TASTE TEST

VISIONAIRE UNLEASHES ITS LATEST ISSUE, *TASTE*, CREATED WITH INTERNATIONAL FLAVORS & FRAGRANCES. HERE, WORLD-RENOWNED FLAVORISTS HAVE INVENTED TASTES FOR SENSATIONS LIKE "ORGASM" AND "GUILTY." BUT AS WRITER CHANDLER BURR DISCOVERS IN HIS INDEPENDENT RESEARCH AWAY FROM THE IFF LABS, EVEN THE SIMPLE TASTES FOUND IN THE SUPERMARKET ARE OFTEN A COMPLEX LABYRINTH OF MOLECULES AWAITING OUR UNSUSPECTING TONGUES

Flavorists practice sorcery in bottles. They are laboratory wizards, industrial sensory illusion engineers. They weave flavors from molecules. You thought that delicate black cherry taste of your dessert came from black cherries? Please. It was a collection of molecules reproduced in a factory. And yet it is molecularly identical to natural cherry flavor. The taste of "Youth" in the upcoming *Visionaire Taste* issue uses a cherry flavor imbedded in films of edible polymers of starches and gums. This is what flavorists do: create the most luscious mango you've ever tasted in a yogurt that never had contact with a mango.

They do it, first, by assembling "flavor profiles"—the unique list of molecules that encode the taste of apricots or honey or oysters. (Incidentally, "tastes" are actually ninty-five percent smells. The tongue only senses molecules that give you sensations we call sweets, sours, salt, bitters, and richness. Everything else is sensed with the nasal epithelium—which is to say, it's smelled.) When the mango is distilled, and the molecules that collectively give it its flavor are isolated and listed, then the flavorist's work begins: making a molecular recipe with ingredients from the lab to give you a raspberry flavor you can sell to a yogurt company.

Spearmint is one of the easiest flavors to create. Why? Simple. It has a single characterizing molecule that, by itself, contains the basic taste and smell of spearmint. It's called L-Carvone. If you tasted this molecule you'd say immediately, "Oh! Spearmint." After L-Carvone, you need modifier and enhancer molecules: dihydrocarveol 1 and dihydrocarveol acetate exist in tiny amounts in spearmint, less than one percent of its flavor code, but they're hugely important for a high-quality spearmint. (Are you creating the flavor of mentha spicata, the most common variety in the United States, or mentha cardiaca, found mostly in Europe? Different flavor profiles require different modifiers.) Jasmone, which tastes herbacious and warm, is actually a predominant characterizer in jasmine but has trace amounts in mint. Plus seven or eight others, and you've got the spearmint flavor. (The taste of "Summer" for *Visionaire* contains lemonade and mint. "Exotic" has a molecular construct of mango.)

Is it fake or real? Flavors made in the lab are faked in that they're constructed—and yet they're entirely real. That spearmint taste created by flavorists has exactly the same molecules as the spearmint taste created by the plant. The constructed molecules are called nature identicals. For example, citric acid synthesized in a factory is absolutely identical in every way to the citric acid created in the lemon. No difference. There's a miraculous molecule called acid aldehyde; add it to store-bought orange juice and you'll instantly get that luscious juicy taste of fresh-squeezed orange juice. Why? It's the molecule that gives you that luscious juicy taste in fresh-squeezed orange juice; it simply deteriorates quickly outside the orange, and adding it merely restores the juice to its original form. That's unnatural? No. Ecologically unethical? It's better than the food industry crushing nine tenths of the world's crop to create cherry flavor that could more easily, consistently, and inexpensively be supplied by flavorists. There is a pseudo-religious puritanism that wants tastes to come from a tree rather than a lab. But it's irrational.

Strawberry is slightly more complex. Flavorists nailed ethyl buterate, ethyl balerate, and phenyl ethyl acetate, but they were getting sort of a canned, unappealing strawberry taste, artificial. Then flavorists found one they trade-named fureanol. The synthesis pathway for this thing is simple: you can make it by heating sugar. (When you smell that caramelized sugar smell, you're smelling 4-hydroxy 2-5-dimethyl 3(2H) furanone.) They added it, and suddenly—the flavor of a fresh garden berry. The fureanol "lifts" the other materials, brings them together, and blends them so that nothing sticks out. Crucial for a real strawberry, you also need cis-3 hexenol, which by itself tastes of green grass. And maltol and ethyl maltol, which by themselves at low levels give you cream and at high levels give you the flavor of "cooked." A tiny, tiny amount of geraneol can also be added to strawberry. (It's a big player in the smell of geranium.) Put in too much, with some phenyl ethyl alcohol and citronellol, and you'd start getting rose.

Meats make fruit flavors look like child's play. They're extremely complicated with tons of components. Because we eat meat cooked (and fruit raw), what we think of as meat flavors are actually the molecules in the meat transformed by the heat of cooking that generates thousands of compounds. They give you notes of roasted, cooked, baked. This is incidentally why people like the taste of burned bacon; the burning actually creates new flavors—amino acids, fats, and proteins change into new molecules. A chef who sears a steak is doing chemistry.

You build meat flavors with thiozoles and thiamines (created in meat when you cook it), and rich tastes like dimethyl sulfide (the taste of truffles, which is a flavor in *Visionaire*'s "Orgasm"). Meat tastes include fureanol (the molecule in strawberries), and you need to put in molecules with sulfur atoms in them—meat has trace amounts of sulfur. (These molecules actually get a bit freaky. You can taste trithiolates in meat flavor at parts-per-trillion, which is like having two basketballs somewhere in an area the size of the United States.) You want chicken? There are the poetically named "species specific" molecules. Put in some unsaturated aldehydes, 4-decenal, undecadienal, and tridecenal, and to quote a chef: Boom. Chicken flavor.

There is, incidentally, a sixth sense alongside taste and smell and the others. It's called the trigeminal effect, and it's sensed through nerve endings all over your face, around your eyes, and both inside and outside your mouth and lips. It's the feeling of cool, tingle, heat, and irritation. L-menthol gives you a cooling effect that is trigeminal, not taste or smell. Hot peppers have a smell, and a taste, but the "hot"—an irritant—is neither: it's purely trigeminal. Oleo resin of jambu, a.k.a. bitter kale, is put in toothpastes to give you a mouth-freshening sensation. A lot gives you an electrical effect, which is sort of unnerving.

And then there's coffee. It's simply unbelievable. How many flavor molecules make a really truly decent coffee flavor? Hundreds, but no one knows for sure. The green coffee bean is complex already, but then it's fermented, which (like heating) creates new flavors. Then the bean is roasted, and the thermoreaction creates more new flavors from these new flavors. Everything multiplies by everything else until the complexity rockets outward exponentially. You create a tiny piece of astonishing intricacy, molecules piled on molecules, flavors wrapped around flavors.

And chocolate? (*Visionaire*'s "Guilty," created by chef Heston Blumenthal, has chocolate taste.) Cocoa beans have a lot of fat, which means the process of making chocolate is coffee plus the interactions of the cocoa fat, and if you're making bitter baking chocolate, you multiply all that by the "Dutch process," adding alkali, the last exponent, which creates even more flavor reactions other chocolate doesn't have. Bitter, smoky, sweet, roasted, fermented, smooth, creamy, fatty, dark chocolate. The flavor is, simply, breathtaking. **Chandler Burr**

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For information: www.visionaireworld.com