



Wet process



Coffee processing aquapulping

In the wet process, the fruit covering the seeds/beans is removed before they are dried. Coffee processed by the wet method is called wet processed or washed coffee. The wet method requires the use of specific equipment and substantial quantities of water.

The coffee cherries are sorted by immersion in water. Bad or unripe fruit will float and the good ripe fruit will sink. The skin of the cherry and some of the pulp is removed by pressing the fruit by machine in water through a screen. The bean will still have a significant amount of the pulp clinging to it that needs to be removed. This is done either by the classic ferment-and-wash method or a newer procedure variously called machine-assisted wet processing, aquapulping or mechanical demucilaging:



Sorting coffee in water

In the ferment-and-wash method of wet processing, the remainder of the pulp is removed by breaking down the [cellulose](#) by [fermenting](#) the beans with [microbes](#) and then washing them with large amounts of water. Fermentation can be done with extra water or, in "Dry Fermentation", in the fruit's own juices only.

The fermentation process has to be carefully monitored to ensure that the coffee doesn't acquire undesirable, sour flavors. For most coffees, mucilage removal through fermentation takes between 24 and 36 hours, depending on the temperature, thickness of the mucilage layer and concentration of the enzymes. The end of the fermentation is assessed by feel, as the parchment surrounding the beans loses its slimy texture and acquires a rougher "pebbly" feel. When the fermentation is complete, the coffee is thoroughly washed with clean water in tanks or in special washing machines.

In machine-assisted wet processing, fermentation is not used to separate the bean from the remainder of the pulp; rather, this is done through mechanical scrubbing. This process can cut down on water use and pollution since ferment and wash water stinks. In addition, removing mucilage by machine is easier and more predictable than removing it by fermenting and washing. However, by eliminating the fermentation step and prematurely separating fruit and bean, mechanical demucilaging can remove an important tool that mill operators have of influencing coffee flavor. Furthermore, the ecological criticism of the ferment-and-wash method increasingly has become moot, since a combination of low-water equipment plus settling tanks allows conscientious mill operators to carry out fermentation with limited pollution.

Any wet processing of coffee produces [coffee wastewater](#) which can be a pollutant. Ecologically sensitive farms reprocess the wastewater along with the shell and mucilage as compost to be used in soil fertilization programs. The amount of water used in processing can vary, but most often is used in a 1 to 1 ratio.

After the pulp has been removed what is left is the bean surrounded by two additional layers, the silver skin and the parchment. The beans must be dried to a water content of about 10% before they are stable. Coffee beans can be dried in the [sun](#) or by machine but in most cases it is dried in the sun to 12-13% moisture and brought down to 10% by machine. Drying entirely by machine is normally only done where space is at a premium or the humidity is too high for the beans to dry before mildewing.



Coffee drying in the sun.

When dried in the sun coffee is most often spread out in rows on large patios where it needs to be raked every six hours to promote even drying and prevent the growth of mildew. Some coffee is dried on large raised tables where the coffee is turned by hand. Drying coffee this way has the advantage of allowing air to circulate better around the beans promoting more even drying but increases cost and labor significantly.

After the drying process (in the sun and/or through machines), the parchment skin or pergamino is thoroughly dry and crumbly, and easily removed in the Hulling process. Coffee occasionally is sold and shipped in parchment or en pergamino, but most often a machine called a huller is used to crunch off the parchment skin before the beans are shipped.

Dry process

Dry process, also known as unwashed or natural coffee, is the oldest method of processing coffee. The entire cherry after harvest is first cleaned and then placed in the sun to dry on tables or in thin layers on patios

The harvested cherries are usually sorted and cleaned, to separate the unripe, overripe and damaged cherries and to remove dirt, soil, twigs and leaves. This can be done by [winnowing](#), which is commonly done by hand, using a large sieve. Any unwanted cherries or other material not winnowed away can be picked out from the top of the sieve. The ripe cherries can also be separated by flotation in washing channels close to the drying areas.

The coffee cherries are spread out in the sun, either on large concrete or brick patios or on matting raised to waist height on trestles. As the cherries dry, they are raked or turned by hand to ensure even drying and prevent mildew. It may take up to 4 weeks before the cherries are dried to the optimum moisture content, depending on the weather conditions. On larger plantations, machine-drying is sometimes used to speed up the process after the coffee has been pre-dried in the sun for a few days.

The drying operation is the most important stage of the process, since it affects the final quality of the green coffee. A coffee that has been overdried will become brittle and produce too many broken beans during hulling (broken beans are considered defective beans). Coffee that has not been dried sufficiently will be too moist and prone to rapid deterioration caused by the attack of fungi and bacteria.

The dried cherries are stored in bulk in special silos until they are sent to the mill where hulling, sorting, grading and bagging take place. All the outer layers of the dried cherry are removed in one step by the hulling machine.

The dry method is used for about 90% of the Arabica coffee produced in Brazil, most of the coffees produced in Ethiopia, Haiti and Paraguay, as well as for some Arabicas produced in India and Ecuador. Almost all Robustas are processed by this method. It is not practical in very rainy regions, where the humidity of the atmosphere is too high or where it rains frequently during harvesting.

Structure of coffee bean

