

A letter from the Editor:

Dear Reader,

Welcome to the February issue of *Hanna's Happenings*! This issue explores one of my favorite intersections of chemistry and cooking: fermentation.

My interest in fermentation began in 2018, around the time I was starting grad school. I was thoroughly absorbed in chemistry at the time, learning theory, teaching undergrads, and spending long hours in the lab mastering techniques to run reactions under vacuum or in oxygen-free environments.

I suppose I was running so many experiments in the lab that I inadvertently brought the habit home to my hobbies. Fermentation scratches the same itch: you set up precise conditions, step back, and let time do its thing. The main difference is that fermentation workup steps are delicious, and the equipment is considerably cheaper.

That said, I didn't learn fermentation from a textbook. Many of the basic lessons of food safety and preservation came from my mom and other skillful women in my life, long before I knew what *Lactobacillus* was. I also draw inspiration from other cultural traditions and the broader fermentation community online. It's not unlike a scientific literature review. In fact, I often turn to peer-reviewed research to answer my fermentation questions

A quick note before we dive in: fermentation is one of the oldest and safest food preservation methods humans have developed, but it does require some attention to detail. If this issue inspires you to try fermentation for the first time, please do your research and use your judgment when fermenting!

I'd love it if you forwarded this issue to a friend, or replied to share your own projects.

With love,

A handwritten signature in black ink that reads "Hanna Clements". The signature is written in a cursive, flowing style.

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Fermentation Lab Notes | Hanna's Happenings

The Science of Fermentation

Difficulty: Primitive **Verdict:** Microbes do all the work

Fermentation chemistry is driven by *Lactobacillus* and other friendly microbes that metabolize sugars into lactic acid for energy, releasing CO₂ gas (“carbonation”) in the process. The role of the kitchen-biochemist is to keep these microbes happy. Luckily, that’s simple compared to the science taking place in the jar.

The key is providing the perfect environment. For *Lactobacillus* that’s salty, slightly warm, and oxygen-free. These acidic, anaerobic conditions are inhospitable to competing microbes, which is what makes lacto-fermentation so safe.

Wild yeasts are mainly responsible for the fermentation of garlic honey and tepache, and tend to produce sweeter, more alcoholic results compared to the tangy, savory character of lacto-ferments. In practice, the two often happen side by side.

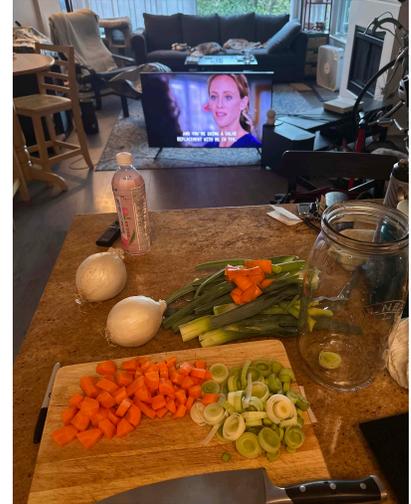
Basic Steps of Home Fermentation

Start with a clean workspace: this matters more than sterilization, which can kill the beneficial bacteria you want. Prepare your produce and weigh it. For water-rich vegetables like cabbage, massage salt directly into the produce at 2% of its weight and let it release its own brine. For drier vegetables, prepare a brine at 2–4% salt by weight (roughly 20–40g per L of water). Any kind of salt, including iodized, is fine. Pack your jar tightly to remove air bubbles, keeping everything submerged below the brine line, and cap with a lid or airlock. Then wait.

My Two Cents

Fermentation rewards careful setup and patience. The active work is minimal; most of the magic happens while you're doing something else entirely. I've optimized accordingly: large batches, kitchen rearranged for maximum *Grey's Anatomy* visibility during prep work, jars lined up where I can keep an eye on them.

The watching-and-waiting is incredibly satisfying once you know what you're looking for. Bubbles mean your bacteria are happy. Cloudy brine is a good sign. Learning to read your ferments takes a few batches, and not all will be successes. Be prepared to toss moldy or otherwise funky ferments.



Experiment I: Garlic Honey

Difficulty: Very easy **Verdict:** Useful and endlessly customizable

Garlic honey was one of my first fermentation projects, and it's one of the easiest. The method is almost embarrassingly simple, which means quality ingredients matter more here than technique. Find the best garlic and honey you can get your hands on, peel the cloves, trim any soft or discolored spots, and submerge them completely in honey in a clean jar. That's it.

The natural moisture in the garlic slowly liquefies the honey and kickstarts fermentation via the wild yeasts naturally present on the garlic's surface. Release the trapped gasses (also called "burping") and gently mix daily for the first week, then leave it alone.

After a month the garlic candies and the liquid syrup thins into something sweet and funky. It's great on pizza or in any sauce that plays well with garlic.

Fermented Honey Variations

- *Hot Garlic Honey* - add fresh or dried chilies to the base recipe for something with more kick.
- *Ginger Turmeric Honey* - replace the garlic to make a curcumin-rich version, delicious with hot water and lemon as a tea.
- *Pink Lemon Honey* - a mix of sliced meyer and pink lemons and honey makes something floral and bright, excellent on yogurt.



Experiment II: Tepache

Difficulty: Moderate **Verdict:** Funky fun

Tepache is a wild-yeast fermented beverage made from pineapple rinds and cores, brown sugar (traditionally piloncillo), and spices. The drink originates from the Nahua people of present-day central Mexico and is a fun treat created from ingredients that would otherwise be food waste.

I use Brad's Tepache as a jumping-off point, but ferment time and spice choice affect the final flavor significantly. It can range from sweet and tropical to funky and beer-like. Taste as you go: pull it when it's pleasantly tangy but still has some sweetness left - usually 3-5 days. Steady bubbling and cloudy liquid are good signs things are progressing.

Tepache is delicious on its own over ice, but also excellent mixed with rum, tequila, light beer, or ginger ale.



Experiment III: Hot Sauce

Difficulty: Easy **Verdict:** Versatile crowd favorite

Making lacto-fermented hot sauce or salsa is as simple as adding peppers and other produce to a ~3% brine and waiting. It's a great way to use produce that's on its way out! For a hotter sauce, tip the ratio toward peppers; for a milder salsa, add more aromatics and other vegetables.

Once fermented, strain and blend (or don't) to achieve your preferred texture. [Serious Eats](#) has a solid primer if you want more detail. Here are some batches I've made:

- *Pineapple Habanero Hot Sauce*
- *Jalapeño "Salsa Verde" with Onion and Garlic*
- *Garlic Serrano Hot Sauce*



Experiment IV: Giardiniera

Difficulty: Easy **Verdict:** My personal favorite

If you read the November issue, you might remember I've been making sandwiches with homemade bread and fermented giardiniera. We ran through that batch, so I started a new one just a few days ago. This time I used a beautiful head of "young cauliflower" instead of the usual mature florets.



My favorite vegetables to include, roughly in order of preference, are: cauliflower, leeks, onion, carrot, garlic, celery. Green beans are also good. Chop everything to roughly the same size, submerge in a 3% brine, weigh it down, and ferment at room temperature for 5–7 days before tasting. When you like the taste, move to a clean jar and store in the refrigerator.

Experiment V: Garlic Ginger Paste

Difficulty: Moderate

Verdict: Worth being patient

Crush garlic and ginger in a mortar and pestle, add salt at 2.5% of the total weight, pack into a jar, and ferment at room temperature for 2–6 months before moving to the fridge. The wait is worth it: the flavor develops into something fresh simply can't match. A fast swap for fresh minced garlic and ginger.

