



The Art of Fermentation

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What is Fermentation?

- *“A chemical reaction in which a ferment causes an organic molecule to split into simpler substances” (Collins World English)*
- Converting a Carbohydrate into an acid or alcohol
 - Fermenting yeast converts sugar into alcohol
 - Fermenting bacteria converts carbohydrates into lactic acid
- Fermentation occurs because of anaerobic respiration
 - Living cells obtain energy from carbohydrates in absence of oxygen the fermentation begins
- Natural occurring process under the correct conditions

Most Common Fermentations

- Fermenting with a starter
 - Salt/ whey/ starter cultures used to inhibit the growth of undesirable microorganisms, and adding good bacteria
- Wild ferment; doesn't use a starter, such as pickling
- As these bacteria divide, lactic acid forms which stops the growth of the bad/ dangerous bacteria
 - Lacto fermentation; the lacto portion refers to the bacteria which is also found in fruits and vegetables

The History of Fermentation

- Wine, mead and beer were all made before the science of fermentation was understood
- Louis Pasteur, during the 1850s and 1860s, showed that fermentation is initiated by living organisms in a series of investigations.*

*A dictionary of applied chemistry, Volume 3. Thorpe, Sir Thomas Edward. Longmans, Green and Co., 1922. p.159

Ways to Ferment

- Salt; dissolved in water, or brine.
 - Hardens pectins in vegetables giving more crunch
- Whey; dairy based
- Freeze Dried Cultures
- Fermenting with other fermented foods
- A quart of fermented food will require 1-3 teaspoons of salt and 1/4 cup or whey or 1/4 to 1/2 cup of juices from a previous batch.*

(*<http://www.culturesforhealth.com>)

Benefits of Fermented Foods

- Probiotics; Eating fermented foods introduces beneficial bacteria into your digestive system and help the balance of bacteria in your digestive system.
- Fermenting is like partially digesting food so your body absorbs it more easily
- Balances the acid content in stomach; helps it feel better
- Good for diabetic patients because it is partially digested and doesn't cause extra stress on pancreas (lactic- acid fermentaion)
- Traditional fermented foods produce numerous unknown compounds that destroy and inhibit the growth of pathogenic bacteria.*
- Traditional fermented foods help the body produce acetylcholine*
- You can save money and make it at home

Pickling vs Fermenting

- Pickling involves vinegars which are a product of fermentation and so don't lend anything to the food
- Fermenting allows the food to ferment on it's own, creating it's own good bacteria

Tips and Tricks to Successful Fermenting

1. Use the best quality organic vegetables, fruit, and spices.
2. Use filtered water that is not heavily chlorinated.
3. During the 2-3 days in which you keep the ferments out of the fridge, make sure their environment stays between 65-75 degrees Fahrenheit. Seventy-two degrees is ideal.
4. Follow the recipe.
5. If you are still scared about what might happen, buy an air-lock fermenting lid.

Fermentation at Momofuku

<http://www.thebraiser.com/momofuku-fermentation-labs-video/>

Pickled Cucumbers

4-5 pickling cucumbers or 15-20 gherkins

1 tablespoon mustard seeds

2 tablespoons fresh dill, snipped

1 tablespoon sea salt

4 tablespoons whey (if not available, use an additional 1 tablespoon salt)

1 cup filtered water

- Wash cucumbers well and place in a quart-sized wide mouth jar.
- Combine remaining ingredients and pour over cucumbers, adding more water if necessary to cover the cucumbers. The top of the liquid should be at least 1 inch below the top of the jar.
- Cover tightly and keep and keep at room temperature for about 3 days before transferring to cold storage.

Injera

Makes: 4-6 Injera

Time: 1 day to ferment, about 30 minutes to cook

1 1/2 cups teff flour

2 cups pure water

1/2 tsp baking powder

1/4 tsp salt, or more to taste

oil for pan

- Combine water and flour in a large bowl, mix well. Cover with cheesecloth or a towel and set aside in a warm place for 24 hours. **DO NOT DISTURB!**
- When you are ready to make the injera, stir in the baking powder and salt, taste for saltiness.
- Heat a large nonstick pan with a lid. Coat pan with oil and then pour enough batter into pan to cover the surface. Cover with lid.
- The batter will begin to bubble like a pancake when it's almost done. Traditionally you do not flip to cook the other side of the injera, but you can if you want.
- The injera is done once it begins to crack and curl around the edges, about 5-7 minutes, remove from pan and keep warm in 200 degree oven while you make the remaining injera.

Berberere -- Ethiopian spice mix

¼ C dried red chilis - de-seeded
1 Tbsp paprika
¼ tsp fenugreek seeds
¼ tsp garam masala
1 tsp cumin powder
1 tsp coriander powder
¼ tsp ground cinnamon
¼ tsp ground all-spice
¼ tsp ground cloves
¼ tsp whole black peppers
½ tsp onion powder
¼ tsp garlic powder
½ tsp ginger powder
½ tsp salt

Grind all the ingredients in a spice grinder and set aside. Keeps for a couple of weeks.

Ethiopian Chicken Stew

serves 8

2 teaspoons vegetable or olive oil
3 large onions, diced (or 3 tablespoons dried minced onion flakes)
2 teaspoons fresh grated ginger
2 cloves garlic
1 (14.5-ounce) can diced tomatoes, undrained
½ lb boneless skinless chicken thigh
1 lb boneless skinless chicken breast
¼ cup berbere
2 cups chicken stock
3 Carrots peeled and diced
2 russet Potatoes, peeled and diced
2 cups Kale
1/4 cup fresh lemon juice
8 hard-boiled eggs, peeled

- Heat a large pot over medium high heat. Add oil, onions, garlic and ginger. Cook just until onions begin to brown.
- Add tomatoes with juice, chicken, spices and stock into pot. Cook for 1- 1 ½ hours or until chicken begins to fall apart.
- Add carrots and potatoes into pot, cook for 15- 20 minutes or until potatoes are tender.
- Stir in kale, cook just until kale wilts, about 5 minutes.
- Turn off heat and stir in lemon juice, serve with a hard-boiled egg.

Homemade Yogurt

Makes 4 cups

4 cups (1 quart) milk

3 tablespoons plain yogurt (purchased or homemade)* or powdered yogurt starter (amount specified on package)**

Flavorings such as jam, honey, dulce de leche, molasses, fresh or dried fruit, garlic, herbs, etc (optional)

1. Make sure all your equipment is clean and sanitized.
2. Heat milk to 180 degrees in a pot. Cool the milk to 110 degrees.
3. In a small bowl mix 1 cup warm milk with yogurt, mix just until incorporated, don't stir vigorously.
4. Add yogurt and milk mix back into warm milk.
5. Cover yogurt with a lid and place in an oven with a light on for 5 hours- 24 hours. The longer you let your yogurt sit the more tart it becomes.
6. Serve with fruit granola, etc.

Homemade Granola

Makes about 9 cups.

4 cups old-fashioned rolled oats

1 cup nuts

½ cup dried fruit

¼ cup water

1 cup sugar

¼ cup unsalted butter

1 teaspoon vanilla extract

1. In a large bowl mix together oats, nuts, and fruit.
2. Preheat the oven to 300 degrees and line 2 baking sheets with parchment paper.
3. In a large pot mix water and sugar together, cook over high heat until the sugar turns a light medium amber color. Turn off heat and stir in butter and vanilla.
4. Dump oat mixture into pot, and stir to coat, pour on to prepared pans and bake for 15 minutes stir and bake for 15 minutes.
5. Cool and break into chunks