Drum Roasting vs. Air Roasting?

Nothing provokes more debate in a roomful of coffee roasters than the assertion that air roasting is as good, and in some cases better, than drum roasts. Of course, it’s a hopeless discussion since we are talking about a process where the final arbiter of the result is the papillae of a biased individual (i.e. subjective taste). Taste is not something that can be measured in a lab beaker or by gas spectrometry, or calculated by some formula.

Drum roasting has “conventional wisdom” on its side. It makes sense to any cook who simmers their sauces slowly, or faithfully oils their cast iron, that a drum roast will be inherently better. After all, it is slower, transferring heat to the coffee seed by conduction (contact with the hot drum metal) and convection-radiance (warm airs passing through the drum). That’s a perfect blend of stovetop pan cooking and gas oven-cooking techniques. And commercial drum roasters are big, attractive, expensive, old-world-European-looking machines. Home roasters generally look to small shops perhaps thinking that drum roasting is the technique of choice among the cognoscenti. If you are going to spend 8 hours a day roasting in a shop or warehouse, it’s nice to have some good feelings for the machine you use.

Air roasting has less intrinsic charm, unless you are really into hair dryers. But the roast is easy to observe, the process is “clean” because there is no effluence from atmospheric gas burners, and some variables of the drum process (bean variability and ambient temperature) are less of a factor.

In the commercial world of quality-conscious coffee roasters, you are going to see drum roasting as the dominant technique. Only the Sivetz roaster is available for small-scale, quality air roasting. It is a great machine, but consumes a lot of power, is noisy and fire-prone without good maintenance, and has little aesthetic value. It’s a ballsy move to start a new roasting shop with a Sivetz roaster, and not many sensible people (well, ones who don’t want to lose their lifesavings in a business start-up) will go that route.

On the large-scale end of things, factory roasters have a better mix of air and drum roasters installed, but this doesn’t bode well for the reputation of air machines. Big business likes the throughput of air roasting, which boasts roast times as low as 3.5 minutes in huge quantities, continuous roasting (not batch roasting), and less weight loss. The coffee “puffs” a bit more, the appearance is more even and attractive, and the roasts are very repeatable. It’s real big in Europe, with the firm Neuhaus-Neotec providing most of the equipment.

Air vs. Drum Cupping Results

“Okay, Mr. Sweet Maria’s,” I hear you saying. “Enough background blathering … which is better, Drum or Air?” I casually taste the difference between drum and air roasts every single day. We compare HotTop, Alpenrost and Probat versus the air roasters (Hearthware Precision, Freshroast, Caffe Rosto) at different resting periods, as espresso and as french press, all the time. Cupping the results from a specific roaster on our stock of coffees is a combination of expected flavors, and a surprise for me; the formula that x roast method will heighten y quality, but not fully develop z quality is something I can predict, but there is always something in the cup that defies preset notions. By the time a coffee is on our list, I have cupped it as a pre-shipment and an arrival sample, each time by drum and air roast methods with varying degrees of roast, so you would think this was all rote. But coffee has a way being endlessly counter-intuitive!

It’s hard to make a drum vs. air simplification; drum roasters really can’t be spoken of as one thing – as you will see, the HotTop (perforated drum, radiant heat transfer) cups differently than the commercial Probat (solid drum, conductive and convective heat transfer). Air roasters are more similar to each other in that they all require less time to transfer heat to the coffee charge, but some are more true “fluid-bed” type (Freshroast) while others are hybrid (HWP, Z&D, Rosto).

Anyway, I set up two formal, blind cuppings as a basis for the following comments. The first was our Kenya Auction Lot AA Mika, the second was the Brazil Vargem Grande. I chose these to represent the range between wet-processed, bright coffees (Mika) and dry-processed, low-toned coffees (Vargem). Also, we could evaluate the Vargem as both french press and espresso since it is suited as a straight-roast for both methods.

Here are some descriptive results that show how the roast method influenced the cup character:

Brazil Vargem Grande – Drum Roast

In regular cup testing, the HotTop (17 min.) and the Probat (15 min.) were surprisingly different. The HotTop, with its long radiant heat transfer, was actually fairly bright and light in the top end of the cup, without the development of the deeper tones. The body was good, and the cup was floral and peanuty. The Probat had strongly developed deep flavors of black licorice, black pepper, and bittersweet chocolate. Yes, the HotTop roast was visibly a hair lighter, but not that much. The HotTop was my favorite Vargem cup in this group. As espresso, the aftertaste from the Probat was outstanding in its pungency and chocolatiness. The HotTop was too bright, although the espresso aromas were the best on the table. I liked the Alp. roasts but they were a bit smoky and ashy in this case, so they didn’t score as well as they should have in this cupping.
Brazil Vargem Grande –Air Roast

The Freshroast had a bright and lively cup but lacked the body of the HWP and the Rosto. All had rested for 28 hours after roasting, and the Freshroast (5 min.) body would certainly improve in another day or two. The HWP (7 min.) had a more herbal character than the nutty HotTop roast, but overall I felt this cup was a little dull. Vargem benefits from the longer roast times, and the Rosto (9 min.) had the most body of the air roasts, good balance and aroma, but no notes of interest (herbal, floral, etc.). As espresso, I was surprised that the short Freshroast batch time had such good sweetness in the cup. The HWP had a fresh fruitiness in it that contrasted most with the winy fruit in the Probat roast. This parallels the notion that drum roasts have a more “developed” roast flavor, and risk “overdevelopment” (winier fruit flavors, pungency, smokiness, compression of flavors into the deep end of the cup) if the roast times are too long. Air roast have a brisk, lively roast taste but risk “underdevelopment” (unripe fruit, gassy or baked flavors).

Kenya Mika –Drum Roast

The bottom end, we’ll call it tenor notes, of the cup were nice, and the shirt is nice, but they don’t exactly go together. This was most true with the Probat roast (a surprise), and less true with the HotTop. In either case, the cup was compressed; the top end was muted, the mid-tones and bass where punched up. This was a Kenya cup for those who like the Sumatra Iskandar or Aceh Gold. Body was good in all cups. Once again, the Alp was a bit ashy and I fear I need to clean it better (the one I use is very old and has quite a lot of buildup in it, which might have unpurified the air in the roaster and built up into a neat bundle, but I can’t!). More than anything, the drum roasts failed to fall into a distinct category, and merged with the cup character. They put a spotlight on the Kenya cup quality right where it belongs – to the forefront in the Probat and Alpenrost, not so much in the HotTop. The HWP (7 min.) had a more herbal character than the nutty HotTop and less true with the Rosto. All had rested for 28 hours after roasting, and the Rosto (9 min.) had the most body of the air roasts, good balance and aroma, but no notes of interest (herbal, floral, etc.). As espresso, I was surprised that the short Freshroast batch time had such good sweetness in the cup. The HWP had a fresh fruitiness in it that contrasted most with the winy fruit in the Probat roast. This parallels the notion that drum roasts have a more “developed” roast flavor, and risk “overdevelopment” (winier fruit flavors, pungency, smokiness, compression of flavors into the deep end of the cup) if the roast times are too long. Air roast have a brisk, lively roast taste but risk “underdevelopment” (unripe fruit, gassy or baked flavors).