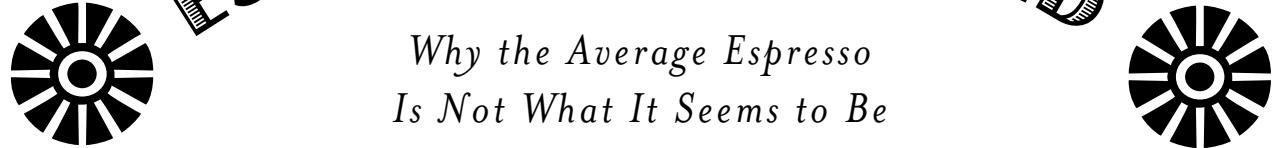


ESPRESSO EXPOSED



*Why the Average Espresso
Is Not What It Seems to Be*

by Dr. Joseph John

When I travel around the United States and spend a few days in a major metropolitan area, I walk or drive around and taste double shots of espresso at local coffee shops. It's not uncommon for me to try 20 to 24 espressos during a typical stay. Of these shops, I usually find one, seldom two, serving decent espresso. Occasionally, these cafés make outstanding espresso, and finding them is like discovering an oasis in the desert. In most cases, they are independents, owned and operated by an individual or a partnership.

Based on such experiences, I have often complained that, unlike in Italy, perhaps less than five percent of all the espresso made in North America is suitable to be consumed "straight." The rest is fit only for milk-based beverages, such as cappuccinos and lattes, invariably sweetened with sugar and flavored with cinnamon, chocolate or syrups. Once, as I lamented the state of American espresso to a roaster in Oregon, he said that Americans "are completely changing espresso, doing to Italian espresso what we have already done to Italian pizza." I happen to disagree.

In the case of pizza, Americans made a significant contribution. We took what was essentially an appetizer in Italy and piled on enough toppings to make it a flavorful entrée. In the case of espresso, we also made it different, but not better. In the process, we lost the very soul of espresso—its ability to communicate the intense flavor of coffee to the person drinking it.

In my opinion, much of what is made and sold as espresso in North America, regardless of whether it is served straight or in milk-based drinks, is not espresso at all. To me, it is brewed coffee made with an expensive espresso machine. Let me explain.

BREWED COFFEE & ESPRESSO

Brewed coffee and espresso share a number of common characteristics, which may explain why many North American practitioners often confuse the two beverages. Similarities lie in the amount of ground coffee used to prepare a cup of brewed coffee or a single shot of espresso, in the recommended brew water temperature range, and in the percent by weight of ground coffee that goes into the beverages.

But there are also important distinctions between brewed coffee and espresso. In the two cases, the amount of water used is different. Since the fraction of ground coffee that is dissolved in hot water is the same in both cases, the espresso turns out to be five to six times stronger than brewed coffee. This difference in concentration is one of the features that separates a well-made espresso from brewed coffee, but it's not the only distinction. There is also a difference in the fineness of grind, because the time of contact of hot water with ground coffee is shorter during espresso extraction than for brewed coffee.

The following table compares the parameters that are key to brewing a cup of coffee and extracting an espresso.

PRESSURIZED WATER MAKES ALL THE DIFFERENCE

To produce a quality espresso requires nearly boiling water at pressures of eight to 10 bars. The production of hot water at these pressures is the primary function of an espresso machine. Unfortunately, these high pressures can be used to force water through the ground coffee too quickly by not grinding the coffee fine enough. In those cases, coffee gushes out of the portafilter spouts. This rapid process extracts only the soluble components of ground coffee, making it—technically—brewed coffee, not espresso.

On one of my many "espresso drive-arounds," I ordered a double shot of espresso from a coffee bar in Denver and was handed a paper cup with about four ounces of coffee brewed using an espresso machine. When I pointed out that the drink took only 14 seconds to make, the apologetic barista said that he could make it in less than seven seconds if he was really rushed. This is not an uncommon occurrence.

In espresso preparation, pressurized water is slowed down by using a finer grind, forcing the hot water molecules to penetrate the interior of the ground coffee particles and drive out their oils, in addition to extracting the solubles. Under the intense pressure generated by commercial espresso machines, oils are extracted from ground coffee, formed into microscopic droplets, and suspended in liquid coffee concentrate. This colloidal dispersion is what makes espresso, espresso. All of the energy packed in the pressurized water must be expended during the emulsification of oils. The resulting espresso oozes out of the portafilter like warm honey instead of gushing out like water. In fact, a quality espresso should consist entirely of crema as it flows gently out of the portafilter spout. The coffee concentrate should slowly separate from the bottom of the crema, somewhat like Guinness Beer separates from the bottom of the foam. The crema should be reddish-brown in color, and it should be smooth, rich, velvety, plentiful, and persistent.

THE SIGNIFICANCE OF CREMA

Crema, or coffee foam, is the single most important indicator of a well-made espresso. First, it signifies that the oils in ground coffee have been emulsified, thereby qualifying the beverage as espresso. Without crema, it is not espresso. Crema markedly impacts espresso's mouthfeel, density, viscosity, wetting power, and foaming ability. Because it captures the intense coffee flavors, crema is as critical as the liquid coffee underneath.

	Brewed Coffee (1 cup)	Espresso (single)
Ground Coffee	7–9 grams	7–9 grams
Water	5–6 oz	1 oz
Brewing Time	3/4 to 4 minutes	30 seconds
Grind	Medium to Coarse	Very Fine
Water Temperature	195–205 deg F	195–205 deg F
Grounds in Solution	18–22%	18–22%
Water Pressure	Atmospheric Pressure	8–10 bars

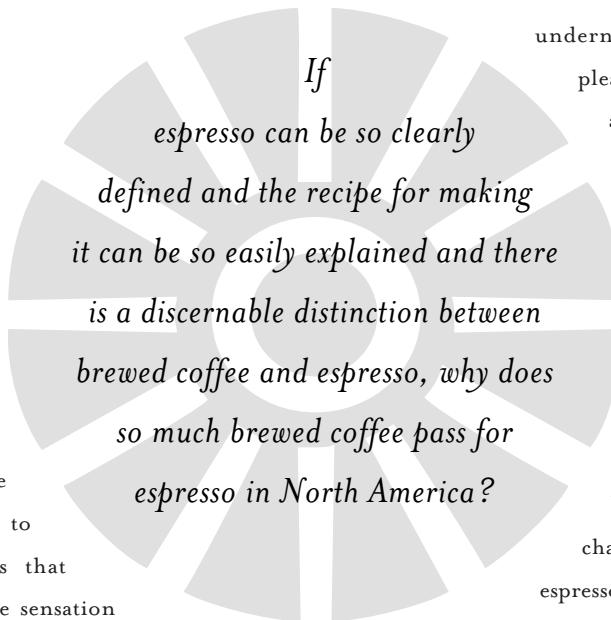
Crema consists of tiny bubbles containing the vapors released by the ground coffee particles during the extraction process. These vapors contain the aroma molecules responsible for the flavor sensation experienced while drinking espresso. Much of that flavor comes more from the aroma sensation in the nose than from the taste sensation in the mouth. The role of crema is to capture that aroma and deliver it to the nose.

PHYSIOLOGY OF FLAVOR SENSATION

Flavor, as sensed by the human brain, consists of two main components: taste, detected by the tongue, and aroma, detected in the nose. Taste is the sensation produced from the water-soluble material extracted from ground coffee. These consist of organic oils and fruit acids whose taste sensation ranges from sweet to sour to bitter, and inorganic mineral salts that account for the saltiness. Aroma is the sensation produced in the nose from the volatile organic compounds released by the ground coffee.

Under normal coffee-brewing conditions, these organic compounds escape into the atmosphere, filling a room with the inviting aroma of coffee. When the oils in ground coffee emulsify, as in the case of true espresso, the formation of the oil droplets happens exactly when the aroma molecules are also released. It is easy to visualize how each bubble consists of a film of oil filled with gases containing these aromatic compounds. As espresso is consumed, these oil bubbles burst in the back of the mouth. They release aroma molecules into the nasal cavity through the pharynx and are detected by the olfactory receptors. That's how we experience the intense flavors of espresso, the intensity of which is greatly missing in the consumption of brewed coffee. The released oils coat one's tongue and limit its ability to detect bitterness. As a result, espresso tastes sweeter than brewed coffee from the same blend of beans.

It turns out that more of the total flavor sensation is derived from the nose—in the form of aroma—than from the tongue, in the form of taste. All the more reason why crema is so critical to the ultimate enjoyment of espresso.



Crema also accounts for the lingering aftertaste that is characteristic of a well-made espresso. The tiny oil bubbles in crema attach themselves to the taste buds and subsequently burst, releasing the vapors contained in them into the nasal cavity. That's why persistence of crema determines longevity of aftertaste. Crema persistence is one measure of espresso quality; a good espresso should have crema that lasts well over half an hour before it breaks

in the middle to reveal the dark coffee concentrate underneath. An outstanding espresso has a pleasant aftertaste that lingers for hours after the drink is consumed.

If espresso can be so clearly defined and the recipe for making it can be so easily explained and there is a discernable distinction between brewed coffee and espresso, why does so much brewed coffee pass for espresso in North America? Some of the blame goes to the poor training of baristi. It's easy to implement small changes in procedure to prepare true espresso, and it will make espresso beverages,

including those laden with milk, carry the real flavor of coffee. For example, using a grinder with very sharp burrs to shave the coffee beans finer and packing the portafilter firmer until espresso extraction is slowed to 30 seconds will produce a beverage closer to espresso than brewed coffee. Using coffee beans that are blended specifically for espresso will also make a significant difference.

Some of the blame must also be borne by consumers, who are still learning about this foreign beverage. But I believe it is our collective responsibility, as coffee professionals, to educate consumers about coffee quality. Remember, just because consumers in North America are not demanding a better espresso does not give retailers license to make an inferior espresso.

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