

Why We Taste Things the Way We Do

Sweet, sour, salty, bitter, and umami (we'll explain in a minute) interact in surprising ways

BY SHIRLEY O. CORRIHER

We tend to use the words “taste” and “flavor” interchangeably, but scientifically speaking, they're not the same. We have physical taste receptors on our tongues and in our mouths for only five primary tastes: sweet, sour, salty, bitter, and the savory sensation called umami, which the Japanese have recognized for decades but whose receptor cells were identified just five years ago.

Taste buds contain clusters of 50 to 100 receptor cells that represent all five tastes. Maps of the tongue that show distinct tasting areas (e.g., sweetness on the tip and sour on the sides) are incorrect. While some areas are more sensitive to certain tastes, we actually have receptors for all five tastes on all areas of the tongue.

Why might we need receptors for these five tastes? In a basic biological sense, a sweet taste rewards us with energy-producing sugars, bitter warns us of possible toxins (naturally occurring toxins taste bitter), salty points out essential minerals, and umami (pronounced oo-MAH-mee) indicates the presence of life-sustaining proteins.

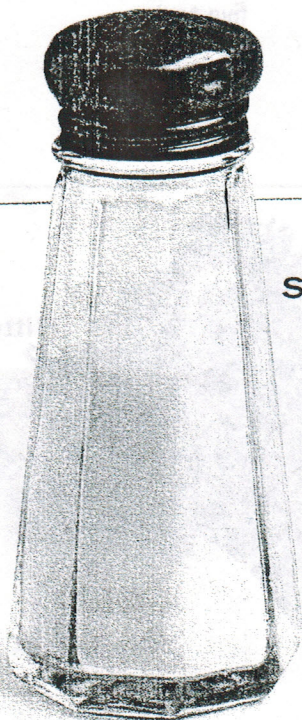
“Flavor” refers to these five tastes plus much more—texture, aroma, color, even physical irritation—all the things that help us recognize a food as being herby, nutty, spicy, fruity, etc. Aroma is key to identifying these flavors, as our sense of smell is much more refined than our sense of taste.

By knowing something about how the five tastes play off one

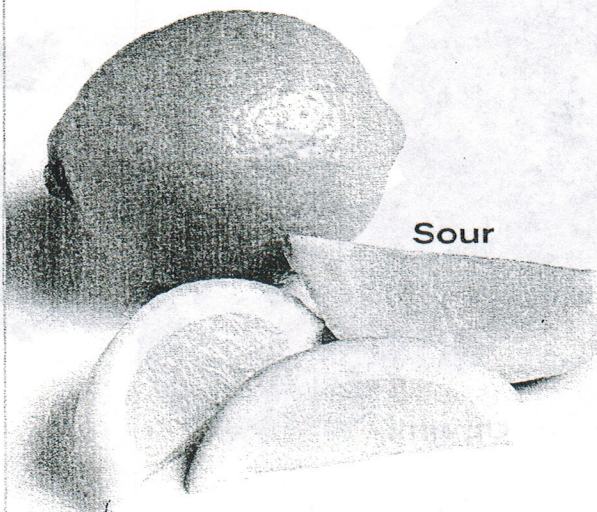
another, you'll become better at manipulating them to make your food taste as delicious as it can.

Salt cuts bitterness, which enhances sweetness

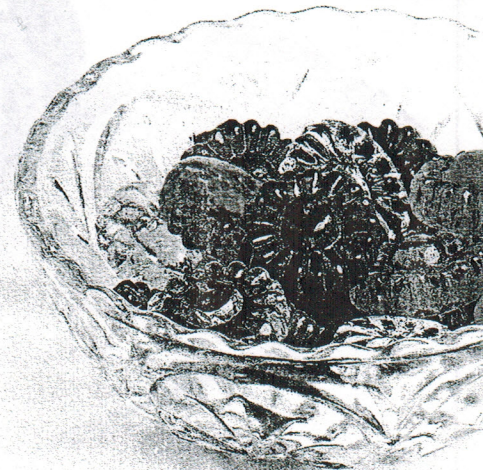
Salt flavors food directly by triggering our salt receptors, but it also influences flavor in other complex and indirect ways. As pastry chefs know, adding a pinch of salt to desserts can actually highlight sweetness. Salt reduces bitterness in a dish, and this magnifies sweetness. To test this for yourself, pour two samples of tonic water, which is both bitter (from the quinine) and sweet (from sugar syrup). Taste one sample straight and add a pinch of salt to the other. The salted tonic water seems to lose its bitterness and taste al-



Salty



Sour



Sweet

most like sugar water. If you've ever sprinkled salt on grapefruit or cantaloupe and marveled at how the fruit seemed to become sweeter, you've tasted this phenomenon in action.

Sugar can draw out hidden flavors

Sugar stimulates our receptors in an interesting way, bringing out flavors that we otherwise wouldn't perceive. Researchers at the University of Nottingham in England demonstrated this by asking volunteers to chew sweetened mint-flavored gum until the flavor was gone. Although the volunteers couldn't taste any mint, the researchers found mint gas was still present in their subjects' nasal cavities. Given sugar, the volunteers said the mint flavor returned. For cooks, the point is simply this: A bit of sweetness can bring out other flavors in food. Just a pinch of sugar in a savory dish can make a big flavor difference. For example, I add a bit of sugar to my salad dressings.

Sour ingredients can correct imbalances

Acids can balance out flavors that have veered too far in a certain direction. You can some-

times rectify a dish that tastes too salty by adding a mild acid like lemon juice or vinegar. These types of sour ingredients can also tame a dish that's too spicy.

Acidic ingredients have a marvelous ability to brighten food—a spritz of lemon or lime often seems to make a dish's flavor come to life. All sour substances have a single hydrogen atom proton that directly triggers our sour receptors. This hydrogen atom is small and reacts rapidly with many ingredients, giving acids their great power to quickly adding to our food.

Umami ingredients build on one another

Just as sugar and salt stimulate certain taste receptors, many foods that contain small protein pieces (such as nucleotides and salts of glutamic acid) stimulate our umami receptors. Umami is hard to describe; it's sometimes referred to as "tastiness" or "savoriness" or "mouth satisfaction." Umami stimulators are abundant in wine, eggs, spinach, ripe tomatoes, mushrooms, soy sauce, and aged cheeses, especially Parmesan, to name just a few.

One very interesting property of umami-tasting compounds is their magnifying effect on one

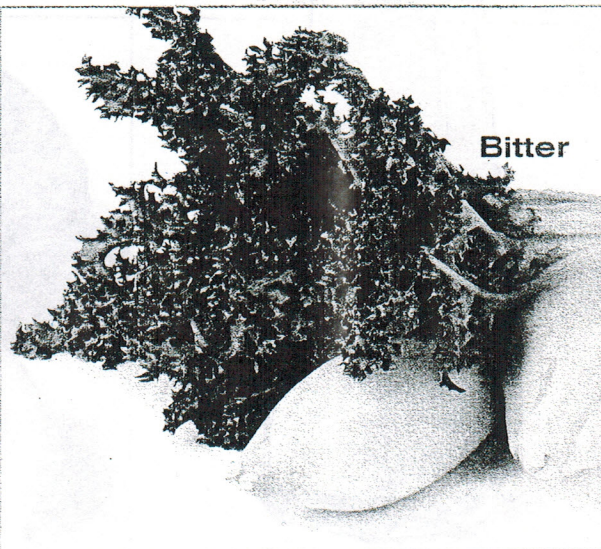
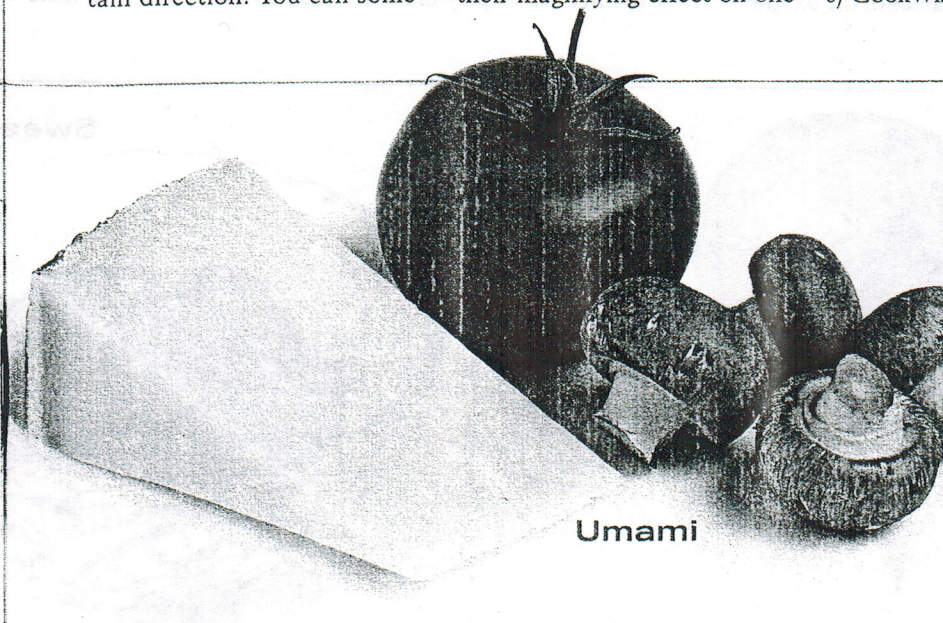
another. Studies have shown that combining two umami compounds produces eight times more flavor than you would get with a single umami compound tasted alone. Put into a culinary context, this means that cooking with, say, either mushrooms or Parmesan will give a dish some umami "tastiness," but if you use mushrooms and Parmesan together, you'll have enormously more "tastiness" than you would get with either ingredient alone.

Opposite tastes attract

Here's one more tip for making food taste great: don't let your taste receptors get bored. As the food scientist Harold McGee has noted, repeated exposure to the same taste causes the receptors to gradually lessen their response to the taste. Variation and contrast are key to keeping our taste receptors stimulated. Playing sweet, sour, salty, bitter, and umami tastes off one another—whether you're serving sweet apples with aged cheese or a sweet-sour sauce for meat—makes physiological sense.

Shirley O. Corriher, a food scientist and a contributing editor to Fine Cooking, is the author of CookWise. ♦

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IN GOOD TASTE

First Session : Teaching Plan

How discriminating is your sense of taste?

Can you taste the difference between a salty peanut and a filet mignon?

Between prune juice and a chocolate milkshake?

What if you couldn't?

Would eating still be enjoyable?

