PDXCU DISTANCE LEARNING

SOURING AND EMPOWERING

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FERMENTATION

Lactic acid fermentation, or lacto-fermentation is a transformative process that preserves food but also fundamentally changes it.

Aside from the flavors created, the probiotics present in naturally fermented foods are linked to health benefits including increasing healthy bacteria in the gut and offering anti-oxidant and anti-inflammatory advantages.

Lactobacillus is a type of lactic acid bacteria - there are different species that do different things but for our purposes and my limited understanding, I'll be using *Lactobacillus* and "lactic acid bacteria" interchangeably and inclusively

Lactobacillus is all around us - and importantly for the purpose of fermentation - all over vegetables.

FERMENTATION

Lactic acid bacteria eat simple carbohydrates and turn them into lactic acid
Therefore
Lacto-fermentation turns sweet flavors sour

This also lowers the pH of the vegetable/fruit/dairy product we are fermenting. By lowering the pH we reap the benefits of acidic foods, in that they are less prone to spoilage because microbe growth is inhibited - our food is preserved and shelf-life increased

Lactic acid bacteria are salt-tolerant and acid tolerant and work anaerobically - in the absence of oxygen.

In the battle of good bacteria vs bad bacteria, we want to create an environment for the good guys to win every time.

Consider - if you leave cucumbers out on the counter for a few weeks, they'll spoil. The color will darken, they sort of wilt in on themselves, they get mushy to the point that your finger goes through it if you try to pick it up. This is bacteria working in an oxygen-rich environment

SO WHAT DOES THIS MEAN FOR US?

- Start with the freshest, best-textured produce we can get our hands on - nothing you ferment will be getting any crispier than it starts off

- Consider and control cleanliness throughout the process

- Create an optimal environment for successful lacto-fermentation
  - Add enough salt to draw out water, keep harmful bacteria from dominating the environment, keep textures crisp, and slow fermentation
  - Create an anaerobic environment to avoid mold growth and assure the success of *lactobacillus*
  - Consider the temperature of the space where you'll be fermenting. You don't necessarily want too much variation between high and low temps - room temperature is generally your friend. There are a lot of opinions that I've seen but most are within a few degrees up or down from 70°F (21°C)
    - The higher the temperature, the faster the fermentation
    - The lower the temperature, the slower the fermentation
      - Youtube - search "The Ferminator" by *ChilliChump*

- Check on ferments at regular intervals. Look for bubbles (carbon dioxide is evidence of successful fermentation underway), feel for texture, observe color change and aromas, ensure that no vegetable matter is exposed to air, smell and taste to decide when it's done!

SUPPLIES

Glass Fermentation Jars or Food Safe Plastic Buckets

•No metal! It is corrosive and can degrade and rust in the acidic environment

•Make sure buckets say Food Safe - otherwise assume they are not! No Home Depot Homer buckets. Not all plastic is created equal.

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SUPPLIES

Fermentation Weights

•You can buy specialized weights for fermentation - these help keep the level of the food below the level of the liquid to make sure mold can’t grow

•In a pinch, fill a ziploc bag with water (or brine in case it breaks) to act as a makeshift weight

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SUPPLIES

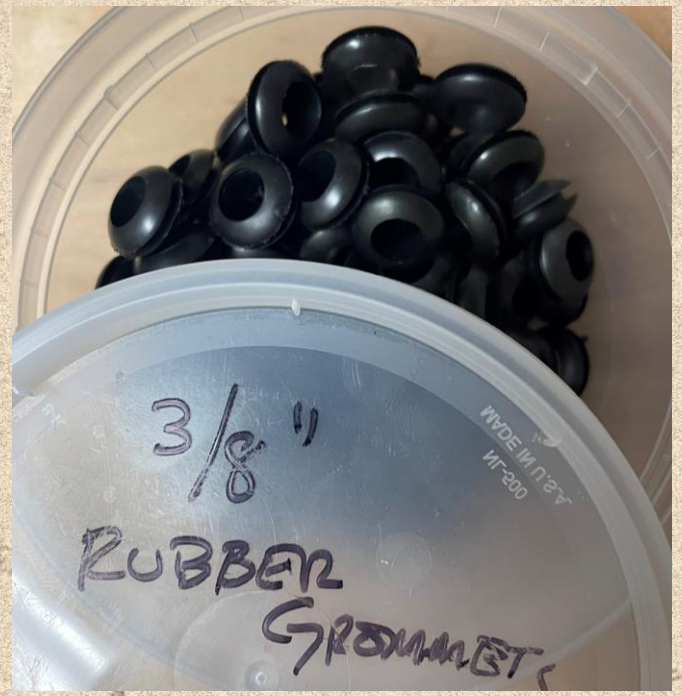
Airlocks

•As carbon dioxide is created in the process of lacto-fermentation, the buildup of pressure can lead to unfortunate accidents. Avoid this entirely with an airlock. Pressure and CO2 can escape, but outside air cannot penetrate the ferment!

•This is not a necessity for successful fermentation - if you choose not to use an airlock, just be sure to “burp” the ferment every day or two to release CO2 and pressure building inside the jar

SUPPLIES

Drill and grommets



- You can purchase food safe 3 and 5 gallon bucket lids, but they don't always have holes for an airlock.

- Grommets should be ⅜" inside and ⅝" outside - you can get 50 on amazon for $7, otherwise they usually come with airlocks

- ⅝" drill bit

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SUPPLIES

Sanitizer

•I use Star-San. It comes as a concentrate - just dilute in a spray bottle

•Food grade, no-rinse sanitizer. Acid based and non-toxic

•Before starting any ferment, sanitize all materials that will come in contact with food to inhibit growth of bad bacteria. The container, weight, airlock, top…

SUPPLIES

EXTRAS

pH Meter or pH Strips

•Only necessary if you are trying to make a shelf-stable product

Painter's Tape for Labeling

•Just like at the bar. Label and date everything! No excuses. Just do it.

Fermentation Journal

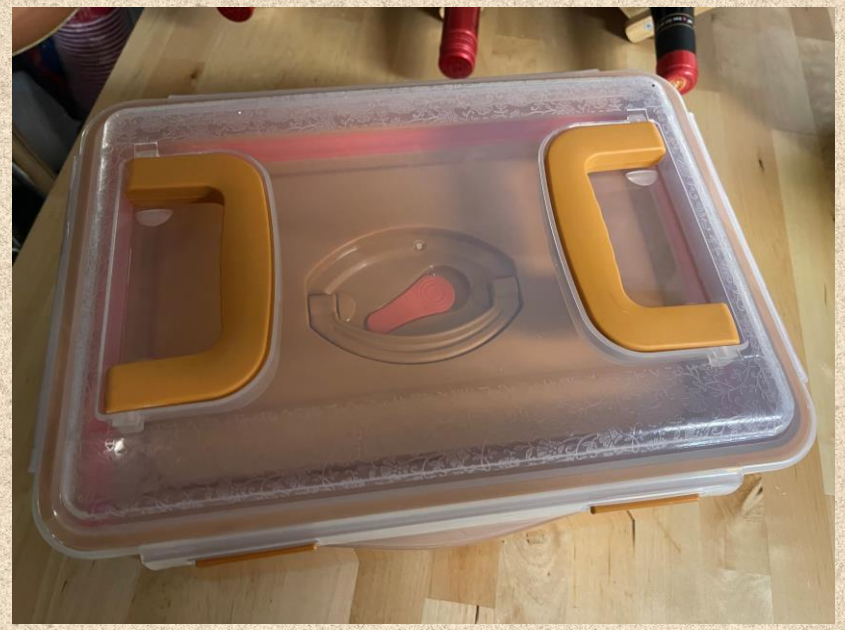
•This is a *whole* different process than cocktail development

•Take notes! You'll want to refer to them later in the process, and to inform future batches

SUPPLIES

KOREAN STYLE FERMENTATION BOXES

- All in one solution! Available in different sizes from relatively small to quite large
- Great for kimchi



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Garlic Sour Pickles - Brickel Method

- I use the produce supplier from my bars to get the best product and price possible.
- 40-50lb baskets of kirby or pickling cucumbers
- Weigh containers and record in fermentation journal - use grams!
- Wash and sanitize containers
- Wash and inspect cucumbers.
- Cut off stem end and blossom end

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Garlic Sour Pickles - Brickel Method

- Add trimmed cucumbers to containers. Don't overfill! ¾ full is plenty
- Add garlic and any other fresh flavoring agents (hot peppers) - whole, chopped, or blended! Add a bit of water to get it moving in the blender
- Weigh full containers and subtract container weight measured earlier
- I use 2% kosher salt by weight of total vegetable matter. Some recipes call for 4%+ brine, but consider that includes the weight of the water. Different recipes call for different salt percentages, but this has worked for me!
- Add any whole dry spices - whole black peppercorns, allspice, clove, cardamom, coriander - or purchase prepared "pickling spice"

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Garlic Sour Pickles - Brickel Method

- My pickles have generally (depending on time of year, average temperature, cucumber quality) been fully soured between day 11-16. What I am looking for is the intersection of best flavor and best texture. I love sour pickles so I know that as they ferment longer and longer, the flavor will still appeal to me - but texture will start to degrade over time. There are generally a few days when I taste them and think they might be ready, but then one day I try them and just know that it is time to pull them.
- Package in plastic quarts or glass jars, cover with brine, and refrigerate! Refrigerating will slow (but not entirely stop!) fermentation, and will further improve the texture. Check pickles for soft spots! If any feel like they have a lot of give, consider throwing them out - or food process into relish for a hot dog
- I do not know exactly how long they last because they've never sat around very long. Refrigerated, it should be able to be measured in months rather than weeks.

CAUTION!!

- DO NOT EAT IF
  - There is any visible fuzzy mold - this likely means the ferment was exposed to too much oxygen
  - The texture is slimy, or the color goes an unappetizing shade of brown
  - The smell is off - it should be funky, sour, garlicky - but not unpleasant.

Hot Sauce - Brickel Method

2 styles that I've tried - **brine** and **mash**

A full water and salt brine needs to be added to cover all of the ingredients in the **brine method**. Generally, 3-5% by weight

When fermenting as a **mash**, all of the ingredients go through a food processor and only salt is added. Natural water leaches out of the vegetables, and it creates its own brine.

Hot Sauce - Brickel Method

- No matter the method, you can use just peppers, but I like adding other fruits and vegetables to vary flavor. Also adding things like onions and carrots supply extra sugar to support healthy fermentation. Mr. Potato Head!
  - Fruit - Peaches, berries, mango
  - Veg - Turnips, fennel, beets
- You can even add frozen, dried or cooked ingredients as long as they make up less than 50% of the total vegetable matter, as there needs to be enough healthy *lactobacillus* on the outside of the vegetables to kickstart successful fermentation.

Hot Sauce Recipe – “Made with Real Apes”

Fresno / Apricot / Carrot hot sauce (half-gallon batch)

Prep all ingredients and add to a cleaned and sanitized half-gallon mason jar. Use gloves and don’t touch your eyes or any other sensitive regions.

Separately - prep enough of a 3% salt brine to cover the veg.

Add brine to cover veg, and use a fermentation weight to be sure that everything is below the brine level, and that there isn’t too much headspace for air at the top of the jar

Apply cleaned and sanitized cover with airlock, and leave to ferment for anywhere from 3-4 weeks up to many months

Check on it every once in awhile - look at the top for mold growth, make sure nothing is floating, smell it, taste the brine

Ingredients:
(washed and chopped into similarly sized pieces)

415g Fresno chilies
75g garlic
200g pitted, skin-on fresh apricots
33g shallot
140g onion
90g carrots
1 dried Carolina Reaper pepper that Josh Seaburg mailed you, carefully ground or chopped finely
.

Hot Sauce Recipe – “Made with Real Apes”

- Check pH to be sure the batch has fermented enough - it shouldn’t be any higher than 4.
  - 3.4-3.7 seem ideal from what I’ve read for safety reasons re: pasteurizing and shelf stability
- Dump everything out into a colander set in a large pot, separating the brine from the vegetable matter
- Blend the veg in a blender or use an immersion blender. Add brine and white vinegar a bit at a time for texture and flavor
- Set up a straining rig - I use a nut milk bag or Superbag set in another clean colander, set over another clean pot - and squeeze all of the liquid out that you can. Be patient and *use gloves* or your hands will <u>burn for hours</u>.
  - Make pepper mash with the resulting dry vegetable matter

Hot Sauce Recipe – “Made with Real Apes”

•Add back to (cleaned) blender or use immersion blender again to blend in ½ teaspoon (for this half-gallon batch) xanthan gum for texture and to avoid separation in the final product. The ratio I’ve used is ⅛ teaspoon per cup of sauce.

- Xanthan gum will help thicken a bit so a drop doesn’t run off your hand
- It will also help keep the sauce from breaking once bottled

•Pasteurize! To stop fermentation, to add shelf life to the product once bottled and for safety reasons, heat the sauce to pasteurize it. Using a probe thermometer, I watch for the sauce to hit 165°F and I hold it there for at least ten minutes

•While pasteurizing, I will wash and sanitize bottles and tops - first with soapy water, then rinsed, and then a spray of Star-San inside and out

•Use a long-spouted pourer to fill bottles, cap, seal, and label

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Kimchi - Brickel Method

- Make sure you have some big bowls/buckets for mixing, soaking and salting - and colanders to help. And make sure your sink is empty and clean!
- Cut napa cabbage. Wash in cold water
- Using kosher salt, salt cabbage liberally and toss. Leave aside, so that the salt begins to draw out moisture from the cabbage. 90-120 minutes total - toss and drain every 15-20 mins.
- Wash salted cabbage again a few times to remove salt

Ingredients

Napa cabbage - large, firm, crunchy heads
Mochiko (sweet rice) flour
Kosher salt
Gochutgaru - Korean red pepper flakes. Available in different heat levels
Kimchi paste:
- garlic
- ginger
- onion
- fish sauce
- fermented salted shrimp (optional)

Optional vegetables to add to kimchi paste:
- scallions
- carrots
- Korean radish or daikon
- chives or Asian chives
- Asian pear

Kimchi - Brickel Method

- Make rice porridge - 2 cups water, 2 tbsp Mochiko sweet rice flour - and bring just below a boil. Add 2 tbsp sugar, mix well, remove from heat and allow to cool
- Chop carrots, korean radish, scallions, Asian chives into matchsticks and set aside
- Puree garlic, ginger, onion, fermented salted shrimp in blender until smooth
- In a large bowl, combine rice porridge, garlic puree mixture, fish sauce, and korean hot pepper flakes (gochugaru) - then add the chopped vegetables to the resulting kimchi paste.
- *Put on gloves*
- A little bit at a time, add washed cabbage to the large bowl of kimchi paste and mix thoroughly to coat every bit of cabbage
- Once all of the cabbage is coated, add it to your (cleaned and sanitized) container
- For a slower fermenting kimchi, you can put the container into the fridge. I like it sour so I leave it out at room temp for 3-4 days before refrigerating

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TAKEAWAYS

Just because they may take more time than we are used to when cooking, doesn't mean fermenting is much harder or time-intensive than making a soup or stew. Just zoom out on the timeline. There is work in the setup and sometimes in the processing, but otherwise it's just keeping an eye on jars and making sure nothing explodes or gets fuzzy.

Fermenting foods and drinks at home taught me to think differently as a creative. When we make cocktails, we are in control of every step of the process. We take ingredients and add other ingredients to make the final product taste how we want. If we want to edit on the fly, we can. And if we mess up, we can dump it, rinse the tins, and try again. Fermenting taught me how to let go of the process a little bit, and approach from a point of view of being creative prior to beginning the process, but then just *letting it happen*.

Resources

The Noma Guide to Fermentation by Rene Redzepi & David Zilber

Wildcrafted Fermentation by Pascal Baudar

The Farmhouse Culture Guide to Fermenting by Kathryn Lukas & Shane Peterson

- Follow on Instagram

@pascalbaudar
@kristenkshockey
@david_zilber
@nomaprojects

- Check out on YouTube

ChilliChump - pepper growing, hot sauce processing
Maangchi - traditional Korean foods including different styles of kimchi