produce. In general, coffees are segregated by country and by growing region. Generally, coffees from a specific region of a country will have similar qualities. Much like wine, coffee can be drilled down by varietal, geography and a wide range of external factors. Again, much like wine, it is up to the individual how far he/she wants to take his/her obsession.

Selecting Beans For Roasting

The best practice for those just starting to roast their own coffee is to select a variety of green coffee beans and roast each of them several different ways. This will give you an understanding of the geographical type of coffee you enjoy as well as the style of roast you enjoy.

Storing Green Coffee Beans

Unroasted coffee beans should be stored at room temperature, away from direct sunlight and kept dry. If you plan on using your beans immediately, then you can use any container you wish. If your beans will be around for more than a month you will want to store them in a burlap bag or something similar that will promote air movement. Above all else keep the beans dry and cool.

Storing Roasted Coffee

Fresh roasted coffee is FRESH, 4-24 hours after roasting is the peak of flavor and aroma. Taken care of it will maintain near that quality for up to 7 days. Immediately after roasting the coffee beans begin emitting CO₂ in a process called off-gassing. This process can last up to 24hrs and helps to protect the flavor of the coffee. Due to the CO₂ emission you'll want to allow your coffee to breath for a few hours before placing the beans in an airtight container. Oxygen will degrade your coffee quickly; you must protect your freshly roasted coffee from oxygen. Mason jars work great. There are also specially designed bags and jars with one-way valves that allow the CO₂ out but don't allow air back in.

Home Coffee Roasting Hot Air Popper Method

Selecting a Popper

- There are many brands of hot air poppers on the market, none are designed to roast coffee. With this in mind you must take care to select the proper units. When selected and used properly your hot air roaster will roast many batches of coffee. Only units that have air vents along the inside wall of the roasting chamber will work. Poppers that have a mesh screen on the bottom of the chamber will catch fire, **do not use them.**

Accessories

- Optional thermometer, Container (I use a paper bag cut to fit the roaster) to catch the chaff, large spoon, colander (aluminum is best) 2 is better than one. Of course, don't forget the high quality green coffee beans.

Roasting Coffee

1. Set up your roaster in a well ventilated and well lit area such as under your stove vent hood, or next to an open window. The light is to help judge the color of the beans, and the vent is for removing the smoke. Have all of your accessories nearby, things can happen quickly.
2. Measure out coffee beans the same way the manufacturer suggests for popcorn, usually around 1/2 cup. Roasters vary, as do the coffee beans, so sometimes you'll have to play around with the amount of coffee your roaster can handle.
3. Place lid back on roaster, position the chute over your chaff container and turn it on. After this point **NEVER LEAVE YOUR ROASTER ALONE!** They're devious little suckers and will burn the coffee or your house.
4. A lot of variables come into play here, ambient temperature, humidity, roaster specifications, but in general you should have roasted coffee in 5-10 minutes. The first couple of batches you may want to stand and watch the whole process, smell the different smells, see the colors and hear the cracks. After some practice you'll be able to judge where you are by these indicators.
5. Listen for the cracks. First crack should happen 3-5minutes into the roast, with the second crack following shortly after that. Coffee is drinkable anywhere between the cracks, and sometimes beyond. Play with it and see where your preferred roast level is. Remember, this time it's about you and what you like.
6. A few seconds before your roast level is achieved shut off the roaster and pour the beans into the colanders (careful they are HOT!) stir, toss, do what you have to to cool the beans down. They will continue to cook until cool.
7. Smile, you've just roasted coffee.
8. You can brew your coffee immediately but it's best if you allow the coffee to rest for at least 12 hours. The first couple of hours after roasting the coffee will be off gassing and it's best to leave the coffee in a container that allows it too breath. After the first couple of hours move the coffee to and airtight container until your ready to use it.

Glossary of Common Roasting Terms

Acid, Acidity

Usually, the pleasant tartness of a fine coffee. Acidity, along with flavor, aroma, and body, is one of the principal categories used by professional tasters in cupping, or sensory evaluation of coffee. Acidity in coffee may be described as bright, clear, snappy, effervescent, dry, clean, etc. Coffee without acidity tend to be flat and boring like a flat beer.

Body

Body is a component of the mouth feel of a cup of coffee. It speaks to the amount of soluble solids in the cup and can be heavy or light, thick or thin, full or watery. Mouth feel is used to describe a broader range of characteristics.

Chaff

Chaff is the silver skin that is left on the coffee bean, a remnant of the cherry that once surrounded it. The final bits of chaff are usually released by the roasting process.

Crack

The term crack refers to the actual cracking of the coffee bean during the roasting process.

- **First Crack**

Usually occurs between 390-415 degrees. The first crack resembles the sound of popping corn and is caused by the expansion of the coffee bean.

- **Second Crack**

Usually occurs around 435-450 degrees. The second crack is shallower and quicker than the first crack and resembles pine needle burning or Rice Krispies in milk. The second crack is a fracturing of the cells of the coffee bean and is sometimes represented by small discs being blown off of the beans.

Flavor Profile

Flavor profiles are used to describe coffees. Different methods are used, graphs, spider, ect. All are designed to explain the unique characteristics of the coffee.

Green Coffee Bean

The dried pit or seed of a coffee tree's fruit.

Off Gassing

A process in which the roasted coffee beans release CO₂. Off-gassing is a normal and direct result of the roasting process.

Roast Profile

Term used to describe the relationship between time and temperature in roasting coffee. The color of a roast is not the only indicator of final flavor, the roast profile plays an equally important role.

Notes:

