Coffee Species

Coffee belongs to the botanical family *Rubiaceae*, genus *Coffea*.
This family has some 500 genera and over 6,000 species, but economically *Coffea* is by far its most important member.

The coffee plant is an evergreen, slender and somewhat pyramid-like in shape, whose species range from small shrubs to large trees over 10 metres (30 feet) tall, though they are usually pruned at 1.5-1.8 metres (5-6 feet) to facilitate harvesting methods.
It has broad, lance-shaped, waxy green leaves arrayed in pairs along thick branches which offer an abundance of jasmine-scented flowers in addition to the small, cherrylike berries where the seeds (called beans) reside.

Among the numerous different species within the genus *Coffea*, the most significant for commercial use are *Coffea arabica* (*Arabica* coffee) and *Coffea canephora* (*Canephora* coffee).
Arabica coffee makes up about 60 percent of the world's coffee production and grows best at altitudes higher than 450 metres (1,500 feet) above sea level; high-quality *Arabica* coffee flourishes at altitudes of 900 metres (3,000 feet). It tolerates low temperatures but not frost and requires a little shade to grow.
Typically, this plant is a large bush with dark green leaves; the berries mature in 7 to 9 months.
The beans have a refined flavour and contain about one percent caffeine by weight.
Canephora coffee (which is commonly referred to as *Robusta**) flourishes at lower elevations and, as the name indicates, is a hardy species: it is resistant to disease – unlike *Arabica* - and has a high yield per plant.
Growing as a robust shrub or small tree, berries take up to 11 months to mature.
The beans, smaller than those of *Arabica*, have a less refined flavour and contain about two percent caffeine by weight, twice the content of *Arabica*. This is the species most commonly used as the basis for instant coffees.

Within each species there are different varieties: in addition to the flavour profile of the beans, the variety will have an effect on tree size as well as on the quantity of berries each tree produces.
The most common varieties of *Arabica* coffee are two original purebreds, *Bourbon* and *Typica*, commonly noted for their cup quality, and two hybrids, *Caturra* and *Catuai*, descendants of *Bourbon*. *Caturra* and *Catuai* grow much shorter than *Bourbon* and *Typica* and are therefore much easier to harvest; in addition, they are higher yielding and more resistant to diseases.
Canephora coffee produces many different varieties in the wild. Its two main forms are upright forms called *Robusta*, the most widely grown variety of this species, and spreading forms called *Nganda*.

Another species worth special mention, even if it is grown on a much smaller scale, is *Coffea liberica* (*Liberica* coffee). A large and strong tree, its beans taste similar to those of *Robusta*. *Excelsa* is one of its varieties.

Blended Coffee

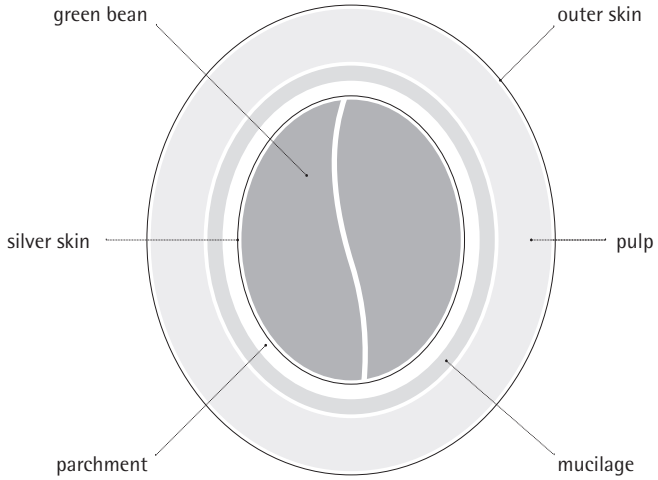
Aside from single-origin coffees, there are also blended coffees, made by combining two or more different types. Blending is a very popular custom amongst coffee producers and restaurant chains as it can create a unique flavour (signature blend) or price-competitive quality. During the process other ingredients can be added to enhance the distinctiveness. Blending is an individual process and quality may vary considerably: a blend can be made by combining anything from two different types of single-origin coffees to dozens of different types.

*not everybody agrees on using *Robusta* as a synonym for *Canephora*, allowing it only for the upright forms of *Canephora*

From the Bean to the Cup

COFFEE CHERRY AND COFFEE BEAN

During the harvest season, coffee trees become laden with bright red coffee cherries. Ripe cherries are slightly larger than a blueberry. The green (or unroasted) coffee bean is the pit, or seed, of the coffee cherry.



There are five layers that surround the coffee bean:
- the outermost layer, the skin of the coffee cherry, is thick, with a slightly bitter flavour;
- the next layer is a sweet-tasting fruit with a texture similar to that of a grape;
- the next layer is the mucilage: this thin, slippery, honey-like layer covers the parchment layer;
- the parchment serves as a protective layer for the coffee bean;
- removing the parchment reveals two bluish-green coffee beans that are coated with a very thin layer called the silver skin.

While most coffee cherries contain two beans, 5 to 10 percent of all cherries contain only one bean. This is called a *peaberry*: a round-shaped bean that forms when one of the two flat-sided beans in the coffee cherry fails to grow. The remaining small bean assumes a rounded pea shape.

PROCESSING

Coffee processing refers to the method by which the fruit of the coffee cherry is separated from the green coffee bean. The three primary methods of processing coffee are washed (wet), semi-washed and natural (dry). Each method contributes to the flavour of the coffee. While the basic steps of each method are similar from country to country, there are many variations based on tradition, environment, geography and machinery.

Washed (Wet) Process

In this processing method, ripe, red coffee cherries are loaded into tanks where water and gravity are used to help pre-sort the coffee. Cherries that are not fully ripe float to the top and are skimmed off. Next, the beans are separated from the fruit but left with the sticky mucilage; they are then washed and moved to a fermentation tank. Following fermentation and a final washing, the coffee is dried on a concrete patio or in a mechanical dryer. This process can take from three days to more than a week, depending on different factors which include climate, altitude and tradition. This process, along with regional characteristics such as soil, tree variety and microclimate, influences the final flavour of the coffee. Washed-process coffees are known for their crisp acidity and refined flavour.

Semi-washed Process

With the semi-washed processing method, ripe coffee cherries are washed, cleaned and de-pulped using small hand-pulping machines. Once the fruit is removed, the coffee bean is washed thoroughly and laid out in the sun to dry. There is no fermentation in this processing method. When the coffee bean has partially dried and is still soft, the parchment is removed and the green coffee beans are spread out again for a final drying. Once dried, the green coffee is sorted and graded before bagging and exporting.

Natural (Dry) Process

With the natural processing method, flavour develops as the cherry dries completely on the bean. After the coffee cherries are harvested, they are dried on patios or tarpaulins before the cherry skin, dried fruit and parchment are removed. Because of the varying degrees of ripeness and different harvesting techniques, naturally processed coffees can be unpredictable and inconsistent. The method can produce berry, spice, cocoa and earthy flavours, and has been used when a lack of water requires an alternative method of processing.

ROASTING

Roasting is a meticulous process that turns hard green beans into flavourful and aromatic coffee beans. There is no set standard in the industry: each roast profile will bring out different flavour, acidity and body notes for each different coffee. The process begins when green beans are poured into heated drum machines. During the roast, beans undergo chemical and physical transformations caused by the heat that affect their size, colour, taste, and smell. When the beans reach their desired roast and flavour, they are released into the cooling tray to prevent over-roasting.

BREWING

The Four Fundamentals

Following these guidelines, together with regularly maintaining brewing equipment (see Brewing Methods section for more information) and using high-quality coffee, will grant a great coffee-tasting experience.

Proportion

Coffee is made when hot water extracts and mixes with the flavour components in ground coffee. The correct proportion allows the extraction of the coffee's full flavours and yields a rich, aromatic cup. Keep the proportion constant, regardless of the quantity you make. The recipe for great coffee is two tablespoons of freshly ground coffee for every 180 ml (6 fl oz) of water.

Grind

All commonly used methods of brewing coffee work in the same way: hot water passes through ground coffee. Among the many variables, the grind of the coffee (the size of the individual particles) is very important. The fineness of the grind determines how much time the water and coffee spend in contact with each other. If coffee is ground too finely, the water stays in contact with the coffee for too long. This results in over-extraction, and the flavour of the coffee can be bitter and unpleasant. If the grind is too coarse, the opposite happens and the coffee is watery (under-extraction). The grind required is determined by the brewing method.

Water

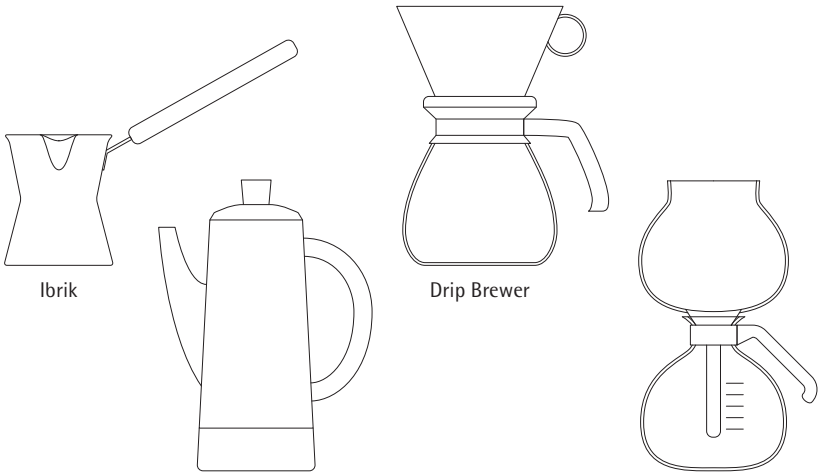
A cup of coffee is 98 percent water. The water you use to brew coffee should taste clean and fresh and be free of impurities. If the water tastes good, it will make good coffee. To ensure good coffee, avoid water from water softeners, distilled water, and any other water with a strong taste of its own. Consider using filtered or bottled water when brewing. Water heated to almost boiling at 91° to 96°C (195° to 205°F) is perfect for extracting the coffee's full range of flavours. When using a kettle to heat water, bring the water to a boil, remove the kettle from the heat for a few seconds, and then pour the water onto the coffee.

Freshness

Think of coffee as perishable. There are simple things you can do that help maintain the quality of fresh coffee:

- store unopened bags of coffee at room temperature;
- once a bag is opened, coffee should be stored in an opaque, airtight container at room temperature to keep it fresh;
- for best results, coffee should be freshly ground just before brewing (whole bean coffee stays fresh longer; by grinding beans each time you brew, the freshness is preserved);
- once brewed, coffee is best held in a thermal carafe (coffee left on the burner of a home machine begins to taste bad after 20 minutes); coffee should never be reheated.

Brewing Methods: main types



Ibrik

Percolator

Drip Brewer

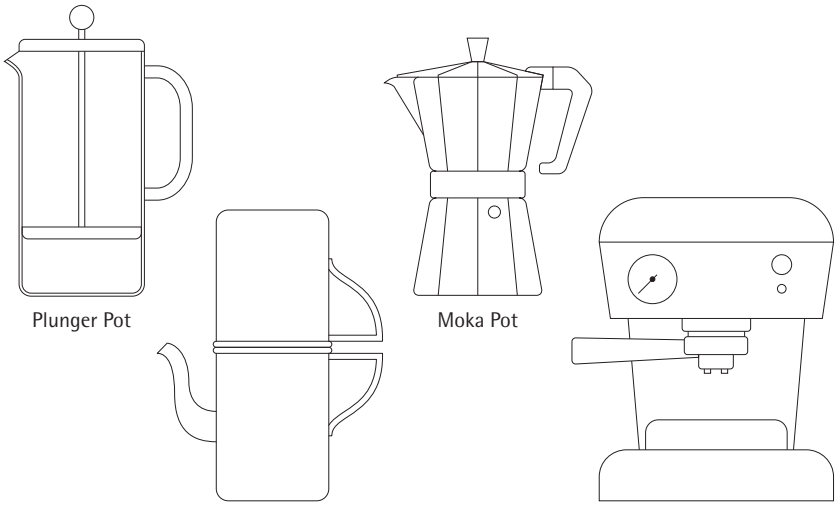
Vacuum Brewer

Ibrik · A small pot with a long handle, it is the first known brewing method and is still very popular in the Middle Eastern countries. Extra-finely ground coffee is placed into the ibrik along with water and sugar (traditionally the proportions are one tablespoon of sugar and coffee to one cup of water for each cup you make). The pot is removed from the heat just before boiling point as a little foam appears on the surface. The pot is brought on and off the heat 3 times. Now the brewed coffee is ready; upon serving, a teaspoon of foam is placed in the cup before pouring the coffee.

Percolator · Invented in Britain in the 18th century, brewing takes place when steam pressure brings water to the top lid through a hollow tube which stands in the middle of the pot. By force of gravity, water drops back down through the coarse-ground coffee held in a basket placed at the top, and down again, mixing brewed coffee with water; this circular process happens a few times in each brewing session.

Drip Brewer · A simple process consisting of pouring almost boiling water over medium/coarse-ground coffee placed inside a filter normally made of paper; by force of gravity the water seeps through the ground coffee to rest at the bottom of the carafe.

Vacuum Brewer · A vacuum coffee maker (also called a Siphon) is made of two bowls. The bottom one is filled with water, and the top one, which has a siphon that sinks into the bottom one, is filled with coarse-ground coffee. Once the water is heated, the pressure pushes the water up through the siphon and into the top bowl where it mixes with the ground coffee. After a few minutes the pot is removed from the heat and the pressure drops. The brewed coffee is sucked down by the vacuum which has now formed; a filter prevents ground coffee from going through. When this process comes to an end, the coffee is ready.



Plunger Pot

Neapolitan Flip Drip

Moka Pot

Espresso Machine

Plunger Pot · This method works by infusion and it normally makes a richer coffee as the coffee grounds and water are in direct contact. The correct proportions of coarse-ground coffee and water are placed inside the container and then stirred and rested for a few minutes. The plunger is then pressed to separate all the coffee grounds from the brewed coffee and trap them at the bottom of the container.

Neapolitan Flip Drip · The Neapolitan Flip Drip is a 3-part pot consisting of a metal filter where finely ground coffee is placed, a water container, and a collection tank. After the water comes to the boil and is left for a few seconds to reach the ideal temperature, the entire pot is flipped upside down to allow hot water to drip through the coffee filter to the collection tank from where it can be served directly.

Moka Pot · An aluminium or stainless steel device made of 3 parts: a bottom tank, a metal filter and an upper tank. Water is placed in the bottom tank up to security valve level, coffee is well packed into the filter, which sits on top of the bottom tank, and the pot is screwed together securely. The near-to-boiling water is brought by pressure through the coffee chamber up to the top tank where the brewed coffee collects. Remove the coffee from the heat and serve immediately to avoid burning it in the hot pot.

Espresso Machine · An espresso machine is used to brew espresso. Hot water is pulled through the ground coffee using either steam, a pump or a piston. The home versions of this machine are typically smaller than the ones found in bars but work on the same principle. The most relevant difference is the way coffee is placed into it: home machines generally use coffee pods or a capsule; with commercial machines loose ground coffee is measured directly into the portafilter. The brewing time is normally 25 seconds.