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For Old-Fashioned Flavor, Bake the Baking Soda

by Harold McGee

Acids are invaluable mainstay cooking ingredients. Lemon and lime juices, myriad vinegars and sour salt, or citric acid, can brighten and balance the flavor of almost any food. But what about their chemical opposites, the un-acids? These are the alkalis, and they're a different story.

The only alkali that most cooks have ever used is baking soda. And about all we do with it is pair it with a neutralizing acid to make carbon dioxide bubbles that leaven pancakes or baked goods. We never use it as a flavoring. It's a mineral, like most alkalis, and it tastes bitter and soapy.

In fact there are a number of equally distasteful alkalis that still manage to create distinctively tasty foods, and they're becoming easier to find. Even lye, an alkali strong enough to double as a drain cleaner, is now sold online and in specialty shops in food-grade form for making pretzels.

You may draw the line at cooking with a corrosive ingredient best handled with gloves. On the other hand, baking soda is too mild to produce the particular flavors and textures that lye can. But thanks to the simplest chemical magic, you can cook up a more muscular and versatile alkali from your cupboard. You just bake the baking soda.

To understand why you might want to do this, consider that an intriguing variety of prepared foods owe their special qualities to alkalis. The unmistakable aroma of corn tortillas, both meaty and flowery, develops from the initial cooking of the corn kernels with the alkaline mineral lime. Mild cocoa powders for hot chocolate are made by treating natural cocoas with alkaline carbonate minerals. The flavor and black color of Oreo cookies come from an extreme version of this process.

Lye is a standard ingredient for making the mild, buttery style of cured olives. It also turns dried cod into the gelatinous Scandinavian oddity called lutefisk. And you can immerse eggs in a lye-salt brine for a week or two and get a version of Chinese century eggs, with solid but startlingly transparent whites and an equally startling aroma.

Acids and alkalis reflect the double nature of water. The water molecule, H_2O, can come apart into a positively charged H^+, or proton, and a negatively charged OH^-, or hydroxyl. In pure neutral water, there are equal numbers of protons and hydroxyls. If you add something to the water that shifts the balance in favor of protons, then the mixture is acidic. If you add something that causes hydroxyls to outnumber protons, then the mixture is alkaline.

Why do proton-hydroxyl proportions matter? Because these charged bits are small, mobile and quick to react with larger, more complicated molecules — changing them and the foods they're part of. Hydroxyls are especially good at breaking fats and oils apart and turning them into soaps. This is probably the reason that alkaline materials feel slippery on the fingers or in the mouth. They're thought to react with trace skin oils and form soaps that then lubricate the surfaces.

Alkaline materials come in different strengths. Lye is especially strong and corrosive because it's a simple combination of sodium and hydroxyls.

A weaker group of alkalis is the carbonates, which include baking soda. The carbonates don't contain hydroxyls. Instead they soak up protons, and release hydroxyls from water molecules.

Baking soda is sodium bicarbonate, which already includes one proton and so has a limited ability to take up more. But if you heat baking soda, its molecules react with one another to give off water and carbon dioxide and form solid sodium carbonate, which is proton-free.

Just spread a layer of soda on a foil-covered baking sheet and bake it at 250 to 300 degrees for an hour. You'll lose about a third of the soda's weight in water and carbon dioxide, but you gain a stronger alkali. Keep baked soda in a tightly sealed jar to prevent it from absorbing moisture from the air. And avoid touching or spilling it. It's not lye, but it's strong enough to irritate.

Baked soda is also strong enough to make a good lye substitute for pretzels. In order to get that distinctive flavor and deep brown color, pretzel makers briefly dunk the shaped pieces of raw dough in a lye solution before baking them. Many home recipes replace the lye with baking soda, but the results taste like breadsticks, not pretzels.

Baked soda does a much better job of approximating true lye-dipped pretzels. Just dissolve 2/3 cup (about 100 grams) in 2 cups of water, immerse the formed raw pretzels in this solution for three to four minutes, rinse off the excess dipping solution in a large bowl of plain water, and bake.

Baked soda (sodium carbonate) is also a standard ingredient in Chinese kitchens, where it's called jian. Fuchsia Dunlop, an expert on Chinese cooking who is based in London, told me by e-mail that jian is added to bread and bun doughs to neutralize the acidity of the sourdough fermentation, in marinades for tenderizing tough meats, and to reconstitute leathery dried squid, which becomes very tender and "slithery."

It's also the defining ingredient in Chinese alkaline wheat noodles. Ms. Dunlop explained that jian increases their springiness and gives them a

distinctive flavor and a refreshing, slippery mouth-feel. It also tints them yellow.

The version of Chinese alkaline noodles most familiar in the West is the Japanese ramen soup noodle. It's normally made with kansui, a mixture of sodium carbonate and potassium carbonate. The New York chef David Chang published a recipe in his cookbook "Momofuku." I experimented with Mr. Chang's recipe, and found that I could get the alkaline noodle qualities with baked soda alone.

I also found that standard bread and all-purpose flours didn't develop much yellow color, probably because refined flours have low levels of the wheat pigments that produce it. I tried making dough with durum semolina, the naturally yellow coarse flour used to make dry Italian-style pastas. The noodles came out less stretchy and with a rougher surface, but they were properly yellow, slippery and full flavored.

This semolina-jian mixture may sound odd, but I think of it as making eggy noodles without eggs, a happy hybrid from the planet's preeminent noodle cultures.

Forrás: http://www.nytimes.com/2010/09/15/dining/15curious.html

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