

## Lacto-Fermentation

Fermented vegetable preparations such as sauerkraut, kimchi, and lacto-fermented pickles are an excellent condiment at any meal. They are sour and salty and, depending on what they are flavored with, can complement a variety of dishes. The fermentation process stimulates the production of B vitamins and vitamin C, as well as numerous strains of *Lactobacillus*. Lactobacilli are probiotic bacteria that live in our colon. These organisms help break down food, aiding digestion and assimilation. Eating foods high in *Lactobacillus* will help improve colonies of flora living in the gut, which will improve digestion, absorption, and immunity. Having healthy gut flora can also help improve chronic skin conditions, yeast infections, and seasonal allergies. Fermented foods are easy to digest and provide good nutrition and energy for the body. A condiment-sized portion of some kind of fermented food at each meal is an important and nutritious addition to any diet.

### Sauerkraut

1 large green cabbage (3–5 pounds)

Unrefined salt (mineral salt, sea salt, or kosher salt; don't use iodized salt!)

Other veggies and spices, as desired

Nonchlorinated water

1. Remove the outer leaves of the cabbage and rinse, if necessary. Cut the cabbage into quarters (you can remove the core or not) and slice finely ( $\frac{1}{8}$  to  $\frac{1}{4}$  inch thick).
2. As you cut the cabbage, place it into a large mixing bowl. Each time you add cabbage to the bowl, sprinkle it generously with salt. For this step I usually end up using about 1 tablespoon of salt for every 3 pounds of cabbage.
3. When you have finished cutting the cabbage, add any other vegetables, herbs, or spices that you wish to include and another sprinkle of salt. Begin to mix the cabbage and the salt together in the bowl, squeezing and macerating the cabbage by the fistful. As you continue to toss and knead the cabbage, it will begin to break down, lose its water, and become somewhat translucent. Eventually liquid will drip out of the cabbage when you squeeze it between your hands. This is good—it means that the salt as well as your kneading is pulling water out of the vegetables, which will create the brine that the cabbage will ferment in.
4. Continue kneading for 5 to 10 minutes. The amount of liquid that comes out of the cabbage depends on how long you knead or pound it for, how much salt you used, and how much water was in the cabbage. When you have finished squeezing and kneading, pack the cabbage into a crock or a glass jar. Push the cabbage down and clean any loose pieces from the edges.
5. All vegetable material must be submerged in liquid brine to avoid molding or rotting – any vegetable left sticking to the sides of the jar or poking up above the brine will most

likely grow mold. If the cabbage did not produce enough liquid to submerge all the vegetable material, you will need to add salt brine. To make a salt brine, mix 1 tablespoon of salt with 2 cups of filtered water and mix or stir until all the salt is dissolved. Then pour enough of this brine over the cabbage to just cover it. Place a plate on top of the cabbage and push it down so that the liquid brine rises above the plate and the plate keeps the cabbage below the liquid. I like to place a rock or a jar full of water on top of the plate to act as a weight. Then cover the top with a towel or cloth; this allows air and gas to be released during fermentation but prevents bugs and other contaminants from getting in.

Note: A crock is ideal for fermentation because it has a wide opening, which makes it is easier to fit a plate inside it. A crock also will keep the kraut at a more stable temperature despite fluctuations in the environment. It is harder to use a plate as a weight when you are fermenting your sauerkraut in a jar. If you must use one, just do the best you can to submerge the cabbage beneath the brine.

6. Place your sauerkraut in a cool place, ideally where the temperature does not fluctuate much. You can check on it as often as every day or just every few days. If there is any mold or bloom floating on top or growing on the edges of the jar/crock, remove it. It is harmless—just a result of contact with air. The cabbage itself is fermenting in an anaerobic environment beneath the brine and the salt is preventing harmful organisms from growing. Taste your kraut often to watch how the flavors evolve. It will start to sour after a few days, and the flavor will intensify over time. The fermentation process will happen more quickly in warm weather and more slowly in a cold environment. You can ferment sauerkraut in a cool basement for months, while a batch made and left on the kitchen counter in July may be ready in just a week or two. It is up to you how sour you want it to be.

7. Once the kraut gets to a flavor that you like, scoop it out of the crock, put it into a jar, and store it in the refrigerator. The cold temperature of the refrigerator will slow down the fermentation drastically, so even though it is still a living food, the flavor will not change very much over time.

Notes:

- The more salt you use, the crunchier the cabbage will be.
- Do not use chlorinated or treated water in your brine, as chlorine and chloramine (a similar compound used to treat municipal water supplies) kill *Lactobacillus*. If *Lactobacillus* colonies present in your ferment are not strong enough, then putrefying bacteria will grow and cause your kraut to rot! Iodized salt does the same thing, so don't use that either.
- The leftover brine is delicious, full of *Lactobacillus* and a wonderful digestive aid. You can drink it, use it as a culture starter in your next batch of sauerkraut or lacto-fermented pickles, or use it in soups, stews, sauces, etc.

### Recipes and Variations:

- Use purple cabbage on its own or with green cabbage; the latter makes a lovely purple/pink sauerkraut. Try adding other vegetables such as grated or finely sliced carrots, beets, turnips, and radishes.
- Add interesting herbs and spices! Very traditional German sauerkraut is made with caraway seeds (you don't need much; try adding 1 teaspoon for every large cabbage). I like to make kimchi kraut with fresh ginger and garlic; you can also add culinary herbs such as parsley, oregano, thyme, and sage or spices like cumin and coriander. Be creative!

### Lacto-Fermented Pickles

You can make pickles from any fresh vegetable, although some hold up better than others. Cucumber pickles are classic, but my personal favorites are beets, carrots, green beans, and yellow beans. I also like pickled purslane (see your Cooking with Wild Foods handout in Unit 2) and pickled garlic. I like to use young, tender vegetables (small carrots, small cucumbers, etc.), but you can use larger vegetables and cut them into an appropriate size. These pickles are delicious and easy to make. Once you have them made, they are a great healthy addition to any meal or picnic.

#### For the Brine:

2 cups filtered water

1 tablespoon unrefined salt (mineral salt, sea salt, or kosher salt; just don't use iodized salt!)

1 tablespoon whey, lacto-fermentation brine, or raw apple cider vinegar (optional)

Note: Using a starter like whey, brine, or raw cider vinegar is optional; fermentation will occur whether it's added or not. I usually only do this when I have leftover brine from particularly delicious batch of pickles, kraut, or kimchi!

#### Assemble:

1. Collect the vegetables, herbs, spices, and any other ingredients for your ferment. Wash and chop the produce, if necessary.
2. Pack the ingredients into a clean jar or crock.

#### Add the Brine:

1. Make a brine: Combine the water, salt, and starter, if using. Mix until the salt is dissolved.
2. Pour enough of the brine into the jar or crock to cover all the ingredients.
3. Set a plate with a weight on top of it, or some other kind of weight, on top of the ingredients to keep them submerged in the brine.

#### Cover and Check:

1. Cover the opening with a clean towel or lid.
2. Let the kraut sit in a warm environment where the temperature is not likely to fluctuate.

3. Check the kraut often, removing any mold or scum and adding brine as needed.

One of the by-products of fermentation is carbon dioxide. When you ferment in a container with a lid, carbon dioxide will build up inside the container. So if you're using a container with a lid, you will have to open the lid every day or so for the first few days to release the carbonation that has built up. Some of the liquid brine may bubble over and spill out, so open it over a sink. Once vigorous fermentation has subsided (usually after the first week), you may need to add more brine to cover the vegetable material.

Depending on the temperature of the environment, lacto-fermented pickles will take anywhere from 1 to 4 weeks to cure. When your pickles reach a flavor and texture that you like (they will become softer and more sour the longer they ferment), you can store them in the refrigerator. This will slow down the fermentation process and keep them stable. These pickles will keep for 4 to 6 months in the refrigerator.

## **Fermented Beverages**

### **Sumac Soda**

*This recipe was inspired by my time at Three Stone Hearth, a community-supported kitchen in Berkeley, California.*

Sumac is a small tree, native to the Northeast, with fuzzy red buds that appear in late summer and early fall. The buds often stay on the trees even after the leaves have fallen, adding color to the barren landscape of winter. The buds are very high in vitamin C and have a rich tradition of use for food and medicine by native peoples. I recommend wildcrafting the sumac buds (please refer to your Wildcrafting Guidelines handout on in Unit 2 for sustainable harvesting practices).

Warm, rather than boiling water, is sufficient here to extract the Vitamin C and other principals in the herb. If sumac buds are not available, you may substitute a heaping ¼ cup of rose hips or hibiscus flowers in place of the sumac buds and use the same method of preparation.

This recipe can be easily adapted for any other herb that you wish to make soda from. You can use the same recipe, substituting ¼ - ½ cup of any dried loose herb or 1 packed cup of fresh herb for the sumac buds. I have tried many different herbal sodas; my favorites are tulsi, shiso, ginger, lavender and ginger, lemon, rose hips and hibiscus, lemon verbena . . . you get the idea.

4 or 5 medium sumac buds

½ cup agave nectar or honey

½ cup yogurt whey\*

juice from ½ lemon (optional)

Nonchlorinated water, heated to 80 to 90 degrees Fahrenheit

\*If you do not have access to yogurt whey you can use 1 teaspoon raw apple cider vinegar as a culture starter.

Place the sumac buds in a half-gallon glass jar and add the warm water. Allow this to steep for 8 to 10 hours, or overnight. Then strain the infusion through a fine strainer. Return the infusion to the jar and add the whey, agave or honey, and lemon juice, if you're using it, and shake well. Screw on the lid and let this mixture ferment at room temperature for 2 to 3 days.

After this initial fermentation, it is time to bottle your soda! I like to use glass bottles, but you can use plastic too. Whatever you use, the bottles should have tight-fitting lid. Make sure your bottles and funnels are all very clean.

Pour the soda into the bottles and tightly secure the lid. The soda can be left out at room temperature in a pantry or cupboard for up to a week, during which time it will build carbonation. Or you can refrigerate it immediately and drink it right away. This soda is delicious and a delightful color.

Fermented sodas are alive and will continue to ferment in the bottle. As always, fermentation will be more active in warmer environments. These sodas are not meant to be aged or stored long term. They should be stored in the refrigerator or in some other cool environment (like a basement), where fermentation will be slower. If the sodas are left to ferment for too long (over a month, or less in a warm place), excessive carbonation will build up in the bottle, and then the bottles may explode or the soda may spray everywhere when opened!

### **Beet Kvass**

Beet kvass is a naturally fermented traditional Russian beverage made with raw beets. It is very high in vitamins and minerals and a nourishing tonic for the blood. Beet kvass is alkaline to the body and a great digestive aid. It is a truly beautiful and delicious drink.

3 medium beets, thinly sliced  
¼ cup yogurt whey or fermented beet kvass\*  
1 tablespoon unrefined salt  
2 quarts nonchlorinated water

\*If you do not have access to yogurt whey you can leave it out. Your initial fermentation may take a bit longer.

Combine all the ingredients in a half-gallon jar and shake well, until the salt is dissolved. Leave the lid on and allow the mixture to sit out at room temperature for 2 days, then refrigerate and enjoy. I do not strain out the beets; I just pour the liquid off the top and leave the beets settled at the bottom. When the jar is down to about just 1 cup of kvass left, with the beets still at the bottom, you may refill the jar with water, let it ferment for

another 2 days, and then enjoy this second round of kvass. That cup of leftover kvass will act as a culture starter, and there is still good stuff left in those beets. After two infusions, discard the beets and begin again. You may continue to use 1 cup of kvass as the starter in future batches of kvass in place of the whey.

## **Resources**

*The Art of Fermentation*, by Sandor Katz

*The Forgotten Skills of Cooking*, by Darina Allen

*The Full Moon Feast*, by Jessica Prentice

*Nourishing Traditions*, by Sally Fallon

*Wild Fermentation*, by Sandor Katz