Photo Courtesy of Kirsten Shockey

CULTURED:
• a guide to •
fermentation

by Maggie Hennessy

Courtesy of Vie

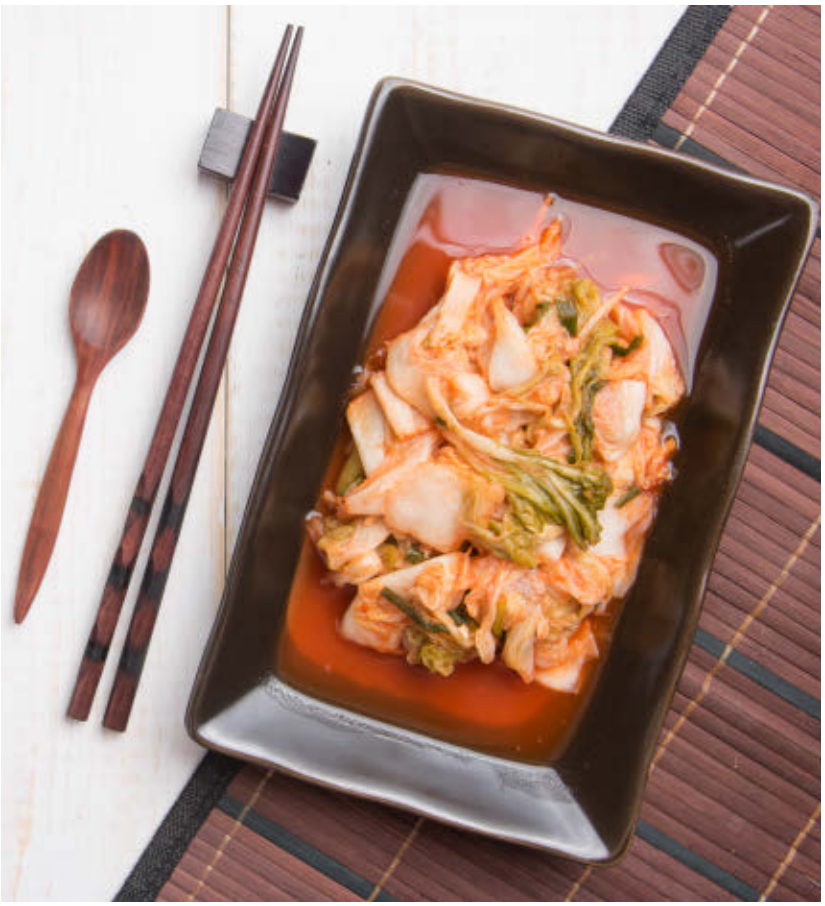


Photo Courtesy of Kirsten Shockey


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From chocolate to cheese, salami, wine, pickles and bread, many of the world's greatest delicacies are the products of fermentation. However, it wasn't so long ago in our antibacterial-obsessed culture that cheesemakers and chocolatiers downplayed the role of bacteria in their processes.

"We grew up with germ theory, antibacterial soap and the mantra, 'Don't leave it out; it will kill you!' — those messages are deep in our psyche," says Kirsten Shockey, co-author with (her husband Christopher Shockey) of *Fiery Ferments* (Storey Publishing, 2017) and *Fermented Vegetables* (Storey Publishing, 2014). That view is changing though, as our culture increasingly embraces live cultures for their health benefits and the exciting flavors they impart.

Fermentation is defined as the chemical breakdown of a substance by bacteria, yeasts or other microorganisms, usually involving effervescence and the emission of heat. For some 9,000 years, humans have manipulated this process to encourage certain strains of bacteria or fungi to grow in vegetables, grains and dairy products to preserve them and add flavor.

Types of Fermentation

The most common form of fermentation is lactic acid fermentation, which is used for making kimchi, yogurt and certain kinds of pickles. Other common types include acetic fermentation (vinegar production) and alcoholic fermentation (occurring in distillation).

"All of the food we eat is populated by various communities of microorganisms, so there isn't just one in play," says Sandor Katz, author of the James Beard award-winning book *The Art of Fermentation*, and a self-avowed fermentation revivalist. "Fermentation is simply a manipulation of scientific conditions to encourage the growth of some organisms and discourage the growth of others."

Lactic fermentation occurs in both sauerkraut and charcuterie, for example, when bacterial enzymes transform protein into amino acids. Moisture is essential to inhibiting bad bacteria in the former but detrimental to the latter. In that case, trapped moisture can lead to spoilage.

Funk is Good for You

Much of the buzz surrounding the health benefits of fermented foods relates to probiotics, a type of good bacteria thought to help with digestion and protect against harmful bacteria. The other half of that equation is prebiotics, which are nondigestible carbohydrates that act as food for probiotics. When the two are combined, they are said to have certain health benefits. For example, fermented dairy products like yogurt and kefir are considered symbiotic because they contain both live bacteria in the form or probiotics as well as the fuel they need to thrive in the form of prebiotics.

Another reason nutritionists remain in favor of fermented foods is that their inherent good bacteria unlocks vitamins and enzymes in other foods that our bodies might otherwise struggle to absorb.

"Fermentation breaks starches down, making them more bioavailable," says Shockey. "You absorb more nutrients consuming fermented cabbage than raw, which is pretty darn cool."

opposite, clockwise from left: 1. Fermenting dried chiles for hot sauce. **2.** Sauerkraut **3.** Kimchi **4.** Sauerkraut, fermented ramps and ruby sauerkraut at Vie in Western Springs, Illinois. **above, from left: 1.** Making a mash, like this one with habanero chiles, is a simple procedure to ferment peppers in preparation for hot sauce. **2.** Mixed small ferments.

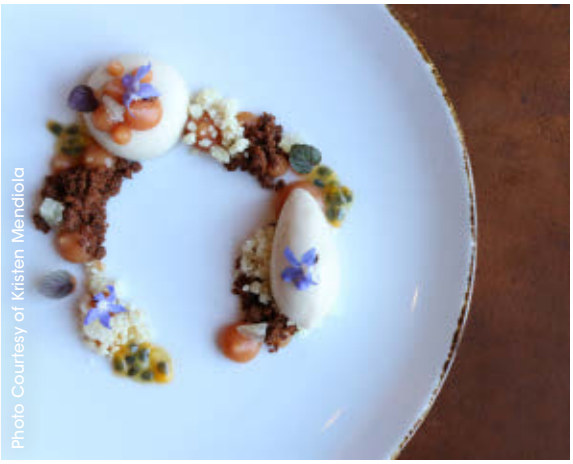

Photo Courtesy of Kristen Mendiola

Photo Courtesy of Kirsten Shockey

Bubbling up on Menus

Chefs around the country are experimenting with live cultures to deliver unexpected flavors on savory and sweet menus. Here are a few of our favorites from around the country.

Baroo, Los Angeles:
Aged caramel corn cappuccino with lightly-fermented, caramelized corn cream, "buttermilked" grape froth, puffed rice and "kimchied" corn and endive

Kitsune, Chicago:
Koji bread with cultured butter, made from sourdough kneaded with shio koji (fermented, mold-inoculated rice)

Emmer & Rye, Austin, Texas:
Dry-aged beef tartare with nine-month-aged eggplant miso, cilantro stems, turnip, radish, onion, salad burnet and egg custard on a puffed Carolina Gold rice cracker

FT33, Dallas:
Hot sauce-cured coppa with carrot romesco, radicchio mostarda and lime juice

Band of Bohemia, Chicago:
Fermented banana cheesecake with macadamia crumble, coconut sorbet, guava-passion fruit gel and lime

above, from left: 1. Band of Bohemia's fermented banana cheesecake with macadamia crumble, coconut sorbet, guava-passionfruit gel and lime sauce. **2.** Salting shiso leaf, pre-fermentation.

Vegetable fermentation is a great gateway to other kinds of fermentation because it's simple to make and, frankly, hard to screw up. "You don't even need a starter — just vegetables, salt, a vessel and time," Shockey says.

Sliced, shredded or mashed produce is submerged completely in salted liquid — by either suspending it in a salt brine or massaging it with salt to release its juices — to create an anaerobic environment that locks out oxygen's entry.

How to Ferment

Paul Virant, author, canning expert and executive chef/owner of Vie and Vistro restaurants in the suburbs of Chicago, has been experimenting with fermented vegetables for over a decade. He ferments whole heads of cabbage for sauerkraut and turnips for kombu. Virant also makes a sweet, funky hot sauce reminiscent of sriracha by fermenting a mash of cherry bomb peppers with local hardneck garlic, carrots and onion. To determine how much salt is needed when fermenting any vegetable, he adds the weight of the produce plus the weight of water needed to cover said produce and multiplies that amount by .025.

Fermentation's initial stage — which takes a few weeks up to a month — is active and bubbly, as microbes consume carbs and push out oxygen by releasing carbon dioxide. The recommended method to enable this process is to store the fermentation in airtight jars or containers, but open them briefly once a day to "burp" your ferment by releasing gases.

Safe Food Fermentation

Once the mixture reaches a pH of 4.6 or below, bad bacteria like E. coli and salmonella can no longer develop or survive. That's why fermentation — specifically acidification — is and was historically regarded as an old-school strategy for safe food preservation, according to Katz. Even still, the process runs counterintuitive to today's food safety regulations and thus requiring the education of individual health inspectors.

"The most basic dogma of food regulation for restaurants in our time states that it's intrinsically dangerous to eat anything that sat for at least hours between 40 and 140

Photo Courtesy of Kirsten Shockey

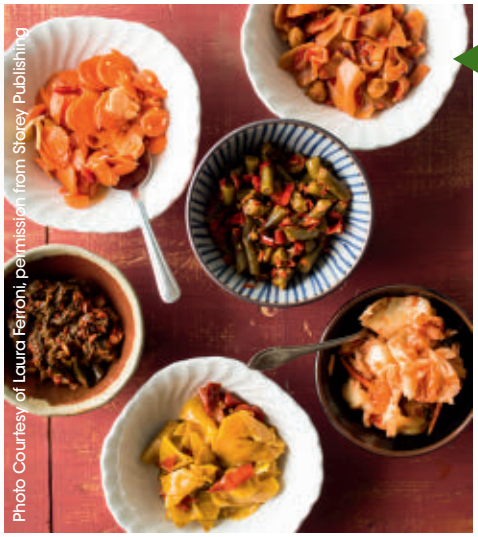

Photo Courtesy of Laura Ferroni, permission from Storey Publishing

degrees F, which suggests that every fermented product is toxic," says Katz. "You constantly hear restaurant stories of inspectors disgusted by the idea of leaving a jar of cabbage out. That's why you need an inspector who is rational and willing to work with you and be educated."

Start by finding out what your state regulations are, and establish clean habits from the get-go. Some chefs, like Virant, have developed HAACP plans to document their safe fermentation practices for health inspectors.

"The dead yeast cells and bloom that can appear on the surface of what's fermenting can look like food that's spoiling so keep that stuff clean and skim it," says Virant, who ferments product in a bucket with the same size bucket fitted over the top. "An inspector might come in and just see a bucket so we'll leave it in there until it stops bubbling, and then we're off to the races."

Indeed, because current restaurant regulations are much more generic than the state-by-state fermentation guidelines in place for manufacturers, it can be tempting for chefs to simply hide it, especially when they're getting started. But skirting the rules won't do this growing movement any favors.

"Some chefs have a rogue style preserving program and maybe that works for them," Virant says. "But it doesn't help other restaurants doing it the right way." ■

Green Bean Kimchi

Excerpted from *Fiery Ferments* (Storey Publishing, 2017), by Kirsten and Christopher Shockey

Yield: about 1 1/2 quarts

- 1 pound **green beans**, cut into 1/2- to 1-inch pieces
- 1 bunch **scallions**, cut into 1/2-inch pieces
- 5 cloves **garlic**, minced
- 2 tablespoons grated fresh **ginger**
- 2 teaspoons good-quality **fermented fish sauce** (or shoyu sauce for a vegan kimchi)
- 1 pound fresh **gochu peppers**, or other thick-walled hot red peppers
- 1 1/2 teaspoons **salt**

1. Combine green beans and scallions in a large bowl. Add the garlic, ginger and fish sauce. Mix and set aside while you prepare the peppers.
2. For a hotter ferment, leave the seeds in the peppers. Otherwise, slice lengthwise, scoop out seeds and discard. Process peppers with the salt to a mash-like consistency in a food processor. Add the pepper mash to the green bean mixture and massage everything together with your hands. Remember to wear gloves.
3. Pack the kimchi into a jar, pressing out any air pockets as you go. Press a resealable plastic bag against the surface of the ferment, fill the bag with water, and zip it closed.
4. Place the jar in a corner of the kitchen to ferment. If you see air pockets, remove the bag, press the ferment back down with a clean utensil, rinse the bag and replace.
5. Ferment for 10 to 12 days. You will know the kimchi is ready when the flavors have mingled and the pungency is pleasantly fused with acidic tones. The red of the pepper will become more orange and the green beans will turn a dull yellowish green.
6. Screw on the lid and store in the refrigerator for 8 to 12 months.

Maggie Hennessy is a Chicago-based restaurant critic, freelance writer and chef. She's been writing about food and drink for 10 years.

above, from left: 1. Finished dried chile ferments. **2.** Green bean kimchi, center right.