HERITAGE

Pickling and Culturing

Making Simple Old Fashioned Brined Pickles, Kraut, Kefir, and Other Lacto-Fermented Foods

Written by LAURA WHEELER
FermentaCap.com
Books.FirelightHeritageFarm.com

Cover Art by JESSICA SELLERS
ChrysalisLogos.com

Heritage

Pickling and Culturing

Making Simple Old Fashioned Brined Pickles, Kraut, Kefir, and Other Lacto-Fermented Foods

Written by Laura Wheeler
FermentaCap.com
Books.FirelightHeritageFarm.com

Illustrated by Jessica Sellers
ChrysalisLogos.com

Sponsored by

Fermenta Cap
Compact Airlock Pickling solutions for Lacto-Fermentation
Ferment Without the Fuss!

Use at your own risk. Lacto-Fermentation comes with no guarantees. Conditions and methods vary widely from person to person, even when they are following exactly the same instructions. We offer no guarantee of success.

Table of Contents

Introduction to Lacto-Fermenting
Disclosure and Overview of Tools
Basic Principles and Concepts
Let's Make Pickles!
Try a Batch of Kraut
Get Your Kefir Going
The Tang of Pickled Salsa
Pickling Peppers, Onions, and Garlic
Start Some Sourdough
Take it One Step Further
Long Term Storage of Fermented Foods
Myths About Airtight Fermentation
Don't Bother With Starters
Recognizing Spoiled Foods
What Kind of Insane Person Gives Their Children Alcoholic Beverages?
How to Make Pickled Eggs, Sausage, or Mushrooms
Fermenting for Livestock
About the Author

Introduction to Lacto-Fermenting

When we first started selling a product for lacto-fermentation, we kind of thought that if someone made their way to our website, they had a pretty good idea of what lacto-fermentation was! Turned out, we were wrong!

Some people came in on pickle keywords. Some people had come from other sites that had some really strange information regarding the use of lacto-fermented foods. Some people heard the term associated with health, and wanted more information – information more basic than we had on our site at the time. So we had to start writing!

You will find some information repeated in here (do I need to repeat that? *grin*). The processes of fermentation, and the issues surrounding it are multi-faceted, so it is very difficult to present it in a logical fashion without repeating some things. By repeating them in different contexts, it may make it easier for some people to understand how all the bits interrelate with one another.

A New Term for an Old Practice

It is only the last few years that anyone has referred to pickling, brining, curing, and culturing as "lacto-fermentation". **The label has actually introduced MORE false ideas about these things, rather than making it simpler.**

The fact that the word "ferment" is used, introduces many other misconceptions and misunderstandings, muddying the waters even further.

The practices referred to by this name are ancient. But many things that people think are lacto-fermentation, are NOT.

Traditional Methods

Just because a traditional method of food preservation involves packing something in brine, and letting it age, does not mean that it is a "lacto-fermentation" process.

- **Pickling using a salt brine**, where the vegetables are left in the brine to form a sour vinegary-like flavor, is an ancient practice. This is one that may be correctly referred to as "lacto-fermentation".

- Brining of vegetables, and the brining of meats and fish, are traditional practices, which result in a variety of short term preserved foods. **But the brining of meats and fish are NOT lacto-fermentation processes.** They are salt curing processes that happen to take place in strong salt brine. Brining of vegetables in salt brine, and subsequent curing of them, IS a lacto-fermentation process.

- **Historically, pickles were referred to as a cured product**, and so were salt or nitrate cured meats and fish. But as referenced above, only pickles are a lacto-fermented cured product.

- **Culturing dairy products may or may not be a lacto-fermentation process**, depending on how the

culturing is done. **Yogurt and kefir are cultured products that are lacto-fermented.**

- **Cultured cheeses are generally NOT lacto-fermented products**, because the sugars are removed in the whey when cheeses are made and the cheeses are cultured with specific molds, though some soft cheeses, made from fresh kefir or yogurt, are lacto-fermented foods.

So now that you are truly confused, we need to define what lactofermented foods really ARE.

They are foods which are preserved using a process which encourages the growth and proliferation of lactic-acid bacteria. More on that later... but there is a ton of hoopla right now about lactic-acid bacteria, which is abbreviated to LAB by people who are tired of writing it out.

These foods have been hailed as some kind of holy grail of probiotics by some people, but they are not the only excellent source of probiotics – nor even the BEST one for some people. They are tasty foods, and a lot of people are shocked at the flavor and wonderful texture of home brined pickles, and the crunch and complex flavors of freshly cured kraut. They are a far cry from the soggy canned foods on the grocery store shelves.

Fermented Foods for Healing

Some foods with lactic-acid bacteria are helpful in healing a body with systemic problems which have started as a result of digestive system imbalances or damage. They work principally in the bowel, but have systemic effects (through the whole body) because they aid in restoring good digestion and absorption of necessary nutrients which help your body to function properly and repair itself more effectively.

- Not all fermented foods are healing.
- Not all foods that are helpful for healing are fermented foods.
- Not all foods with lactic-acid bacteria are healthy.
- Not all foods with healthy microbes have lactic-acid bacteria.

Fermented foods can aid in healing. But usually they are not the entire solution.

> **NOTE:** Meats cannot be lacto-fermented. Lacto-fermentation requires carbohydrates. Oils cannot be lacto-fermented. There is no such thing as “Fermented” Cod Liver Oil, and there is NO traditional process which ages Cod Liver Oil (or any fish oil) for human consumption (only for machine oils). It is a scientific impossibility, and not based on any actual history. Sorry to have to even bring this up. But it keeps coming up!

Traditional Use of Pickled Foods

Pickles, cultured dairy, kraut, and other similar foods have been used with most meals in some ethnic cultures, but not in all. This is important to know, because there are sources online that have listed specific types of these foods as an essential part of every meal, and as a “traditional” part of every meal. These sources are not exactly correct in this assertion!

There are a few regional cultures that do habitually use pickles or "sours" with every meal. This tends to be very northern cultures where fresh vegetables were more scarce in the winter, and where fruit was very scarce in the winter. Lacto-fermented vegetables may contain higher amounts of nutrients that are typically found in fruit, so they became an important addition to winter meals especially.

But this is not by any means a tradition in all parts of the world, or even in the majority of the world. Fermentation of vegetables tended to be more prevalent in cold areas, fermentation of milk was more prevalent in hot areas.

The types of brined and cured foods worldwide are staggering in their variety. Their health benefits are deeply debated. I think a lot of whether it heals or harms is due to very individual bodily responses, though there are some kinds of fermented foods for which ample evidence exists, that are NOT helpful to healing the body (I do not tell you how to make them!).

In traditional diets, lacto-fermented foods were merely one small source of probiotics.

Fresh Fruits, fresh Vegetables, raw Dairy... they ALL contain lactic-acid bacteria BEFORE they are fermented, IF they are fresh, and IF they have not been pasteurized or chemically treated. They also contain a host of other healthy, AND HARMFUL bacteria, molds, fungus, enzymes, etc. But... **the harmful ones are NOT in sufficient amounts to cause illness**. They ARE in sufficient amounts to strengthen your immune system by minor regular exposure. Raw and fresh foods contain a BOUNTY of microbes that help your body to heal, function, and protect you.

The process of lacto-fermentation just kills some of them, and encourages others. So you get MORE of some, and LESS of others.

Fermented foods are NOT "better than fresh". They are simply an alternative to fresh, and were traditionally used more when fresh was not available.

You Won't Find Alcohol Here

We never present methods for preparation or production of any alcoholic lacto-fermented food or beverage. These foods and beverages include many that are a surprise to some of the people who think that making a thing from scratch is a safer method than using a commercial version. They are shocked to find that the thing they liked so well is not suitable for pregnant women, or children, or anyone with bowel disease who has been warned about alcohol consumption.

Alcohol does not help heal the body. The higher the alcohol content in a food or beverage, the lower the healthy bacteria. With a high enough and concentrated enough alcohol content, a liquid can be used to kill living cells – it kills healthy and unhealthy bacteria unilaterally.

If you choose to use alcohol, and know you are doing so, then that is your choice. But you need to know what kinds of ferments contain significant amounts, especially if you are trying to heal your body, or if you are one of the many people who has cause to avoid alcohol.

It is kind of a foolish concept to state that you want healthy bacteria, and to take a beverage or food which has a minute amount of it, but which will kill a large amount of the existing microflora in your digestive system. It is

like ripping out a mature producing orchard, and planting two strawberry plants in their place, because you want more fruit!

There is no scientific dispute over the fact that alcohol kills microbes (except for a few strains of microbes that can survive in lower amounts of alcohol), **and there is no dispute that it kills the microbes in your digestive system** – indeed, alcohol is used specifically for killing microbes in medical applications. The stronger the alcohol, the more pronounced the effect.

There is also no dispute in medical circles over the fact that alcohol consumption is harmful for anyone with any digestive disease that involves damage to the wall of the bowel. It has many other harmful effects also, and contrary to "studies" done to support the use of a glass of wine daily, there is nothing that wine can do that grape juice cannot, and grape juice does not have the unwanted negative side effects!

We do not subscribe to the theory that any food is healthy just because it is traditional, or just because it is lacto-fermented, or just because it contains "natural" ingredients. Any of these "reasons" for consumption of that which harms is just plain silly. Plenty of poisons are "natural", plenty have been used "traditionally" before they were discovered to be harmful, and lacto-fermented foods are not blessed with the capacity to be exempt from natural laws by virtue of containing an abundance of a specific variety of bacteria!

There are also people who may need to avoid alcohol for other reasons – medication conflicts, allergies, prior alcoholism or being around someone who must avoid alcohol. The information regarding alcohol in later chapters may be useful in helping them avoid difficulties.

So, our book contains recipes for many healthful foods, and warnings about those that are more likely to contain sufficient alcohol to be above the legal limit for classification as an alcoholic beverage or food, by the US BATF (in other words, it is illegal to sell it without licensing to sell it as an alcoholic beverage or food).

There are plenty of good things to enjoy without taking unneeded risks with your health.

It is our position that pickles, kefir, kraut, kimchee, or even natto, if you can gag it down, and other lacto-fermented foods which do not contain significant amounts of alcohol, are appropriately used in a single context only:

- Eat them as often as you crave them!
- If you crave them with every meal, chances are your body responds well to them on that frequency.
- If you cannot gag one down, chances are, it is not something your body is able to use.
- If you crave them like crazy one week, and can't stomach the thought of them the next week, you are not slacking! There is every reason to believe that your body got enough of what it was short on, and now it needs something else!
- PLEASE do not force your children to eat what they do not enjoy! Introduce a food three times, at three different meals. If they need it, they will adjust to the new flavor. If they do not, then their body does not know what to do with it. Don't berate your spouse for not eating these things either. Let them

choose, because their taste buds know best whether they need it or not!

There is no other sensible rule about when you should have them and when you should not. You will not be healthier if you eat them every day, or every week. You will be healthiest if you eat the wholesome foods that contain lots of good probiotics and lots of good fresh nutrients, that your body craves and wants.

Making these traditional foods should be an enjoyable task, because you enjoy the foods. It should not become a dreaded chore.

Disclosure and Overview of Tools

We Make Fermenta Cap Products

This book is produced as an advertising vehicle. But it is not produced as a one-sided perspective with the aim of persuading you that you HAVE to buy our product to do it right!

You can skip this chapter if you want to get on to the fermentation information. **Or you can read a little about some of our nifty products, and get a little more info on Traditional Fermentation Tools.**

See that simple little orange button in the lid on top of that jar? That is our flagship product. That lid with the button goes on any wide mouth mason jar, and provides a simple and compact airlock, to let gasses out, while keeping air from entering back in. It is efficient, elegant in its simplicity, and **WE INVENTED IT – ours is THE original one-way airlock**. There are a few copycats out there now (that is how good our product is), but this product would not exist in any form if we had not taken the time to figure out how to make a prototype, and then how to make a mold, so we could make this at home. Once we did that, some other companies have taken our design, and sent them off to India or China to have a copycat product made in bulk. **But we have kept right on making this product in the USA, by hand, because we feel this is a more ethical way to make it.** And we didn't have to copy anyone else to do it!

We also make the airlock system for this jar. We drill the glass lids by hand, using a technique that is unique to our business. We developed the airlock valve for Fido Jars, and made the molds to create it just like we did with our first airlock valves for plastic lids.

With both of these products, there is no water level to monitor, no brittle plastic pieces to break, nothing fussy to mess with to clean it. And it does not stick up where it can get knocked off. It just works.

Unlike a water-lock, the air cannot reverse and go back in if the air pressure outside the jar gets higher than the air pressure inside. The valve is designed to TIGHTEN when there is higher outside air pressure, and to LOOSEN when there is higher inside air pressure. So it only lets air go ONE way, even if things go wrong with the ferment or the weather (affecting outside air pressure).

Along with the jars, **we sell glass weights, dunker extenders** (to hold the food down to the edge of the jar), and an assortment of other little gadgets to make lacto-fermentation a simpler process.

But we are not going to try to persuade you that you HAVE to have our products. They make it easier, but you have many options for producing successful batches of pickled and cultured foods. **If you want to use a plain Mason jar, or Fido jar, go right ahead.** If you want to use an old fashioned crock, be my guest. **If you think that a goatskin bag with a horn and cork stopper is the optimal choice, then go for it!** You won't be the first!

Traditional Tools for Fermenting

One of the sources of misinformation online has claimed that “traditional” fermentation was done more in containers that were sealed or buried than it was in containers that were open to the air or just had a lid on them. **This is untrue.**

The truth is that certain foods have always been done covered in one way or another. Other foods have almost always been done in an open container, with the food just held under a brine. A few have been done in leather bags, some done wrapped in leaves and buried, or fermented in closed earthen pots, but not the majority by any means! **There are as many ways to create these foods as there are places where recipes originated.**

Historically, foods were pickled and cultured in a cool, but not cold, environment, more often than in a hot environment. But some were done in hot climates, or in the heat in the summer, and in the cold in the winter. Those that were buried in the ground were more often done that way to control temperature than to seal out air (and it did not seal out air anyway, it just limited air circulation). **Flavors, ingredients, and techniques varied by the kind of conditions that were locally prevalent, and the kinds of foods that were locally grown.**

Root cellars were often the venue of choice for storing pickled foods long term. The temperatures were more stable there year-round than they were in homes or out of doors. Many pickled items were started in the root cellar (indeed, a full pickle crock was not something that was easily moved). Some were started in a warmer environment and then moved to the root cellar.

Modern Pickling Tools

Root cellars have gone the way of the horse and buggy for most homes. Replaced by storage warehouses that store commercial foods until the customer demands it in the grocery store, and by the refrigerator in the

home.

Pickle crocks, goatskin bags, and pottery jugs have also gone by the wayside, replaced by convenience foods delivered on demand in the grocery store aisles. Fortunately, most can be replaced by any clean jar with a loose lid, or, if you want something simpler to manage, a pickling system that takes care of the details for you once your food is inside it (our Fermenta Lock and Dunker Bundle is such a system, and there are many others).

A few of the fermentation bloggers online have done comparison tests between open ferments, and closed ferments with various types of covers (plain lids, airlock lids, cloth covers, etc). Some have shown a higher percentage of mold on open ferments, but I have found that the experiments were often performed incorrectly, with some of the foods left out of the brine, so the results are not highly reliable.

Our customers have indicated that it is simpler to produce a predictable result WITH an airlock, with SOME kinds of foods. Personally, I have found that with pickles and kraut, an open ferment creates foam on top that requires removal and may mold, whereas a ferment done with an airlock does not need to be touched, because it does not tend to form significant foam, and what does form does not mold. But either way can produce good, healthy food.

I have a jar of kraut in the fridge right now, that has not been touched in the three weeks since I packed it in the bottle, and the water is clear, and there is no foam whatsoever on top of the jar – it is packed in a Fido Jar with a Fermenta Lock airlock valve. My sourdough which is on the counter, also has no darkening to the surface, even if I forget to feed it for a day or two.

I participate in making and selling this product, because I believe it has value. I don't just think it is as GOOD as the competition, I believe it is provably BETTER. I use it, and prefer to use it given the choice between it and a standard canning jar lid, because I never have to worry about getting the lid tension right, it just works with no messes, and no fruit flies crawling in when I cannot see them (fruit flies LOVE fermenting smells!), no fussing with water levels or pieces to put together, no foam to skim, easy to hold the food down and weight it with some of our other products. But I do not by any means feel that our product is the only way to do it, and I won't compromise my principles by trying to persuade you that every other method is faulty, and mine is the only “correct” method to produce edible food (there are other companies that go to these lengths... but their information is not accurate, and thousands of years of history soundly contradict their claims!).

Anybody Can Make Lacto-Fermented Foods

The term "fermented foods" applies to many different kinds of foods, which can be loosely classed in several different categories. This can help you know which type of fermentation process works best, and what kind of environment is appropriate for the food you want to ferment.

Fermentation encourages the growth of certain microbes - bacteria or yeasts (that means FUNGUS, or even MOLD - not all mold is harmful), while discouraging the growth of harmful microbes. Those helpful microbes then CHANGE the food - imparting a different flavor, incorporating air bubbles, adding alcohol (if there are simple sugars), extending shelf life, or other changes that people want to impart to their food.

So, we have foods that do really well in an open container, some that do well in open or closed container (they aren't picky as long as conditions inside the ferment are right), and some that are easier to ferment in an airlock system (because they do best in a closed container, but they release a lot of gas, and an airlock system vents more easily). NONE of them require an airtight environment.

Some of the basic classes of fermented foods include:

- **Brine pickled foods** - this includes pickled vegetables of all kinds, pickled salsa, and sauer kraut. These foods either use a salt and water brine to submerge the food, or by adding salt to the food, they create their own salt brine to cover the food. **These are some of the easiest foods to ferment.** They work well in either type of fermenting system as long as you keep the food under the brine.
- **More solid salted fermented foods** - bean paste, hummus, mustard, ketchup, mayo, and other foods which are fermented but do not have a brine on them. **These do best in an enclosed system, though you need to leave plenty of headspace, they can expand quite a bit!** Many people do these successfully in a mason jar, by venting the lid periodically to keep gasses from building up.
- **Cultured Fermented Dairy** - Kefir and yogurt, sour cream, buttermilk, and other milk cultures which are cultured using a specific bacteria or bacteria and yeast starter, and which are grown to encourage the growth of those specific microbes in the milk. These can work well in either type of system, though a closed (but not airtight) system is traditional. Kefir will gas quite a bit, so an airlock helps avoid messes.
- **Sourdough** - Either wild or cultured sourdough starter. Either open or closed works very well for sourdough starter (I've personally used both, with excellent results). If reviving a dried starter given to you by someone else, you may wish to do it in a closed airlock environment, to discourage outside contamination (this is actually NOT a huge issue from the air unless you live in a very moldy environment, most outside contamination comes from ingredients, or improperly cleaned dishes, not from the air). Sourdough does release a lot of gas, making an airlock a nice convenience.
- **Alcoholic Beverages** - Modern brewing is done with an airlock - Traditionally done in open vats, or in a cask with a hole at the top which let out the gasses and much of the foam as the brew expanded. After the initial fermentation, it is sealed up in containers for long term aging, or in the case of ale, used right away. The goal here is to concentrate the alcohol and keep out air loving that would cause it to turn to vinegar (this is NOT the goal with healthy ferments). Alcohol is usually cultured with specific microbial cultures to produce a more predictable flavor, but was traditionally done without that. **There is NO direct comparison in needs between alcoholic beverages and pickled vegetables, because one has a high amount of natural sugars, and the other is fermented in a salt brine.** Those two internal environments are completely different. We do not provide information on creating alcoholic beverages nor do we encourage their manufacture.
- **Water Kefir** - This stuff will brew open or closed. If you want a low alcohol concentration, drain off the grains, and re-ferment the water for several days, in an open or loosely lidded container. This diminishes the alcohol content and gives it a vinegary flavor and smell. **If you keep it in a closed container, it WILL become alcoholic.** "Tests" which purport to show otherwise were improperly conducted, invalidating the results. It becomes most alcoholic when fermented with fruit juice (you just made hard cider, folks!).
- **Kombucha** - Kombucha is fermented in an open container until the Scoby is established, after which it can be fermented in an airlock. Kombucha is another thing which we do not ferment ourselves, nor do we provide further information on doing so (it is mentioned here because of the number of requests we get regarding which type of cap to use). **Kombucha that is fermented with SUGAR or ANY carbohydrate based sweetener (honey, molasses, agave, fruit juice, etc), IS alcoholic.** It becomes most alcoholic when combined with fruit juice (more hard cider!).
- **Vinegar** - Traditionally done in an open fermenting container. Vinegar, once it is finished fermenting, is stored in an airtight container. Vinegar goes through an alcoholic phase, and then the alcohol diminishes as the sour vinegary aspect increases. It may be fermented for 2-3 weeks initially, with an airlock (which can lessen the amount of alcohol in the alcoholic phase), and then open fermented to finish (the alcohol converts to acetic acid best in an open environment because it requires air).

The type of environment a fermented food requires depends upon the needs of the food during fermentation, and upon the end goal.

Once you can do one food from a fermenting group, you can easily do another from the same group. Even between all of the groups, a similar set of skills and conditions are required for the majority of the tasks involved, so it is not difficult to learn to make pickles if you have made kefir, etc.

The whole argument over whether you have to have an airlock system to properly ferment foods or not is pretty silly really. Some things REQUIRE open air, some do better in a closed system, but none of them require an airlock. It is just a matter of convenience for those things which do better in a closed system but which gas a lot during the fermentation process. It helps to not have to keep venting the jar.

Frankly folks, we'd love to sell you our airlock cap. But we'd much rather give you the facts and retain our integrity than to leave out half of the truth in an attempt to persuade you to buy our product. **If you want convenience, good tools can help make the process easier and a bit more predictable. But if you just need to get good food onto your table, just DO it, and don't feel guilty because someone is trying to persuade you that you have to spend a boodle to do it right! You don't.** Just follow the longstanding rules that humanity has practiced for thousands of years, and you'll be able to turn out healthy and invigorating foods that you and your family can enjoy for months.

Happy pickling!

Basic Principles and Concepts

Preservation Processes Simplified

Warning! This topic is NOT complicated, but it does have different parts, because some types of foods are fermented in one way, some in another way, and a few can be done in more than one way. So we'll try to cover the basics in as simple a manner as possible.

Fermenting foods introduces healthy microbes into the food, which sometimes preserves the food for an extended period, but sometimes is done for reasons other than preservation. The microbes consist of an assortment of bacteria and yeasts. When it is done properly, the healthy ones grow faster than unhealthy ones and keep the unhealthy ones from populating significantly. For more on good and bad microbes, read this article: Good Germs, Bad Germs

Other terms commonly used for fermented foods include:

- Cultured
- Cured
- Pickled
- Brined

We do NOT advocate or provide information on making alcoholic drinks - we do provide information on not ACCIDENTALLY making such foods! (I know... I said that before. I'll probably say it again.)

Commonly fermented foods include:

- Sauer Kraut
- Pickles (old fashioned brined pickles do not use vinegar)
- Vinegar
- Milk cultures such as kefir, buttermilk, and yogurt
- Salsa
- Kimchee
- Mustard
- Ketchup
- Many types of condiments
- Bread yeasts (including wild yeast made without store bought yeast)
- Hummus, Natto and other bean ferments

Many of these are traditionally fermented foods. Most fermented foods end up with a pickled flavor, and may taste like they contain vinegar even when they do not.

Most fermented foods follow a basic set of processes and rules:

1. Use clean containers and utensils, and clean your produce with water (vegetable detergents are not helpful, they inhibit microbial growth).

2. Prepare the food - peel, chop, crush, mix items together, etc. WARNING: If the food has spoiled bits on it, soft spots, or other signs of decay, do not use it (if there is visible mold, there is too much invisible mold growing where you can't see it). You need fresh food with no signs of mold or rotting, or you'll spoil your ferment before it even gets started.

3. Either pack it into the jar so there are no air bubbles, or submerge the food in salt brine. Exception: wild

sourdough yeast is simply mixed in a jar, and milk ferments are just dumped in the jar.

4. Solid foods that do not have liquid above the surface should be close fermented with a lid on the jar. Brined foods may be open or close fermented (closed fermenting may take a little more attention if you don't use an airlock system, so pressure does not build up). Vinegar requires open fermenting.

5. Leave plenty of headroom in the jar, so the food has room to expand. Foods will typically increase by 25-30%, but some increase as much as 50% in the fermentation process. The THICKER THE FOOD, the MORE it expands.

6. During the initial fermentation period, make sure the food stays under the surface of the liquid if it is a brined food (use something to hold it under the brine if needed – glass weights and an extender is the simplest method, but you can also use other weights, ziplock bags of water, or other common methods).

7. DON'T MESS WITH IT! Leave it alone and don't stir it, don't open the cap, don't repack it, just leave it alone for at least 3-5 days (or however long the recipe calls for).

> **Exception #1: Non-airlock close fermented containers should be vented as needed.** This does NOT mean opening the top! It means loosening the lid until you hear it hiss, and tightening it back a little when it stops hissing. The top of a canning jar lid won't pop down when pushed if it needs vented.
>
> **Exception #2: If you are making sourdough starter or Amish Cinnamon Bread starter, then you need tend to it as directed in your instructions.** If you are making wild yeast, it is important to open it and stir it daily during the initial fermentation period to help with the propagation of yeast in the starter. That is not important once it gets going.
>
> **Exception #3: If you are using a process that causes foam to build on the top of the ferment, you may need to remove it** if it covers the entire top of the ferment.

NOTE: During the beginning of the process, the ferment won't have much odor, but by the second or third day, you should start to smell a vinegary, pickly smell (or other smell characteristic of the product you are making). **If it lacks that smell, after four or five days, and especially if the water has gone unevenly cloudy (iodized salt may cause a little bit of even opacity to the water, this is more clumpy looking), or if the vegetables have started to feel slimy, or if the top layer has gone nasty gray, throw it out.** This isn't likely to happen if you follow the directions, but the best of us push the limits sometimes and find out the hard way just where they are!

8. When the food has reached the desired degree of fermentation, move it to a long term storage area (most recipes recommend when to do this). Store the container in a cool, dark place - a refrigerator is good, or a cool root cellar. (Unless the food calls for other types of storage.)

9. During storage, DON'T FUSS WITH IT! If you need to remove some to use it, do so, but don't mess with it a lot. After removing some food, submerge the foods again, and reapply the lid, tightly. Don't bother repacking it into smaller jars as you use it (this is encouraged by companies that want to sell you lots of different sizes of expensive jars, but it exposes the food to more air to repack it than it does to just push it down into the jar again, and close it up).

10. Make sure you clean your hands before getting foods out, and use clean utensils. It can be really difficult to keep the kids from getting into the pickle jar with their fingers, but it helps the food last longer!

11. Use your eyes, and your nose. If something does not look or smell like food, don't eat it. Throw it away instead. Don't try to salvage it. Your compost will appreciate it, but your stomach probably won't.

12. Do not freeze, or can your fermented foods if you want them to contain good probiotics. Store them in a cool place instead.

Some foods do require specific temperatures to incubate cultures, but most pickled foods do not. Some won't do well in summer heat - in fact most don't, though you can culture yogurt in the summer without an external heat source if you live in a warm climate. Most pickled items were fermented in a root cellar in previous centuries, where the temperatures were fairly cool, allowing for a long slow ferment. A root cellar is typically warmer than a fridge, but cooler than room temp, and many ferments thrive in that range. The top of the fridge provides a warmer place to culture foods that like a little extra warmth in the winter time. Pay attention to the way your recipe says to do it, and find a spot that meets the general requirements.

Fermenting foods can be a lot of fun. There's a real thrill in biting into a pickle that started out with a few simple ingredients, and turned into something that does not taste like any of the ingredients you put in, but which is simply delicious. Fresh cultured foods are not like the embalmed grocery store versions, they are crisp and lively in flavor and texture.

So follow the rules to enjoy healthy fermented foods. And have some fun with it!

Theoretical Nutritional Myths

The world of lacto-fermentation has been a hotbed of perpetuation of myths regarding nutrition, as people who profit from the industry rush to capture every new nutritional theory and bend it to make fermenting the answer to all the nutritional ills of the world.

First of all, let's get two things out of the way:

1. Phytates and Oxylates.
2. Anti-nutrients.

Someone did some work in a test tube, and claims that their results show that foods with phytates or oxylates are harmful to the health. All work was done in a test tube, and the work is **accompanied by a disclaimer that says something to the effect of, "We just did this in the lab, not in the human body, and we don't really have any idea whether the results would be the same in the human body, or whether it has some means of compensating for this effect that we have not yet studied." No further studies have supported the theories**, no further studies have suggested any harm or correlation of these things with any particular nutritional deficiency or health problem.

Now... there is anecdotal proof that HIGH oxylates (we mean VERY HIGH, to the point where they burn your tongue if you eat them UNCOOKED), are harmful. This is not in dispute. **But there is no evidence whatsoever that the amounts of oxylates in commonly consumed foods have any kind of negative effect within the human body**, and they are in so many green foods which have been incorporated into our diets for thousands of years, that you'd think that the body would have a means of compensating for them, right?

Sorrel and Purslane are two wild greens that are high in oxylates, and they taste sour. The sour flavor is in part due to the oxylates in the food. You can eat it raw, and if you eat very much, your tongue will get sore, and prompt you to stop eating it (like salt and vinegar chips!). But you have to eat a LOT... far more than you'd usually eat using these foods as an addition to a salad, or in other NORMAL uses. And when you DO over-eat these items, your body tells you that you've had enough! **The body has a NATURAL built in alarm system that tells you when you are getting too much oxylates, and it makes you stop eating them!** So you don't need to worry about it. **You can't eat too much without KNOWING you are eating too much! Your tongue tells you!**

Same goes for phytates – the body has natural methods for compensating. Phytates were unheard of until recently. **The foods they are found in are usually cooked, often sprouted, but some are not, simply because they contain insignificant amounts of anything harmful.** How can entire classes of foods which have been safely consumed by healthy populations for thousands of years suddenly be bad for us? In fact, they are not!

Phytates in foods are simply Phytic Acid. To understand why it is not harmful, you have to understand what Phytic Acid actually IS!

Phytic Acid is a compound made up of Inositol (sometimes referred to as Vitamin B8), and Phosphorus. Both are elements that are essential for proper bodily functions, and affect liver function and other major organs.

Your digestive system simply breaks down the Phytic Acid into things that the body DOES need – Inositol, and Phosphorus. It does not bind with minerals in the digestive tract, because it is broken down by the body into components that your body can use – **remember, the only place it has been shown to have a negative effect is in test tubes, NOT in the actual environment of the digestive tract** where it is being broken down by acids, enzymes, and bacteria.

I choose to think that the disclaimer (from the original studies on these things, which stated that there was no evidence that they caused harm in the body) should be paid attention to. But others in the fermentation world are crying in panicky tones, and recoiling in horror at the thought of eating raw spinach, cooked leeks, or toasted almonds, or eating any food made from unfermented flour (some condemn all grains unilaterally, ignoring all evidence that cooking or sprouting removes the substances they fear anyway). Suddenly every raw vegetable or grain is suspect, and people who misunderstood the study are afraid to eat foods they've always enjoyed and which their bodies crave because they are good food!

They have claimed that fermentation is the answer, in spite of a lack of credible evidence to support this claim. And they've tried to rewrite history and insist that these foods have ALWAYS BEEN EATEN THAT WAY!!!! and that nobody ever ate them raw, and nobody ever cooked them, or that cooking them is unhealthy, etcetera, etcetera!

Ok, so this is really dramatic, right? But these people really do get that heated up about it. **And if you contradict them or insist that people HAVE been eating these things every which way right along, they will retaliate with scathing and belittling remarks about how someone as uneducated as you is clearly unqualified to express your opinion.**

These individuals claim that fermentation will break down oxylates and phytates, and that if you don't do that you are flirting with food poisoning of the most agonizing kind (though they can't even tell you the harm that it actually might do if you ignore their advice, but just hint wildly at chronic digestive illness because that is a hot button topic guaranteed to panic the masses). **While there is some equivocal (that means it can be interpreted more than one way) evidence that fermentation may affect oxylates and phytates, there is no reliable scientific evidence to support any claims that fermentation has that effect.** Those studies and research that DO support this lacks credibility, with results taken out of context, or conducted in-vitro (that means in a test tube), and NOT in the human body, and never with actual controlled studies. This is something we intend to eventually test, but cannot do so yet. If there were reliable evidence, we would not need to test!

In short, the hue and cry about phytates and oxylates may be safely ignored except in one respect – if a food high in oxylates burns your tongue, it is too high in oxylates and will cause harm. That is all. The human body is capable of compensating for the presence of these elements.

There is a similar panic over other elements (which often includes Phytates) which are referred to as "anti-nutrients". **The worriers have taken some information out of context, such as the misquoted studies regarding Phytates, and some additional information involving a few plants that have known negative effects and can reduce the absorption of a single nutrient in the body, and they've applied it to all sorts of foods, for which there is ZERO credible evidence to support.** They claim that certain elements in common foods are destroying nutrients in the body, so that the net effect of eating the food is a negative one. And they claim that this is the case with dozens of common foods which have been consumed raw, cooked, pickled, dried, and in other forms for thousands of years, and every week or so, the list of "unsafe" foods grows, and the complexity of the "necessary" preparations to make the food "safe" grows. But hey, it keeps their readers dependent upon the writers to inform them of the latest hazard and remedy, and it sure sells product that would be harder to sell without a crisis to address!

While it is true that there is historic evidence showing that overconsumption of Nardoo (an aquatic plant) which has been insufficiently cooked, has properties that will interfere with the absorption of Thiamine, it is also true that this is not a food you are going to be eating daily. It is also true that some other exotic plants have been shown to have similar effects – but they, also, are plants which are not mainstream, and never have been, for just that reason! The plants that you ARE going to be eating daily have been pretty well vetted over the years, and those with effects like Nardoo, have been labeled as either poisonous, or edible with caution, long ago!

To assume that ANY plant that contains the same elements as those contained by Nardoo (or any other "poisonous" plant) is harmful, regardless of the amount of the element that it contains, or to ignore the other elements in the plant which may offset the affect, is rather silly. Nature is smarter than that, and so is humanity.

The example with Nardoo is not actually an "anti-nutrient" anyway. OVER-consumption of Nardoo, which has been insufficiently cooked, has this effect. Having it in a salad once a week or so makes no difference... the body can compensate just fine, and you don't have to do anything. **Cooking it removes the harmful affects** also. Eating it raw, daily, or trying to live off it is what causes the harmful effects.

But then, if you label ANY food as a super food, and look to it for deliverance from all of your health woes, it is going to have SOME kind of negative affect! Normally after a few days you find you've lost your appetite for anything that your body is overloaded on, so there is a built-in mechanism for over-consumption if you just pay attention and don't try to force your body to like what it does not!

Anti-nutrients do not exist in the way that the pop-food bloggers are claiming. They are a non-issue.

There is also no reliable evidence to suggest that the changes that occur during fermentation change these issues. **There IS ample evidence that demonstrates that even when an issue such as this DOES occur (ie, Nardoo), cooking is an appropriate remedy.**

There is no evidence to suggest that cooking and fermentation result in the same kinds of changes. In fact, one of the greatest claims of lacto-fermentation supporters is that fermented foods are NOT cooked, and do not have the effects which they label as negative, from cooking.

Various other nutritional claims exist regarding fermented foods as well.

There IS some evidence to support increases in some nutrients, but there are also DECREASES in other nutrients (the microbes consume much during the fermentation process). So it balances out. **Lacto-fermented**

foods are NOT more nutritious. They just have a DIFFERENT nutritional balance!

There are claims to greater digestibility, but this also cannot be supported by any impartial research, when compared to raw, or cooked foods. Some fermented foods MAY BE more digestible for SOME PEOPLE, and LESS digestible for other people.

There is no credible research on the WAY in which nutrients are changed, and whether that is ACTUALLY more digestible IN the human body. Only some **hasty test tube research from which some individuals have extrapolated a theory** that if it changed, it must be good, because they wanted it to be, and there are results that show some bacterial enhancement of some nutritional elements, but which fail to record the LOSS of other helpful nutritional elements. There is some research involving livestock and fermented feeds, but those also show a tendency to gain weight more (not always a good thing, and attributable in part to the alcohol in the fermented feeds), and increases in some kinds of nutrients with reciprocal decreases in other kinds of nutrients.

Real Nutritional Benefits

Fermented foods as a group are NOT “better” than fresh foods, and they are not “better” than cooked foods. Some foods are more appropriately prepared cooked (because cooking can bring about beneficial changes), some are best fresh, and when food needs to be preserved, fermentation is an alternative to high or long heat preservation methods (which result in very high nutrient loss), or freezing or drying.

Mostly, fermented foods are just DIFFERENT. Just as raw and cooked foods are different. Some foods, for some people, are more enjoyable, and more digestible when fermented. Other foods are NOT more enjoyable, and NOT more digestible to those same people when fermented. And the foods that one person handles better fermented won't be the same as those that another person handles better fermented! (Check out the chapter on fermentation for animal feed for additional information on this topic.)

The real benefit is that it is another CHOICE, which MAY BE OF BENEFIT TO YOU, for some foods.

Generally, there are some reasons for those benefits.

Fermented foods are living foods. They are full of healthy bacteria and yeasts, which help the body function properly. They help regulate and balance the immune system, and they may help change some nutrients into forms that are more absorbable for some people, but not all. The microbial benefits affect every system in the body, and contribute to good health in ways we do not realize until we start to feel better. Probiotics really do have a very real and measurable effect on the body, but it is also a very individual effect.

The commercial food industry has robbed fermented foods of the living elements. With only a few exceptions, foods sold in the stores are dead, embalmed, and contain only a mere shadow of the nutrition of freshly prepared foods.

Commercially prepared fermented foods are generally prepared in three ways:

1. **Live fermented non-dairy.** Very few foods are prepared this way, and those that are are then heat-preserved, thereby destroying the probiotic benefits.

2. **Vinegar pickled.** Instead of using traditional fermentation processes, many foods are quick-pickled using vinegar. Vinegar is a fermented food as well, so it would be a good choice if live culture vinegar were used, but it is not. Pasteurized (dead) vinegar is used instead. These foods do not contain probiotics, because they are

heat processed with vinegar, or short term brined, and they are always heat processed to seal them.

3. **Live fermented dairy products.** Most of these are packaged and sold as live-culture foods. Some are pasteurized prior to packaging and resale. Even the live ones lack the benefits of naturally fermented foods, for two reasons. First, the cultures are carefully controlled - they have specific bacteria added to pasteurized milk and cultured. They lack the full complement of healthy bacteria and yeast found in naturally fermented foods. Second, they are mass processed in industrial facilities, using dairy products which have been mass produced from industrial ag dairies, and then handled in another industrial facility prior to reaching the final destination. This increases the potential for dangerous contamination exponentially, at a number of points in the process, and pasteurization does not compensate for this potential. This means that these products are more likely to be exposed to superbug contamination after culturing with the probiotic cultures. And when that happens, the end user gets seriously ill. Controlled culture fermentation does not provide protections against superbugs the way natural fermentation does, because some of the naturally occurring healthy bacteria and yeast which limits the growth of superbugs is not present during fermentation (due to initial pasteurization and subsequent culture with only specific microbes and not a full complement). Yeast, in particular, aids in limiting the growth of superbugs, and yeast is pretty much never added to dairy cultures deliberately.

So the foods you buy through the majority of commercial channels, even in the BEST situation where you are able to obtain live culture foods, still lack the full benefit of naturally fermented, living foods.

That said, kefir, particularly, was one of the major foods that I used on a daily basis to help in reversing Crohn's Disease. The rich probiotic and nutritional content of the fermented milk product was a kind of miracle for me. Other types of fermented foods may provide a similar benefit for other people, depending on what their individual physiology responds to.

How Do You Know Which Fermented Foods Benefit Your Body?

Quite simply, if you love it, your body likes it (provided it is not a harmful but addictive substance, which the body craves for other reasons).

> If you love kraut, or pickles, or kefir, or yogurt, or kimchee, then your body knows EXACTLY what to do with those foods!
>
> If you gag at natto, think kimchee smells nasty, and cannot gag down kraut, then DON'T EAT THEM! Your body does NOT know what to do with them!

Me, I love homemade kraut, in moderation. I do not really care for canned kraut even though I can eat it sometimes if it is served with cured sausages. I LOVE LOVE LOVE fresh dill pickles when I'm in the mood for them, but not if I am not! And I can eat yogurt any day of the week and still want more! Not coincidentally, those are the foods that also help me when I am trying to heal my body.

Fermentation is a process, not an event.

It is not something that you set up, and it happens one day, and then stops. It is an evolution, a gradual state of change, from fresh, to lightly fermented, to heavily fermented, to aged and past the optimum flavor and benefit.

The flavor and bacterial and fungal (yeast are fungus) content changes throughout the entire process. It is not the same any two days. Truly living food will be slightly different every time you eat it, just as a tomato ripens, and is a different experience one day than it will be the next. And just like a ripe tomato, a fermented food has many phases during which it is good, and possibly one point that you think is the BEST point in the

process (the peak of ripeness!).

The manner in which it is fermented will affect, to a certain extent, the variety of microbes that affect the food. **Improperly fermented foods WILL culture unwanted microbes which can be harmful - but they typically display evidence of their presence which will alert you (appearance, smell, etc).** Because of the wider variety of healthy microbes, naturally fermented foods withstand contamination better than foods that are cultured with a carefully selected group of cultures - this is partly why kefir ferments nicely at room temperature, but yogurt has to be heat fermented under controlled circumstances. Kefir is easier to manage, and requires far less care, and continues to propagate indefinitely, because of the wide variety of healthy microbes that simply overpower and grow faster than the unhealthy ones.

So what if some unhealthy microbes DO get in there? This typically isn't even a problem. They DO get in! And some even grow and multiply! They just do not do so at a fast enough rate to make you sick (we aren't talking about stuff you can smell or mold you can see - items that smell off or have visible mold should be discarded, we are just talking about small amounts that you cannot detect). They do establish JUST ENOUGH of a presence though, to expose your body to them, so that your immune system is strengthened, and you build up a resistance to them. Their presence is a benefit, not a threat, but the presence of some unhealthy bacteria may be the reason why fermented foods cause loose stools or mild upset stomachs the first few times they are eaten (this is common with kefir) - it takes a couple of exposures for your body to adapt, but when it does, the benefit is more than worth it, because this exposure helps make the body more resistant to superbugs! For more information on good and bad microbes, read this article: Good Germs, Bad Germs

Most people who ferment their own foods say that taste and texture is as compelling as a benefit to fermenting vegetables themselves as any nutritional benefit. And I gotta say, homemade pickles are crisp and have a snappy flavor that you just can't get from a grocery store jar of pickles. Homemade kraut is crunchy and lively, and not that limp single flavor stuff you get in a can.

Yes, you can buy crisp pickles. But they are typically made using chemicals to keep the crunch through the canning or pickling process. You can get the same results at home using grape, raspberry, or horseradish leaves in the bottom of the fermenting container.

Home fermented foods DO taste different. Some people do not welcome the change. But the cool thing is, you have some control over it at home! If you don't like the results, then change it! Change the ingredients, monitor the flavor through the fermentation process so you know where you like it best, or ferment it in a cooler location to develop the flavors more slowly (some people say this makes the flavors more complex). **If you don't like the product at the store, it is always going to be the same way. If you don't like something you made, then you can do something about it!**

Many people credit home fermenting with improvements in their health. We're talking the big stuff - healing from bowel disease, heart and circulatory problems, asthma, diabetes, arthritis, auto-immune disease, food sensitivities, persistent obesity, and more.

There are just as many though, who have got on the fermentation bandwagon, claimed it was the answer to contemporary health declines, and then gradually faded out when it failed to do all they hoped. I suggest any time you read about fermentation as a miracle cure, that you follow up with the writer, and look at what they are doing 1-2 years after the post you just read. Are they healed? Are they still slowly healing? Or are they getting worse and still looking for the next miracle? You will find them across the spectrum, because not everybody NEEDS more fermented foods, and not everybody responds the same way to them!

I feel that when combined with removal of chemicals from the diet, and eating whole and fresh foods instead of refined foods, fermented foods can be a great part of achieving and maintaining good health. I also feel that by themselves, they won't make much of a difference - you really have to remove the causes of the problems (chemicals and refined foods), and replace them with a variety of truly healthy foods.

If you aren't sure, go give it a try, because it is worth finding out whether they are part of the answer for you!

Keep it Under the Brine

For ferments with liquid, this is the number one rule. **And failure to keep the food under is the number one reason for spoilage in the initial stage of fermenting.**

Ferments that do not have a brine will often spoil on the surface – they may discolor, crack, and develop surface molds. They can generally be removed down to the level that the color evens out (often the top will be discolored, with another layer of darker food just under that, and then an even color throughout the rest of the ferment). Kefir does this if left too long without maintenance – the top layer may go yellow.

With pickled vegetables, kraut, and other ferments that have a salt brine, or water added, the food needs to be held under the brine with a weight. There are many methods for doing this, and basically, whichever one works for you, is fine!

- **Glass weights** – excellent since they do not leach, and they clean up easily. They may break though, and if you use a jar like a mason jar for fermenting, the glass weight that will fit through the mouth of the jar won't be wide enough to go to the edges, and you will need something to hold things down to the edges. **Dunker Extenders** (we sell these) can be used to hold it down to the edge, or a leaf of cabbage, or other food items, but if food items are used, they also MUST be kept under the brine or they will also have issues with mold.

- **Rocks** – rocks are a traditional method. They must be cleaned and sanitized prior to use. Some rocks can leach minerals into the ferment, but the rate is pretty slow. They have the same issues with size and keeping the food under that glass weights have.

- **Ceramic weights** – same issues as rocks, but may or may not have issues with reaching the edge of the container.

- **Zip lock bags filled with water** – a large one works best, but I have also used three or four smaller ones in a large container. Some people will put brine in the bags instead of water, in case the bags pop open. I found it was useful to double-bag.

- **Plates, smaller jars, or other heavy objects** that can be submerged in the liquid and weighted with additional heavy objects or filled with water.

During the fermentation process, good bacteria will proliferate in the food that is not exposed to air. The good bacteria will produce acid as they grow and multiply, and that is what gives the food a sour taste. The acid helps to provide further protection from spoilage for a longer period of time.

So anything that is under the brine, or in the lower levels of a more solid ferment, will be protected from having harmful molds and other nasties growing instead of the friendlies that help preserve the food.

Salt in the brine helps to inhibit the growth of nasties that will proliferate in low-acid foods such as vegetables. Some people DO ferment these without the salt, but the failure rate is much higher. **Salt in the brine is the safest method to keep the food from spoiling until sufficient acid has formed** in the ferment to

provide additional preservation.

Fermentation is a living process, not a dead one. That means it changes. It has a life-span. At first, the healthy bacteria and other microbes establish themselves, and create an acid environment. They eat the carbohydrates that they like, and convert them to acid. So the ferment will typically become more sour over time.

The food is usually refrigerated, or stored in a cool environment after the sour flavor and smell have become established (a few days, to a week or two, on average). Refrigeration slows down the process considerably. **Foods stored this way can keep for many months, or even a year or slightly more. But they do not keep forever.**

Eventually, the friendly microbes run out of food, and the next level of microbes moves in – you can't stop this from happening unless you heat preserve the food, which will kill the bad ones and the good ones. It is part of the natural process. When the food for the good guys runs out, there is nothing left but food for the bad guys.

So at some point, the food will start to lose texture, the color will start to fade, and the good pickly or sour smell will start to get confusing and funky. Eventually mold will grow, the food will go gray and slimy, and the smell will tell you that something is definitely NOT RIGHT! My son tells me that when this happens, if you taste it, instinct will make you spit it out. It is not something you will want to have stay on your tongue anymore!

Yes, you WILL be able to tell the difference. But unless they forget that it is in the fridge, most people who are fermenting in small batches never see the end life of their fermented foods. They've eaten them LONG before it got to that point!

Is All That Salt Unhealthy?

Fermenting and pickling recipes typically call for a pretty good amount of salt - Between 2 and 3 TBSP per quart of liquid. Too little salt is another top reason for fermentation failure with foods that require a salt brine.

The salt provides an essential benefit - it deters the growth of harmful microbes until thriving populations of good bacteria acidify the liquid enough to continue to deter the nasties.

While you CAN ferment without salt, there is a much higher failure rate, and it is more sensitive to temperature, contamination, and even the quality of water you are using. This is why most fermenting systems do not recommend fermenting without salt.

So, do you have to worry about the amount of salt in the fermented foods?

In general, no. But it does depend on the OTHER foods you are eating.

If you are eating a diet of refined foods, there is salt in EVERYTHING, even foods that do not need it! Not only that, there are other forms of sodium that are even more harmful in excess than simple sodium chloride. Generally, those forms are the ones that cause the majority of health issues.

Salt is ESSENTIAL for good health, and less is NOT always better. You need more of it when exercising, or in warm weather when you sweat more.

If you are cooking your foods from scratch, using ingredients that do not already have salt added, then you will have to ADD salt to your diet. If you do not, you will become deficient, and that can cause a medical emergency.

How do you know how much? **Once you get used to NOT eating refined foods, just salt to taste.** One of the reason men have a reputation for reaching for the salt shaker is because they do, in fact, require more salt than women, due to the larger body size. Active men, especially.

If you are not heavily salting everything, then salty fermented foods just end up being a good and healthy source of salt. You eat what tastes right - if the fermented food tastes good, then you need it.

You'll need to find a balance with your brine - and you can judge that by taste as well. If it tastes good to you, then you probably got it right. If it tastes too salty, then you need to reduce the amount of salt in the next ferment (not more than 1/3 reduction). You'll get it right in a few tries.

A refined food diet gets your taste buds all out of balance, and you get to where you can't really trust it to tell you what you need. But after you've been on a more natural food diet for a time, your taste buds balance back out again. You start to crave whole grains and fresh fruits and veggies, and clean meats and dairy. And sometimes you crave salt.

When you do, reach for a pickle.

There is no need for guilt when you are eating well.

A Note About Salt: We use Redmond Real Salt. It is a mineralized Sea Salt, mined in the Rocky Mountains. It costs much more than so called “Sea Salt” from the grocery store, and it may be harder to find (you can order it online). But...

It is a more complete salt than simple sodium chloride. It does not have iodine added, and there are no anti-caking agents added, so it does not cloud ferments or canning. The only “problem” I've had with it is that some of the minerals in it dissolve very slowly so I sometimes get some very fine reddish looking sand stuff at the bottom of the jar.

The real reason I use it though, is because it TASTES better to me. Odd, that salt could taste better, but it does. And I can't define the reason why. It is just that when I salt food with refined salts, I get overloaded on them pretty quickly while still craving salt. With Real Salt, I crave less, but it does not overload my taste buds. Odd, but it has a mellower flavor to me, that just satisfies.

So saltiness may be affected by the TYPE of salt you use, and HEALTHINESS of the salt may also be similarly affected by the quality of the salt you use!

Watch Out for Sugars

When salted vegetables ferment, it results in a tangy sour preserved food that lasts for months.

When foods or beverages with carbohydrate based sugars (sugar of all kinds, molasses, honey, agave, fructose, corn syrup, fruit juice, and some foods with simple carbohydrates like fruit, tomatoes, potatoes, beets, carrots, sweet potatoes and squash, and grains), are fermented, they produce alcohol. If they are fermented for more than a few days, they can produce quite a bit of alcohol.

There are some compensation strategies, but if you are fermenting for health, don't ferment these items unless you intend to ferment them open until the alcohol converts to acid (takes several weeks longer out of the fridge), or unless you intend to cook the alcohol out prior to consumption.

Milk is a Special Case

Milk has some simple carbohydrates, and it contains lactose, which is a simple sugar that does produce alcohol. **Milk contains many other elements though, that also ferment, and it will go SOUR, before it goes alcoholic.** When it goes alcoholic, it will have considerable fizz, and smell just a bit boozy. So it is safe to make yogurt, and kefir, provided the kefir is not over-fermented. Sour but not fizzy kefir is not alcoholic. Yogurt is not alcoholic either unless it goes fizzy.

Use Fresh Untreated Produce, and Clean Water

If you want to increase the rate of success with your ferments, use fresh produce that has not been treated with preservatives or chlorine (if you got it from the store, it has been treated with chlorine even if it is organic), and use fresh water that has no chlorine.

You can let the water sit overnight, which will work in some cases but not all, to remove the chlorine. If your town uses chloramine though, it won't evaporate or cook out.

Our best option for clean water was to take our own glass jars to a grocery store that had a filtered water fountain, and fill the jars there. Cheaper than bottled water – it is municipal water that has been filtered through reverse osmosis and a few other filters. Good well water is better, but the fountains are about the next best thing.

If you cannot get "fresh from the garden" produce, then do the best you can. Removal of a few layers of cabbage leaves will help, but other veggies will have to take their chances.

Do NOT use veggie wash. It has detergents in it which absorb into the food, and their purpose is to kill microbes. So you don't want them preventing the growth of good bacteria – something ALWAYS survives the wash, and it is usually the most aggressive and unpleasant of microbes, which are not the ones you want to encourage!

If you purchase veggies at a farmer's market, look for the ones that do not look identical to the ones in the grocery store. Some individuals order in boxes of produce from elsewhere, re-package them, and sell them as fresh from the garden. Watch for extra leaves, unusual shapes or colors, and other indications that these are homegrown, and not mass produced in an industrialized setting where every item allowed to go for sale must be the same size and shape.

Fresh and snappy is best. The fresher it is, the better the results!

Let's Make Pickles!

The World's Best Dill Pickles

These truly are the world's best dill pickles! Made from all natural ingredients, NO VINEGAR! Just zesty, crispy pickles, with a fresh flavor you can't get from a jar at the store!

This is an old fashioned recipe. That means there are no absolutes, it is very flexible. You can use it with whatever you have on hand. Sure, if you have a balance of ingredients, you'll probably like it better one way than another. But don't feel intimidated. There's nothing scary about this! Feel free to experiment.

Old Fashioned Brined Dill Pickles

- **Baby Cucumbers** - any amount will do (ok, so you are going to want at least 10 or so...)
- **Garlic** - about 1 clove for every 10 baby cukes
- **Fresh Dill** - about 1 sprig for every 10 baby cukes (with or without the seed heads, it does not matter, I often use baby dill because that is what is available)
- **Grape leaves** - enough to put a layer, 2-3 leaves thick, across the bottom of your container. You can use wild grape leaves, they work great! If you don't have grape leaves, then raspberry leaves, or horseradish leaves are supposed to work also, but horseradish will probably impart a spicy flavor.
- **Salt** - about 3 TBSP for every quart of brine (or about 2 tsp per cup of brine) (table salt will work - iodized salt will cloud the water, but still work. Non-iodized salt is best, some people insist pickling salt is even better, but we like sea salt)

Ok... you'll need a fermenting **container** large enough to hold the pickles, with plenty of headroom (you can fill the container about 3/4 full of pickles).

Scrub the pickles to get the spines off, and the mud, and anything else unpleasant that might be lurking there. You don't need to sterilize them! Don't put chemicals or veggie wash on them. Just use plain water and wash them well.

Wash the grape leaves and shake the water off them.

Split the garlic cloves into quarters (or leave them whole if you want less intense garlic flavor).

You can leave the **dill sprigs** whole, or break them up some, however you like them.

Mix up a quart of brine to start (more if you know you'll need it). Just stir the salt into water until it is fully dissolved (no need to boil it, the brine should be cool when put on the veggies). IMPORTANT - use water without chlorine! Yes, this is important, chlorine kills microbes, and you NEED microbes to make your pickles.

Ok... **Put the leaves in the bottom of the pickling container**. The leaves are there to help the pickles stay crisp. Commercial pickles use concentrated chemicals for this, but grape leaves are the natural alternative.

Start putting in the cukes, and **distribute the garlic and dill** among the cukes as you fill the container.

Once the veggies are in, **pour in enough brine to cover the pickles** by an inch or so if it is a large container, half an inch or more if it is a small one. Your cukes WILL float! So **you'll need something to hold them down**. A dunker, or a double ziploc baggie filled with water (or filled with brine), a clean rock, whatever. Just make sure whatever you use can keep all the cukes under the brine, with nothing sticking up.

Cover the top of the container - you can use a plate, a cloth cover, or a fermenting cap. These pickles are the easiest kind of thing to ferment, and most of the time they aren't terribly picky.

Let them sit for 2-3 days. Don't mess with them. They'll get foam on the top if your container is open. That is ok. If it is summer, you'll want to skim off the foam if it gets very much and **put them in the fridge after three to four days**, and let them continue to ferment there. In the fall, or in a root cellar, you can leave them out a lot longer.

If the process is going right, you should start to smell dill pickles in about 2-3 days. If you are using a Fermenta Lock or Fermenta Fido, then you can smell the top of the valve – when the food begins to ferment it will release gas through the top of the valve, and leave a little bit of brine scented moisture there, so you will smell the pickles as they begin to cure.

You can start sampling after about two or three days IF the smell is pickly. The first batch is always the hardest one to wait on! But go ahead and sample. Just make sure you use a clean fork to spear one out, and make sure all of the cukes get back under the brine when you close up.

It is always a miracle to me that I can leave cucumbers out for two days, and come back and suddenly I have these awesome pickles - lightly brined at two days, but definitely dill pickles! The flavor gets stronger each day.

Ok... so here is the experimentation part:

- You can use this same basic formula for pretty much ANYTHING.
- The brine can be tinkered with some, but I strongly recommend you do not reduce the salt more than half. This amount of salt and water can be used for any vegetables.
- If you want it crispy, use grape leaves, no matter what you are pickling. If you are pickling broccoli or asparagus or something else that you don't want really hard, leave them out.
- If you want garlicky flavor, put the garlic in, or MORE garlic in.
- If you want it spicy, put in horseradish leaves or hot peppers, or whatever else you like for zing.
- If you like pickled onions, throw those in - baby onions, onion rings, shallots, whatever.
- You can make dilly green beans, or pickle broccoli and cauliflower, asparagus, just anything!
- You can leave out the dill, and put in other herbs, or no herbs at all.

If you can make dill pickles, you can make virtually any pickled food.

Note about vinegar...

"But I LIKE the vinegar taste", said my son, when he asked me how to make pickled jalapenos. I told him how to make them using an old fashioned brine. "Where's the vinegar?" he first asked. I explained that it did not

need it, that this was the traditional way of making pickles. He protested that he liked the flavor of the vinegar - he was sure I had not understood what it was he really wanted to make. I then explained that it DOES taste like vinegar - that the fermentation process creates the vinegar flavor. He was very hard to persuade.

He finally agreed to try it. He made the brine, scrubbed the jalapenos and stuffed them in the jar, added the brine, dunked them down, and put it on the counter. A few days later he tried them. “WOW! Mom! These are good!”. He told me that they were HOT, but really good. He put them in the fridge, and had one more a few days later. And he forgot them.

A few months later, I was speaking to him on the phone, and he was discussing his intention to make something else. I mentioned the pickled jalapenos. He said he had forgotten them, but they were still in the fridge. He ran to get them, and tried one as we were talking. “Ooooh! This is even better!” he said. He told me that the heat had mellowed, the pickle had deepened, and they were just excellent. He offered one to his Father-in-Law, who took the jar, and did not give it back. Instead he sat on the couch, eating the pickled jalapenos until my son took them away from him.

Many people are surprised when they hear that the recipe has no vinegar, because they are unfamiliar with the process of natural pickling. Putting vinegar in is not traditional. Pickles were made for millennia before vinegar was added to make the process of canning pickles faster, and to eliminate the tedium of brining. (Though it is important to point out, that vinegar is made by fermenting apple cider, until it develops alcohol, and then letting it ferment open until the alcohol converts to acid. A very similar process, involving some of the same concepts.)

You get a BETTER pickle this way. The flavor is brighter, fresher, and more complex. It does not taste like cucumbers and dill soaked in vinegar. It is absolutely recognizable as the pickles you love, but more so.

THIS is how pickles are supposed to taste!

Try a Batch of Kraut

Lots of Ways to Do It

Homemade kraut is one of the simplest fermented foods, but it follows slightly different rules than many other fermented foods, because it involves only a single vegetable (though it can involve more), and because it does not require a separate brine.

To make kraut, you slice or chop the cabbage. Size of the pieces is irrelevant, they may be any size you prefer. Most people go for something a little larger than coleslaw, though there are some people who prefer to pickle entire cabbages whole... We'll assume you are chopping the cabbage though, since it is the best option for beginners.

There are many methods for making kraut. There are many recipes. But we'll give you the simplest recipe we know, and tell you the way that we do it, because it helps make it easier to do.

Many people use food processors, electric slicers, or mandolin slicers for chopping kraut, but if you are only doing a small batch, it is simple enough to chop it by hand. You can see the cabbage was cut in half, and cored, and then sliced. It may be sliced in long shreds (like a mandolin will do), or it can be shredded very fine.

Our Method

The short version is that the cabbage is chopped and packed into jars, and salted (or salted then packed into jars), and weighted down so the juice is pressed up around the cabbage to cover it, after which it is left to ferment until it is nicely soured.

Tip #1: Kraut requires HEAVIER WEIGHTS than many other ferments. When we make kraut, we use about 4-5 of our standard square weights, on top of a dunker extender to press the cabbage down.

But... The cabbage will not produce enough brine to cover the cabbage right away. It can take a day or so for this to happen. That is NORMAL.

Since it does not call for a separate brine, there are various methods for getting the cabbage to produce enough liquid to cover the cabbage. A frequently recommended method is pounding it, either in a bowl, or as you put it into the jars.

Tip #2: Don't pound the cabbage. For the very best kraut, do not pound the cabbage either prior to packing it, or during packing. You get a crisper texture and a longer lasting preservation if you do not pound it. Smashed cabbage does not have much appeal to me!

> Instead, put the cabbage into a large bowl, and salt it in the bowl. **Put about 1 tbsp of salt for every pound of cabbage.** (The average market cabbage weighs 2-3 lbs, but may be much less by the time it is trimmed and cored.) Just grab a large double handful of cabbage and put it in the bowl, and then sprinkle a teaspoon or two of salt over it, then repeat. Let the cabbage sit for about 8 hours. Stir it every hour or two, to help distribute the salt. You will see the liquid start to form in the bottom of the bowl.
>
> **NOTE:** If life interferes, it is perfectly fine to pop the bowl in the fridge for up to 2 days, but it is best that it is stirred a time or two.
>
> **Pack the cabbage into jar**s - leave about 1/5 of the jar empty at the top for headspace (and room for weights). Pack it tightly. I use a wooden spoon to press it firmly into the corners and press it into the jar (do not pound it into the jar... this can break the jar). Divide the juice between the jars.
>
> **Weight it down heavily.** You want half a pound of weight or more on a half gallon jar. Less on smaller jars. Enough weight to get the juice about to the top of the cabbage.
>
> The key to this is the weight. Cabbage just takes a lot of weight at first.
>
> **ANOTHER NOTE:** Weights do not hold the cabbage down to the edge of the jar. You get floaty bits that want to rise up to the top. To prevent this, you can use a whole cabbage leaf (or part of one) to tuck over the top, and then put the weights on that. If you do this, you MUST make sure the leaf is ALSO completely covered in brine. Alternately, you can order Dunker Extenders from our website (FermentaCap.com), which will work to hold the food down all the way to the edge. Put your weights on top of the leaf, or the Extender, and floaties are no longer an issue that you need to worry about.

Tip #3: More juice will form over the next 24 hours. Yes, the top of the cabbage will be out of the juice for part of that time. This is normal.

After about 24 hours, the juice should COVER the top of the cabbage. As long as it is covering it by at least 1/4", it will be fine, because it will continue to settle and and the liquid will continue to rise very slowly over the next few days. After about three days, you want the brine to cover the cabbage by about 1".

Tip #4: If the brine has not covered the cabbage, or if you just cannot get it weighted down enough to begin with to reach the top, then it is PERFECTLY FINE to add additional brine. Mix 2 tsp of salt with 1 cup of cold water, and stir to dissolve it (keep stirring, it will work). Pour that in until it covers the cabbage.

This jar of kraut started out as a small head of cabbage. You can see the light blue Dunker Extender on top of the cabbage, and a bunch of small square glass weights on top of that. You can also see the brine level is up just under the metal band on the jar. When the Extender and weights were first put in, I had to press them down (not pound) to get the juice to come up, and then I had to add several more weights to get it to cover the cabbage completely. Three weeks later, the liquid in the jar was just as clear and no foam on top of this ferment.

Sometimes a cabbage maybe drier than at other times, and older cabbage will be drier than fresh cabbage. (I said that just because I know someone wants to know WHY it sometimes makes enough juice, and sometimes not, and whether they were doing something wrong!) Variations like that are normal, especially when having to use commercially supplied cabbages.

Tip #5: Let the kraut ferment at room temperature to start with. Some sources say to keep it in the dark, but I have never done so until it went in the fridge.

Fermenting times are variable, they depend on the temperature of your room. In the summer, when temperatures are higher, it will ferment faster. In the winter, it will ferment more slowly. It GENERALLY takes **about 3-5 days** to develop the initial kraut smell - a pleasant vinegary smell (if your house is cooler than 65 degrees, it can go more slowly). You can smell this on top of the orange valve if you are using a Fermenta Lock valve.

Ideally, you leave the kraut to ferment at room temperature 1-2 weeks (counting from the day you PACK the jars). Yeah, there are people who disagree with this. Yeah, they say science is on their side, but they are not considering ALL of the science. If you want your ferment to not only be healthy, but also to be preserved well so that it will last in the fridge if life gets hectic, then ferment it 1-2 weeks at room temperature, because longer on the counter SIGNIFICANTLY reduces lifespan in the fridge. (Besides, traditional kraut making took place in cool basements and root cellars where a cooler initial ferment was practiced for thousands of years, not in 70 degree temperature controlled kitchens!)

Tip #6: Ferment it at room temperature for only 1 week in the heat of summer. Ferment it for 2 weeks in the dead of winter. In between, you'll just have to ballpark it somewhere in between. You are dealing with temperatures generally between 65 and 80 (no AC). So base your guesses on where your home falls in that range. If your home is a steady 72 degrees year round, then ferment your kraut 12 days all year. Most of us can't afford that though, and will have to adjust!

NOTE: These rules can be affected by the size of the cabbage pieces – and this rule applies to all foods. The LARGER the food pieces, the longer they take to ferment all the way through. Smaller pieces take 1-2 weeks. Larger things like whole pickles take up to 3 or more weeks, but some of that can take place in the fridge, it is not a problem.

This is NOT EXACT SCIENCE!!! It never will be. Sometimes you may need to put the food in the fridge sooner due to circumstances in your life. Sometimes you may leave it a few days longer when something distracts you. THIS IS OK!! It won't ruin it. It will continue the fermentation process much more slowly in the fridge. As long as it still looks and smells like FOOD, extra days out won't kill it!

Tip #7: The only visual clue you have that kraut is ready for the fridge is that the concentration of bubbles in the jar will reduce some. This is not always detectible, it depends on how much the jars are handled, how tightly the food is packed, and how much brine - and with foods other than kraut, it also depends on the thickness of the liquid (thicker shows more bubbles than thinner). So you may or may not be able to tell by observation when that 1-2 week period is completed. **Judging readiness for the fridge by temperature estimation is JUST FINE. Don't fuss over this, just take your best guess. It will be RIGHT the majority of the time (trust your intuition... you have it for a reason!).**

Tip #8: DON'T repack the jars as you eat the kraut. Not only is this a waste of resources from washing jars, it is counterproductive!

The theory is that you repack the jars to reduce air in the headspace of the jar. This theory was devised by people who make money from persuading you that you have to have an "airtight" container for fermenting (which is pure fallacy to begin with since we know the containers they sell are not airtight at all) and who really like the idea of selling you multiple sizes of expensive jars. **So IGNORE THIS THEORY. It is COMPLETELY WRONG.**

Repacking jars introduces many times more air into the ferment than leaving excess headspace does. The reason for this is that the BRINE protects the kraut from air exposure. This is borne out by thousands of years of history - the kraut barrel was packed in the fall, and emptied through the winter, and the top was generally only covered by a cloth to keep dust and cat hair out. The weight was left on it, and dropped with the level of the kraut to keep the cabbage under the brine. That is all.

If you take all that cabbage out and dump it into another jar, you are not only unnecessarily exposing it to air during the transfer, you are trapping air bubbles in it, and oxygenating the brine as you pour it between containers. Removing some food and replacing the extender and weight is less disruptive, and keeps the food fresher longer.

Tip #9: You can reduce the number of weights as the cabbage ferments. Generally about the time you put it in the fridge you can remove some of the weights. You'll know how many. When it floats too much, put one back. As you eat the food from the jar, you can also remove weights to use them elsewhere.

Tip #10: Fermenting is a CASUAL and ENJOYABLE business, not a fussy worrisome thing. It has been done throughout the ages in conditions that were not only less than ideal, they were often appalling! It has been done in makeshift containers with unwashed foods. It has been carried out in root cellars with dirt walls and mold or mushrooms in every corner. Mothers prepared kraut in the back yard, or in a kitchen with a dirt floor, or an unpainted and dusty plank or brick floor with kids running through in bare feet stirring up the dust.

Nobody had thermometers, or airlock jars, or refrigerators or temperature controlled houses. They did not even have precise instructions! They had vegetables, salt, water (of questionable purity), a large crock, makeshift weights (usually a plate with a brick or rock on top), a ladle or spoon to skim off the foam. Yeah, there are other ways from other cultures as well, but this is the tradition most Americans and Europeans are familiar with. The pickle barrel and kraut crock in the corner of the basement or root cellar was relied on all winter in MANY cultures.

Enjoy the art of Fermentation. Watch your kraut, smell it, taste it, and learn to see and feel the process.

The REAL tradition is not the precise directions. **The real tradition and heritage that we can recapture is the art of noticing and getting to know the food and the process.**

Remember the Proportions

1 tbsp of salt per pound of vegetable.

If you add shredded carrot, caraway seed, minced onion, or other ingredients to your kraut, then you should adjust for the additional weight if it is more than a few ounces of food.

These proportions work for ANY shredded vegetable that does not need additional brine added. Anything that is pickled like kraut can use this ratio of salt to vegetable.

2 tsp salt to 1 cup of water – if you have to add extra brine.

You can reduce the salt a little, if you have a need to do so, but your chances of spoilage will increase as the amount of salt decreases.

Variations

There are all kinds of variations for kraut. Some are regional, some are impulsive inspirations of the moment.

Kraut can also be made from shredded broccoli or cauliflower, turnip, rutabaga, kohlrabi, and many other vegetables. It traditionally has a base of cole crops (brassicas – like the ones listed), but may be done with other shredded, julienned, or finely chopped vegetables as well.

A note about alcohol: If you ferment shredded carrot, it has sufficient sugars to go alcoholic on you. Same with beets, sweet potatoes, white potatoes, winter squash, pumpkin, tomatoes, and fruits. BUT... you can generally add a few tablespoons of shredded carrot, beet, or sweet potato to a batch of kraut, and it won't go alcoholic. If you put enough in that it goes fizzy on you, then you know it has created a significant amount of alcohol. If it does not go fizzy, then it has not.

Enjoy your Kraut!

Get Your Kefir Going

An Unexpected Commitment

If you are making kefir from grains, it takes a commitment to keep it going. For me, **the real difficulty was having enough milk** to keep it going, since I was keeping kefir when we did not have dairy animals to supply milk on a steady basis, and it was difficult to even afford the raw milk I needed.

Keeping it going is a lot like sourdough, except that kefir does not take to refrigeration as well.

So when you decide IF you want to culture kefir, you also have to decide HOW you want to culture kefir. There are two methods, and one is cheaper, but a long term daily commitment and lots of raw milk. The other costs more, but you can do it on an occasional basis.

Cultures Versus Grains

The classic kefir is kefir grains. Grains are a matrix of collagen, which is permeated with various bacteria and fungus – they look sort of like cooked tapioca beads. When the grains are in balance, the good microbes outnumber the bad, and grow faster, so your milk is cultured with good microbes.

Kefir originated in Asia, where milk was kept in skin bags and curdled in them (there are various stories about it online, which may or may not be entirely true). I am presuming that the bags were never washed, but that milk was just repeatedly put into them, emptied partway or all the way, and then more put in. Over time, the grains formed (likely in the milk solids that sank to the bottom), and were skimmed from the top and shared with others who were not so fortunate as to have a skin bag in which to ferment their own milk! Yes, I do think you could recreate them, but it might be difficult to find the appropriate untanned yak-skin bag (or goat, cow, sheep, etc). I do not know what might be possible in other environments!

The wonderful thing about kefir is that it cultures at room temperature. All you do is throw in the active grains, and let the thing sit overnight on the counter. You can use a cloth cap, a loose canning lid, or an airlock. It is very forgiving.

It takes between 12 and 48 hours to reach a point where it smells similar to yogurt, and is lightly set (when you tip the bottle, the milk no longer tips easily). The grains are then removed, and the kefir can be used, or refrigerated for later use. The grains get popped back into a new jar of milk and off you go again. They gradually grow over time, so every few weeks you have to divide them and find a use for the excess – otherwise your kefir will culture faster and faster, or you'll have to add more and more milk to slow it down!

Grains like RAW milk best. Whatever the microbes are in your raw milk, the grains will eventually absorb and they will be replicated in each batch. Raw milk has lots of goodies in it, so it works really well with kefir grains.

The problem with pasteurized milk is that all of the good microbes have been destroyed by heat. The only microbes it has in it are the opportunistic ones that have entered after pasteurization – you can't stop them, they are in the air, and the minute the milk cools, they will grow in there again. This is why the milk in the jug eventually goes sour – not the sourness of raw milk that has soured, but a nasty sourness that is not a healthy

smell. Only the baddies have grown in there.

Because kefir absorbs the microbes from the milk it is in, as well as releasing the microbes in its matrix to grow in the milk, over time, the kefir will absorb those nasty microbes from pasteurized milk, and they will gradually dominate. For this reason, pasteurized milk does not work well for kefir over the long term.

If you have no access to raw milk, or if you just cannot face the daily need for more milk to feed your kefir grains, then kefir cultures may be just the thing for you!

They are just like yogurt cultures, in that you purchase enough for a single batch at one time. Instead of receiving grains that are re-usable, you receive a packet of microbial cultures that is stirred into the milk, and which proliferates the good microbes from healthy kefir.

You can add more milk to it once it is finished, and re-culture it a time or two, but it won't keep going indefinitely. It will eventually pick up too many opportunistic microbes and start to smell off. Usually, 2-3 cultures is all that is recommended by people who do it this way, before you need to start over again with a fresh packet of microbial cultures.

I like to do Kefir in a 2 qt jar, with a Fermenta Lock Airlock Cap, but it is very flexible and does well in almost any container that is covered to keep the fruit flies out. This jar lived in the corner of my kitchen until I could no longer keep up with the required milk supply.

Care and Feeding of Kefir Grains

Rehydrating dried grains: Put 1 TBSP of dried grains into 1 cup of milk. Change that daily, until the resulting milk starts to smell like FOOD. It will probably smell unpleasant, and go through a series of odor changes for 3-7 days, before it starts to smell like something edible. Your nose will tell you when it smells drinkable. It can take up to two weeks, but should not. Discard the milk, or feed it to livestock (it won't hurt them), until it smells good. It should also develop a stickiness, and have a slimy egg-white type mucusy look to the milk around the grains when it is fully revived. Good grains also float to the top of the jar. Poor ones sit on the bottom. Dried grains should produce usable kefir in 7-14 days, unless it is fermented in a cool place (can take longer then), but may take much longer to fully regain a complete and robust balance. That is normal.

To use kefir, let your active grains sit in milk overnight, or longer, until it is set enough that tipping the jar over partway shows that it is set like yogurt (it is typically a little softer than yogurt, but not a lot). When it is set, you can strain it to get the grains out – you may decide over time that you like it soft, or separated – different people like it at different stages, but it is actually best for the grains if you strain it before it separates (the grains grow faster that way). If you like it more bubbly or separated, then simply strain it, and then set the kefir out to continue fermenting while the grains are put into fresh milk.

You'll need to strain it each day (or every other day in winter) to get the grains out – a metal mesh strainer (medium or coarse weave) is the best method to do this (a flat bottomed strainer is much slower to drain). Thump the strainer on the container you are draining the kefir into, to get the kefir to drain off more quickly. When you have nothing but lumps left in the strainer (some may be curds, that is ok!), use a spoon to transfer them into a clean jar. Those are your grains.

> **Do NOT rinse them with water!** If they get funky looking (they should look like cooked tapioca pearls with thin cottage cheese on it), put them in a dish with 1 cup of milk, and wash them in the milk, lightly rubbing them to remove any discoloration on the surface. Strain out the grains, and discard the milk.

Take the new clean jar with the grains, and pour about 1 cup of milk into the jar, and swirl it around several times to loosen the grains from each other. Pour in additional milk as needed – the amount of milk is determined by how fast the kefir is getting done. Put a lid on the fresh jar, and set it back to ferment again.

Pour the finished kefir (that you took the grains OUT of) into a clean container, and pop it into the fridge (or follow instructions to re-culture).

You can expect to have to increase the amount of milk over a period of 1-2 weeks, at which time you'll have to separate the grains, and either give some away, freeze them or dry them for backup, or eat them (or feed them to your omnivorous livestock). We cycle our grains between 4 and 8 cups in a large jar, separating them to reduce the amount of milk, and then gradually increasing it as they grow. We know they are growing as much by the behavior of the ferment as we do by the bulk of the grains. It will go from setting lightly in 24 hours, to setting with visible whey by morning, so we add more milk.

The key to getting your grains to grow quickly, is three things:

1. Give them good raw whole milk, without growth hormone or antibiotics. They'll grow in low fat milk, they just grow better in whole milk.
2. Swirl the grains with 1 cup of milk before adding more milk – this separates the grains, and makes sure all of them make contact with fresh milk, which feeds them better than if they stay in a big clump.
3. Increase the amount of milk as they grow – if they are always in too little milk, they don't feed well.

Re-Culturing Kefir After Straining the Grains Out

If you like stronger kefir, simply leave the container out of the fridge, and it will continue to ferment. **You can also dramatically increase the output of kefir from even a small amount of grains by straining the grains out, and then mixing the finished kefir with more milk** – up to 3 times as much milk. Leave that out overnight, and you'll have LOTS of kefir sometime the next day (which is a GREAT way to use up a bunch of skimmed milk after you've made butter!).

It is best to do this BEFORE you put the kefir into the fridge. Once you put it into the fridge, some of the bacteria start to die off, and others that grow better at colder temperatures will gradually start to dominate.

That isn't a problem usually – kefir will stay good in the fridge for quite a while (I don't actually know how long – we've had it after a week and it was still good), but it is best to NOT use it for a re-ferment after refrigeration.

This is also how you rescue milk that is just starting to sour. You can mix the sour milk with some fresh kefir, and leave that out to culture overnight. Yes, you will get more of the sour milk cultures, but then you just use the resulting fermented milk to make COOKED cheese, which will kill the harmful microbes, and mellow the sharp flavor, giving you a very good end product. We've never done this with REALLY sour milk, so I can't speak for how that would work. But we've done it with milk that was just starting to turn, enough so that it smelled just a bit off, and we did not want to drink it. You could also pasteurize the sour milk, and mix it with some fresh kefir without grains, and culture THAT overnight, and the kefir flavor should overpower the flavor of the sour milk, and you would not be encouraging the growth of nasties.

A second ferment is an excellent way to get large amounts of kefir to make cheese, though frankly, we rarely have to do that, since after a few days we have a gallon or so of surplus that we can use for cheese if we want. Not enough kefir is not a problem we've had to deal with!

Recipes

Ranch Dressing

1/3 cup mayonnaise
1/2 cup kefir
1 large clove garlic (or two small), minced (I use a quarter tsp of garlic powder)
1 tbsp minced fresh parsley (or 1/2 tsp dried)
1/2 tsp salt
dash pepper

Put in a pint jar, put a lid on, and shake the dickens out of it! You can use it right away, but it is actually better after it sits in the fridge overnight so the flavors can develop.

Thousand Island Kefir Dressing

½ cup Olive Oil
1/3 cup ketchup (homemade is fine)
½ cup kefir
1/3 cup sweet pickle relish
pinch salt
3-4 shakes pepper

Put all of that into a 1 ½ pint jar, put the lid on, and shake it until it is well blended. Adjust the ketchup and relish to individual tastes. This may separate some, so shake again before use.

Tuna Salad

¼ cup soft kefir cheese
2 tbsp mayo

½ cup homemade sauer kraut or fresh pickle relish
1 tbsp wheat germ
2 cans tuna, drained

Mix all together. Makes 4 sandwiches with lots of live cultures, and provides veggies right in the meal. This is great for people who love tuna, but who may have digestive upset from it – the kefir can counteract that for some people.

Add Kefir to:

Smoothies, homemade ice-cream, mix with fruit or juice.
Use in place of milk for biscuits, or pancakes.
Use in place of sour cream in stroganoff, or other dishes (strain it through fine cheesecloth first).

Soft Kefir Cheese

Easy as can be! You need:

- Strainer (colander will do)
- Cheesecloth – NOT the loose stuff, but the kind like muslin, or a clean woven dish towel, or even white T-shirt material. Just something with a moderately tight weave that will allow liquids to drain, but keep the solids back. About 18" X 18" is a nice size.

Line the strainer with the cloth. Leave the edges hanging out.

Dump in the kefir – the only limit is how much the strainer will hold. If you have more kefir than it will hold, you can add more later, when you loosen it. I usually fold the edges of the cloth over the cheese, to keep insects out.

Let drain for 3-5 hours. Use a spoon to gently loosen the kefir from the edges – it will be semi-solid against the cloth, and will peel away. It will be wetter in the middle. You want to pull the dry stuff from the edges, into the middle. Don't stir. Just move it a bit.

Let drain for another 3-10 hours, or longer, depending on how dry you want it. Carefully remove from the cloth and put into a container and store it in the fridge. I say to remove it carefully, because if you are careful, the cheese will just pull away from the cloth. If you mess with it, it will mush into the cloth and is harder to remove.

This is a nice substitute for cream cheese, sour cream, or other soft milk or cheese products.

Use Soft Kefir Cheese in:

Stir into chili, or soups.
Use in place of sour cream.
Use in place of cream cheese.
Replaces Mayo in sandwiches or spreads.

Use Cooked Kefir Cheese for:

Replaces cottage cheese or ricotta in lasagna, or cheese ravioli.
Stir into main dishes.
Crumble over salads.

Cooked Kefir Cheese

The easiest cooked cheese. Temperature is measured by look, and feel. You need:

- Large non-reactive pot (not aluminum)
- Stirring spoon
- Cheesecloth (same kind as above)
- Strainer

- Cheese press (optional)

- Kefir – 1-4 quarts, well fermented (whey separated, very curdled)
- Milk – 1-4 quarts

Now, this cheese takes ANY balance of kefir and milk, in either direction. We usually do it with 4 quarts kefir, and one quart of milk, because we usually have way more kefir to use up!

Put whichever you have the most of into the pot. Heat, stirring gently (especially if you put the kefir in first), until a fine foam forms on the surface around the edges – you can test the temperature by touching the edge of the pot, right at the level of the top of the milk (outside). If it is too hot to keep your finger there, it is right.

Add the other ingredient, pouring it in slowly, stirring very gently – you do not want to break the curds. Keep it over the heat, until the fine froth forms on the top at the edges again – you'll see larger curds starting to cling together just before this point. You should see the whey and curds separating, the whey looks yellowy, and trails after the spoon. After you see that fine foam on the edge, cook for 1 minute more.

Line the strainer with the cheesecloth, with the edges of the cloth hanging out. Pour the cheese into the strainer. You'll probably have to wait a while to fit all of it in if you have a big batch. Once all of the cheese is into the strainer, fold the edges of the cheesecloth over the cheese to keep out bugs.

Let drain for about 24 hours. It can be in, or out of the fridge, depending on the air temperature and season.

At this point, you can either put it into containers in the fridge (or freeze it), or you can wrap it in a smaller piece of cheesecloth, and put it into a cheese press to make semi-hard or hard cheese.

This cheese tastes a lot like cottage cheese, though it is drier. It substitutes well for cottage cheese or ricotta.

Storing Kefir for Extended Periods of Time

Kefir grains may be frozen to store for long periods of time, but quality will degrade over time. Not recommended for more than 6 months. Kefir grains stored this way will take several days to a week to balance out again after thawing out. Should be frozen without rinsing them.

Kefir grains may be air dried (do not use heat to dry them). Rinse with non-chlorinated water before drying them. Once dried grains are reconstituted, they may take as much as 2-3 weeks to fully balance out again, with a fresh change of milk daily until that time. The milk may be fed to animals in the mean time. **They will balance out faster if they are put in buttermilk or multi-culture yogurt instead of milk for 1-2 days – this works to rescue grains that have lost vigor as well, or to help sluggish grains balance out faster when you first get them.**

Kefir grains may also be stored in milk, in the fridge, for up to two weeks. They will slowly continue to ferment the milk in the fridge, but different cultures grow at cold temperatures than warm temperatures, so they will take a few days to balance out again once you return them to room temperature. This is the best way to store them for short time periods, such as a vacation when you don't want to bring it along. Milk should be changed every 2 weeks, and kefir should not be stored this way in the fridge for longer than a month or two – it just steadily looses the microbial balance that it needs to produce good kefir. It will get it back, but the longer it is in there, the longer it takes to get it back.

Kefir travels well, just take your strainer along, and a container to put the finished kefir into.

Enjoy your Kefir!

The Tang of Pickled Salsa

Fermented Salsa is more rightly referred to as Pickled Salsa. It not only more accurately describes what it is, it causes fewer raised eyebrows among the tea-totaling element, which is important in my family!

Pickled Salsa it is! It ends up like Salsa Fresca, or Pico de Gallo, with a pickly taste.

NOTE: Read the section on Kraut first. The basics about keeping things covered, and how long to ferment on the counter, and how to handle some of the processes are in that chapter.

The Problem With Pickling Salsa

IMPORTANT! Tomatoes will produce alcohol. If you make the salsa with tomatoes, it will not be safe for children, pregnant women, or people with medical issues requiring the avoidance of alcohol!

This picture is of my first batch of pickled salsa. You can see the tomato juice on it (later batches with red peppers instead of tomatoes have a clear brine). It went boozy, and I had to cook it before use, to get the alcohol out. It was still really good with eggs! But future batches were made without the tomatoes. You can see the red line across the top just under the top of the juice, which is a Dunker Extender, holding the salsa down. You can also just barely see some round glass weights in the jar, they look like red ovals on top of the juice.

The Remedy

We substitute red peppers for the tomatoes. This gives a lovely color, and a wonderful salsa flavor.

The Recipe

You can make it using pretty much any salsa recipe, without the tomatoes. The key is to get about **1 tbsp of salt per quart of finished salsa** stirred into it, and add water to cover. As with all pickled items, salt, and dunking the food, is the magic that gets the job done right.

So... the basic recipe includes:

- Chopped onions
- Chopped bell pepper - green, yellow, purple, whatever you can get.
- Chopped red bell pepper – lots of this for the red color.
- Chopped jalapeno, anaheim, habanero, or other types of hot peppers
- Cilantro - fresh, or dried, chopped
- Salt
- Water to make brine.

You can balance the proportions however you like. The peppers will be hotter to start, and will mellow as the pickle ages.

I used 4 red peppers, 2 onions, 3 green bell peppers, 2 large jalapenos, a couple tablespoons of dried cilantro (really you put it in until it looks right to you), and of course, the salt and water.

I capped and cored the jalapenos, and tossed them in the blender with 1 whole cored red pepper, and ran that until it was completely liquid - I really didn't want chunks of jalapeno, because I am recovering from intestinal disease, and need to be careful about pieces of hot pepper. This also had the happy consequence of saving me from having to touch the jalapenos with my hands while chopping them.

The rest of the veggies were chopped and mixed together with the salt. At this point I had a really nice fresh salsa.

The salsa goes into the jar, and gets covered with water. I use a half gallon Ball mason jar, with a Fermenta Dunk Extender, and Dunkers (I use more than one dunker) and I put on a Wide Mouth Fermenta Lock Cap.

The second or third day, the salsa begins to smell pickly. The Fermenta Lock lets the gasses out, and as it does, the valve becomes lightly scented with the smell of the salsa. But you can open it and smell it if you want also - Salsa is not so fussy that it can't stand being opened to check the progress with your nose. I would not recommend digging around in it until after the third day though!

It is usable at this point, but is so much better if it pickles somewhat longer. This particular combination made a medium heat salsa. A single jalapeno would make mild salsa, and no jalapenos would make a no-heat salsa.

After about a week, the salsa goes in the fridge, where it continues to mature.

Using Pickled Salsa

The onions and peppers in this stay crisp and crunchy. It works well both as a condiment straight from the bottle and onto foods, and as a seasoning in cooked foods, added while the food is cooking. I love it in eggs, and in breakfast burritos. The flavor is different than fresh salsa.

Salsa is wonderfully flexible stuff, you can juggle the ingredients around all you like, make it with what you just happen to have, or leave out what you can't stand. It isn't like running a company where it has to be the same all the time. Give yourself permission to just go with what you've got.

Pickling Peppers, Onions, and Garlic

For some people, the little pearl onions are the best part of certain types of pickles. For others, a good pickled jalapeno or pepperoncini is a delightful treat. Pickled garlic is a nice addition to many salad dishes, and pickling these things is also a great way to store them for later use.

Pickling fresh herbs, bell peppers, nasturtium buds or seeds (for a caper substitute), and other seasoning or garnish type items will give you some tangy additions to meals for months after your garden has given up for the year.

As long as the sharp vinegar-like flavor is a helpful addition to the food, pickling is a good way to preserve some of the fresh ingredients that you want to use when your garden is not producing them (or when good quality is not available fresh).

NOTE: Read the section on Kraut first. The basics about keeping things covered, and how long to ferment on the counter, and how to handle some of the processes are in that chapter.

Going Back to Pickles

For all of these things, the brine recipe is the same as it is for old fashioned dills.

The process is also the same.

Cover with brine, weight it down, wait 3-5 days to smell that pickly smell, then after about 2 weeks, put it in the fridge.

Remember the Proportions

2 tsp salt per cup of water, OR 3 TBSP salt per quart of water. This brine works with ANY non-starchy vegetable.

Some Things Get Better With Age

These things are living foods. They change as they age. The bright combination of flavors that you taste in a young ferment may be very different from the mellow blended flavors of a mature ferment.

Stored in the fridge, they will keep for many months, and they'll change gradually through that time. Hot flavors tend to mellow – which is exactly the opposite of hot flavors that have not been pickled. The brine works its way in, and the flavors of the vegetables work their way out, little by little.

Don't Forget Them Entirely

It is common for people to use what is new, and then get tired of it. The fermented food gets shoved to the

back of the fridge, and forgotten, like the half bottle of pear sauce that we opened one morning to put on pancakes and just did not find a use for again before it spoiled. Unlike that pear sauce though, a forgotten ferment will just continue to ferment for many months. You can drag it out three months later, and it will just be BETTER... not moldy.

It does have an end of life though. Pickling should be used for those things that you know you are going to use within a year – and is BEST used for those things that will be eaten during the winter, when your garden is not producing fresh foods.

If you know you will eat it all before the new crop comes in next year, then it is a perfect candidate for pickling.

Start Some Sourdough

Sourdough starter is like having a pet (only not cuddly). You feed it and take care of it, and it gives you something back. You never have to buy yeast again (if you keep it going), and you get awesome slow bread.

NOTE: Some sources call this Homemade Yeast. It does NOT work like commercial yeast. You cannot just dry it and use it like commercial yeast, in spite of implications of this kind printed on a few common blogs.

Make it from Scratch

I've run into a number of different methods for starting sourdough starter. Some of them make it sound terribly confusing. It isn't really, you only need two things:

1. **Flour.** Whole wheat works best. The fresher the better. Wheat germ in the wheat helps but isn't necessary. Rye, barley, oat, or rice flour may also be used, but some kinds may require more than just two ingredients. If you need gluten free sourdough starter, you can Google a recipe for it, there are several online.
2. **Water.** Clean as you can get. Non-chlorinated is best, but low chlorine amounts won't hurt.

Start small - half a cup flour, a little less than half a cup of water. Should be stirrable, but sticky (not soupy). Put it in at least a quart jar. Cover it with a cloth, or even an airlock cap (The yeast is already in the wheat flour, no need to expose it to air).

Watch it. When it gets bubbles (12-24 hours, usually), give it another half cup flour, and a little less than half a cup of water. Stir it again. Don't worry if there are lumps, they'll work themselves out as it fizzes.

We'll get back to this in a minute – after we discuss rehydrating dried starter, because after this point, they share common processes.

Rehydrating Dried Starter

If you have received a dried starter, it may or may not come with good instructions. This is the method that we have found that works best. It takes only a few days to have usable sourdough, if you do it in the right way!

If you Google how to rehydrate sourdough starter, you'll find many instructions, some of which are incorrect, some of which are right, and almost none of which tell you WHY the right way is right, and the wrong way is wrong.

ANOTHER NOTE: If you dry your own starter (just spread it out on a pan and put it under a fan – do not use a dehydrator, it will kill the fungus), this is how you reconstitute and revive it for use also.

This is the Right Way

Soak a small amount of dried sourdough starter in 1 TBSP of warm water (make sure it is not hot at all, or you may kill the starter – stick your pinky in, if you can hold your pinky in and it feels warm and not hot, it is right). A "small amount" means between 1/2 and 1 tsp of starter.

Let it completely soften, so there are no hard lumps left. This should not take long.

Add 1 TBSP flour, and stir. You may need to add another tsp of water if it is too dry. It should be a sticky stirrable mess.

Wait 12 hours. If there are bubbles, add another TBSP flour, and about 2 tsp water. Stir again. If there are no bubbles yet, wait another 12 hours before you feed (or sooner if you DO notice bubbles). Feed after the second 12 hours even if you don't see bubbles.

> Some instructions say to rehydrate the starter, and then add a cup of water and a cup of flour. This is incorrect, because as stated, flour contains yeasts already. If you start with a small amount of starter and flour, the starter has the ability to spread yeasts into the flour. If you start with a LOT of flour, and only a tiny bit of dried starter, the yeasts in the flour will take over. This is important because people buy specific starters because they want the particular flavor of a long established starter or a historic starter (some do taste differently).

Feeding Sourdough

You've made new starter, or you've rehydrated some dried starter and it is now making bubbles.

Now, every 12 hours you need to feed it. Before you think this is going to be too much work, relax. You don't have to do this forever, just until it is established. And it doesn't have to be every 12 hours on the dot, just twice a day - morning and night. You can do that! If the temperatures are cooler, then once a day is all it takes.

At first, you are going to feed it another half cup of flour, and a little less than half a cup of water every time, until you have about 2 cups total (when the bubbles are stirred down). Then you'll start removing some each time you feed it. **At this point, I also like to have it in a 2 quart jar – it just fits better!**

Once you have about 2 cups total, you'll have to maintain it at that level, remove half, replace with 1 cup of flour and a little less than 1 cup of water. Yes, it will get the jar messy. Put it in a clean jar every other day or so. That will help it not look so nasty, and keep mold from getting hold on the sides.

Using Sourdough

Sourdough is used in place of yeast. But it is not a fast process. It is a slow process, one that weaves its way through your day, and calls you back to it periodically. It requires planning ahead, and the development of a routine.

It takes PRACTICE to get it right.

First, we want to know how to take care of the sourdough as we use it.

Keep watching it.

First it bubbles (that was your cue to start feeding it), and next it starts to grow - that is, it will expand, and then deflate as the bubbles rise and then burst and slow down again. It does this on a cycle. Once it starts to deflate, that means it no longer has enough food to keep growing. It may "peak" and reach the high point when you are not there, but you'll see streaks on the side of the jar, and a "high water mark" where it came up to. You don't have to feed it as soon as it starts to deflate, it will just slow down. Let it go too long though, and you'll starve it, mold will take over, and poof, you've just killed it! This is why you feed it once or twice a day - to keep it from starving.

Second, you watch how MUCH it bubbles. It will rise more and more each day if it is happy. **When it gets to the point where it is doubling each day, you can use it for bread or whatever else you want to bake.**

> **NOTE: Hard Red Whole wheat flour may not contain enough gluten to rise double (it may not hold together well enough). You may either add a little white flour (half and half, or one feeding all white), to get it to stick enough, or you can just watch the amount of bubbles. It will have bubbles distributed all through, top to bottom, when it is ready to use.**

Now, the other factor you can pay attention to is **the SMELL.** Sourdough starter can smell really funky at the beginning. Nasty stale stuff that does not AT ALL smell like what you are aiming for. Bear with it. It gets better, though not necessarily how you expect!

After about three days, or maybe four, it will no longer smell so funky, and will smell alcoholic instead – some kinds of flour may smell sharply vinegary instead. Bread does form alcohol when yeasts digest the flour - not a problem, because it all cooks out when you bake it. But if you've done baking, you'll recognize the sharp alcohol smell of rising bread. It may take a little longer to smell yeasty - that other more comforting smell associated with yeast dough. Let it go through the phases.

To use the sourdough, remove the amount your recipe calls for – usually 1 cup, sometimes more.

Feed the sourdough to replace what was taken out – if you remove 1 cup, add 1 cup of flour and a bit less than 1 cup of water.

Follow the recipe for the part you removed – often they will instruct you to feed THAT, (with 1-2 cups of flour, and some water), and let it set overnight.

The next day, you will add the rest of the bread ingredients, and let it raise all day, and bake it sometime in the afternoon or evening.

Even making sourdough pancakes or biscuits is a slow process. It can be even slower in the winter when temps are cool.

Because it is a slow process, many recipes call for adding commercial yeast to the sourdough. But this is a CHOICE, not a requirement. It is just SLOWER if you do not add the commercial yeast.

I have not included recipes here, because I am not practiced enough at making sourdough breads yet to be able to say this or that recipe is the best. I don't like sourdough all that much, and while I've made sourdough starter, and I've made bread from it, I never got good enough at it to really achieve a bread that I could say I wanted to serve to anyone else. If I liked the flavor of sourdough better, I'd have practiced more at it. My life has also interfered with some of my goals lately, so I could not experiment for the sake of experimenting. It is on my list though, and I look forward to the day when I can work it out sufficient that I never need to buy yeast again.

With practice, you can make a three ingredient bread – it will have nothing but flour, water, and salt. Of course, some of that flour and water will be your starter – so you may need to think of it as a four ingredient bread. It requires no sugar, no oil, no milk or eggs. Just the starter, more water and flour, and a little salt. It generally takes about 1 cup of starter for 1 loaf of bread, but if you increase it overnight (with more flour and water), it can make 2 or more loaves.

There are many recipes online for sourdough breads, pancakes, biscuits, even cakes and desserts. You can make your own choice as to whether you choose recipes that use supplemental commercial yeast, or whether they do not. Without it, it is slower, and you have to learn how to recognize when it has risen enough, and when to put it into the oven.

Many people recommend using a banneton or other dish to rise the bread, and then transferring it into the pan once it has risen. I do NOT recommend this, especially for beginners. Getting the bread into the oven at

the right time is tricky to start with, and if you let it rise a little too long, the loaf will collapse when it is transferred. It is far easier to shape the loaf and let it rise in the baking dish. It should be greased with solid grease, not butter or oil, so that it will hold up to the long rise time. Once you learn the trick of it, you can experiment with other ways of doing it, and you'll be able to understand why it reacts the way it does.

Getting Tired of Sourdough

Yeast is like kefir, in that it takes a commitment to keep it going. Feeding twice a day to establish it is one thing, but if you are not using it daily, you cannot leave it where it is growing so fast that it takes 2 cups of flour a day to just keep it living!

Once you have it well established (give it two weeks or more), you can put it in the refrigerator for a week or two at a time. Don't go longer than that without taking it out, feeding it, and letting it sit on the counter overnight before you put it back into cold storage, or it will mold.

Any time you want to use it, you need to feed it, leave it at room temp 12 hours or so, then remove what you need to use. If you need to feed it but do not want to cook, remove half, then feed it. The half you remove can be shared with a friend, fed to the piggies (you can stir it in with your chicken's fermented feed if you want), or added to your compost pile.

Playing Around With The Flavor

Ok, so once you have that down, there are some variations which are easy to experiment with. You see, there are different ways to make sourdough, and all of them produce a slightly different end product! What you put IN it has more to do with what it IS than the air around it.

A well established sourdough is hard to budge through the influence of airborne yeasts - there is simply too much already established in it.

Many recipes to create sourdough starter call for adding commercial yeast. Honestly there is no reason to do that. It just isn't needed, and it will harm more than it helps. When I start a sourdough, I want to do it without 20th century influences if I can. I mean, why should I use 20th century shortcuts when I am trying to recreate something that is meant to produce breads in the manner in which they were baked BEFORE those shortcuts were available? I can be a bit obstinate about authenticity, but I also don't like paying for things that should not be necessary if the truly traditional method is used, and I know that often when we take a shortcut, there is a trade-off that we didn't really want - and this is true of using commercial yeast as well.

Baker's Fast Rise (Active Dry Yeast) is not the same as the yeasts that grow in your sourdough. It is not symbiotic with the bacteria in quite the same way. It will tend to dominate and take over your starter, and you will never have starter that develops quite the same character as you will without it. Overblown commercial yeast tends to go dramatically sour, and tend to not taste flavorful like true sourdough. Give me the good stuff... give me the ability to control it naturally.

There are other things that are also recommended to get a faster start, and which will affect the long term sourdough that is produced, because they influence the kind of yeasts and bacteria that establish in the starter. Some of them are natural - again, they won't give you the same kind of sourdough you'd get from just flour and water, but sometimes that may be a good thing. Other additives can affect the outcome and flavor as well.

So what are some of the variables? What can you have some fun with?

- **Milk Kefir** - adding this can change the yeast balance, and affect the resulting sourdough starter. It can also help when you have stubborn flour.

- **Wheat berries** - if you are using commercial flour, it can be stubborn to start. A tablespoonful of wheat berries can put some nice natural yeasts into the starter, allowing it to start without adding other things, producing a pure historic sourdough. By the time you get to the point of using it, you will have thrown most of the berries out, and the ones that are left will soften when cooked, so they won't hurt your teeth or anything.
- **Water Kefir** - this is an alcoholic liquid, but it can be useful for jump-starting a sourdough start. If you use that instead of water on the first mixture, it can speed up the initial stages. It will also affect the long term outcome. It can help to broaden the spectrum of available yeasts in the sourdough, and may be especially useful for low gluten grains.
- **Wheat Germ** - traditional sourdough used milled flour with the germ. The components in the germ will encourage a broader complement of microbes in the starter, and make it more like "caveman bread". If you are not able to use fresh milled wheat, a tablespoonful of Wheat Germ every other day or so can help to get a more complex flavor and more vigor in your sourdough.
- **Different types of flour** - Rye flour, barley flour, spelt, durum wheat, hard red or hard white wheat, rice flour, oat flour, etc. Addition of other flour types to a starter can change the long term flavor. Alternately you can make the starter from other types and then maintain it on them also. If the sourdough starter is bubbling up nicely in the jar, then it will raise that kind of flour - which is a nice way to tell if your starter is going to raise what you want to bake. This can also help in trying to recreate a regional flavor - consider what grains they used historically in that region. Many areas used very coarse red wheat, some used barley and wheat blends, many used rye. Some used different flours during different times of the year, or according to availability and price. Many areas used blends of flours. This is a major influence on the flavor and qualities of a starter - various grains encourage the growth of different strains of yeast and bacteria, so it can affect both flavor and performance. In general, whole grains produce more sour than refined grains.

If you have a starter that is established that just isn't quite what you want it to be, you can also separate off half, and test it with different things, and see if you can come up with something closer to what you were hoping for. Starters can be very sour, very mild, fast rising (relatively speaking), slow rising, they can raise whole wheat or rye or white bread better than anything else, they can be gluten free or organic. They are all similar and recognizable as sourdough, but also distinctly different. Imitate one you like, or branch out with something completely new!

Have some fun with it, and feel free to experiment. That is one of the beauties of starting sourdough starter yourself - you can play with it until you get it just right.

Once you have it going, it is fairly low maintenance, as long as you are baking once a week anyway.

You, like the Yukon Sourdoughs, may find that you'd rather give up anything rather than give up your sourdough pot! But you don't have to sleep with it to keep it warm...

Take it One Step Further

If You Use These Foods

Once you have the basics down, you can branch out into fermenting many traditional foods from cultures all over the world.

Foods like Kimchee, Natto, Gourmet Mustard, and various soy ferments, as well as an assortment of exotics from around the world can be made at home, using similar techniques to those used for simpler fermented foods.

Recipes for these foods abound online, just search for them by name until you find one you understand and can obtain the ingredients to make.

Complicating With Condiments

Condiments may be more difficult to ferment than other foods, because so many of them contain sugars which will go alcoholic if they are fermented. There are a couple of ways to handle this, but the most effective method is outlined in a later chapter.

There are recipes online for fermented ketchup, barbeque sauce, mayonnaise (with eggs), and much more. These foods have different rules, and should be fermented according to the recipe instructions unless you are modifying to remove sugar to reduce alcohol.

Cautions

Many foods not included in this booklet have been left out specifically because they have some fairly complicated issues surrounding them, and quite a bit of controversy, which makes them more difficult to explain. We wanted to keep the book simple, so that we could produce it free, and so that it would not confuse beginners.

When a recipe has a caution, or when it seems like it is different than what you expect, either shrug and follow the recipe, or do some more research to find out why.

Mayo, for example, having eggs in it, is only fermented for 12-24 hours (depending on room temperature). Longer is not considered safe, due to the eggs in it. The vinegar, salt, and oil in it inhibit the growth of some pathogens prior to that point though. And anyone who is uncomfortable fermenting mayo certainly should not do so!

Also, if you run across ketchup recipes calling for fish sauce, do not use that recipe and omit the fish sauce. Just find a recipe that does not call for it if you do not wish to use it. It is best to find recipes that are the way you want them to begin with, and not modify unless you are either experienced with it, or have no other choice. Omitting sugar in the initial stages, and adding it back in prior to refrigeration is the exception – this is an acceptable thing to do to eliminate issues with alcohol.

When you want to ferment something and cannot find a recipe, ask on a forum. There may be a good reason why the recipe you want is not available.

Culturing Buttermilk

There are myths about buttermilk. Those myths are created by our modern processing methods. What buttermilk is NOW, is not what buttermilk was THEN.

If you skim cream from your raw milk, and make butter from it, the milk that you get off the butter isn't buttermilk. It is just skim milk with no fat. Sweet tasting, and good to use, except for the low fat.

In the stores, you can buy cartons of cultured buttermilk, which has specific bacteria introduced into skim milk, which is then fermented until it is lightly clabbered. I can't tell you what the flavor is, because I have never been inclined to taste it! But this is what passes for Buttermilk now.

Historically, this is not how it was done!

Cream was the most valuable part of the milk, in former eras, and there was not much of a market for milk that did not have the cream on it. Whole milk, and clabbered buttermilk were the two types of milk that were sold (all raw milk), and the buttermilk was considered to be poor man's fare. What did not sell, was used to feed pigs. Every small dairy farm also had pigs, to use the excess buttermilk.

Prior to the invention of various types of cream separators, skimming the cream was a fairly tricky job. If you've ever skimmed cream from the top of raw milk, you'll know what I am talking about. How it SHOULD be the same thickness all across, but isn't once you start dipping. And how you SHOULD be able to skim the cream without getting milk in, but can't.

So milk was cultured prior to skimming the cream. In those days, “cultured” simply meant that it was left at room temperature (which meant in a building with no heat in warmer months) to let the cream rise for several days. Naturally occurring bacteria and fungus which is present in raw milk, would proliferate. The good ones proliferated faster than the bad ones in temperatures from 60 to 80 degrees. (Milk production was more seasonal then, so temperature concerns in the winter were not an issue.) The result was what we would call buttermilk, but with a layer of cream on top.

After a few days of culturing (or fermentation), the cream would thicken on top of the jar, making it easier to skim off. The jars would be skimmed, and butter was made from the cream. The leftover milk, and the milk that was poured off the butter, was all “buttermilk”. Naturally soured milk.

Raw milk sours differently than pasteurized milk. Pasteurized milk has all of the beneficial microbes killed, so there is nothing in it except opportunistic nasties that develop in it after the pasteurization process is completed. When pasteurized milk goes bad, it is disgusting. If you have older recipes that call for “sour milk”, they are NOT asking for that nasty stuff you get when pasteurized milk goes off. They are asking for buttermilk – old fashioned sour raw milk.

Raw milk has a broad complement of good microbes in it, which proliferate faster than the bad ones if it is left OUT of the refrigerator. At refrigerator temperatures, different microbes grow, and it will still sour in an unpleasant way. But fresh milk that is left out, having never been in the fridge, will sour into buttermilk – when

we did this with goat milk, it tasted cottage cheesy, but a little sourer. I used it in smoothies.

- So, when you leave fresh raw milk out, warm from the cow, and do not refrigerate it, you get old fashioned buttermilk.

- If you leave it long enough that the cream layer sort of sets (like kefir or yogurt do), then you can skim it off more easily.

- If you make butter from the clabbered cream layer, you get Cultured Butter. You know, the stuff you pay an arm and a leg for at the store? That stuff. The good stuff.

Refrigeration was not an essential home need in earlier years, there were ways of handling food that were safe, which did not require cold conditions. Many farms had an Ice House, but it was not used for food storage much. They might also have a Spring house which provided cooling for long term storage of some kinds of foods, principally fresh milk. They may also put jars or jugs in the edge of a creek to cool them in summer. But mostly, they just worked around it, and took advantage of natural processes that occur when food is not able to be refrigerated.

Cream was often separated fresh, and hauled off (more so after the invention of the hand-crank cream separator). Skim milk was sometimes made into cheese. Cream that was hauled for long distances over bumpy roads was often turned to butter by the time it arrived at its destination. But for those who made a living from selling butter that they made themselves, and for homesteaders and home farmers, the milk to be used for making butter was set to clabber. Milk used for cheese was also frequently soured some before it was used – which is why so many cheese recipes call for acid of some kind.

If you are using raw milk, you have options you might not have realized that you have, for making nutritious and healthy foods which bring the benefits of heritage food preparation back into your kitchen.

With buttermilk, as with all fermented foods, trust your nose!

Traditional recipes for all kinds of fermented foods are available online. You have a great opportunity, if you want it, to seek out those things that your family appreciates most, and give them a taste of the past, which just may prove to be richer than the equivalent in the present.

Long Term Storage of Fermented Foods

How Long Do Fermented Foods Keep?

The color was pale gold, and translucent. The texture was still mostly crisp (more so than canned), slightly squeaky on the teeth. The flavor was boldly sour, not sulfurous at all, with mellow overtones. It was too salty. This batch was too salty right from the start. But then, the kraut I was sampling was easily 10 months old. Made nearly a year ago, shoved to the back of the fridge, and forgotten as other things circulated in and out of the fridge around it.

It had been fermented using an airlock (from FermentaCap.com), and a dunker extender with weight on top. After about five days on the counter in mid-summer heat, it was put in the fridge for about a month with those items still in place. Several servings had been removed, leaving a larger percentage of brine behind. After about a month in the fridge, the weight and extender had been removed, leaving the solids free-floating in the brine - for the most part, they stayed under by this time. The airlock was replaced by a standard canning jar lid. A few more servings were removed before it was forgotten - it had a lot of airspace in the jar. More airspace than food, in fact.

The fridge was the last thing we packed as we loaded the trailer to move. "Toss that." I said to my husband, as he pulled the kraut out of the fridge to put in the cooler. "No! Wait!", I had second thoughts... we were pretty low on veggies, maybe we'd need it, if it was still good. Worth a chance. "Keep it, please." One of the after effects of having had Crohn's Disease is that I need a lot of fresh veggies to supply certain nutrients. Without enough, I have headaches, muscle issues, blood clots, and heart palpitations (harmless, they say, but uncomfortable).

The new house did not have a refrigerator. Ours was packed away in a trailer that had to travel to our new destination later. We would be at least several days without a refrigerator - you can't stock up on things with a short shelf life in 90 degree weather when you only have a large cooler for storage.

Sure enough, by the third day, I needed some more vegetables. Time to see if the kraut was still good.

First, the visual inspection. Even color. The color had dulled and deepened, but was not gray or nasty looking. It still had the faint appearance of having once been green. The top layer was the same color as the bottom layer (this is a major indicator of when things are going bad - the classic change is that the top layer will darken or turn gray).

Second, the nose test. Smelled like... kraut. Well, not like store-bought canned kraut, a little different than that. But edible smelling. Like food.

Third, the texture test. Still firm, slightly crispy. Pretty much, if you make it to this point, and the texture is not mushy and broken down, you can be fairly certain it is good to eat.

Last, the taste test. A tiny piece. The flavor was good. Krauty... deeply flavorful.

I served up a helping (which I rinsed with fresh water, first, to reduce the saltiness), and enjoyed a cold treat in the middle of a hot afternoon.

So how long do fermented foods keep? The answer is not simple, because it depends on many factors: The food in question, the way it was fermented, the storage methods and conditions, the saltiness of the brine, etc. When things are fermented properly, and stored in a dark, cool location, they can keep for anywhere between 4 and 18 months. There have been reports of some foods keeping longer, under ideal conditions, but we don't usually have that.

Ferment your foods properly. Keep the solids under the brine, let the gas out.

Store them in a cool and dark location, with a lid that limits air transmission. It need not be airtight. It just needs to let air OUT more than it lets air IN during the first month, and after that, it just needs to limit it to the point that the amount becomes negligible - canning lids on mason jars are fine, as are plastic storage caps, with or without a gasket. They all work just fine for this, because what ACTUALLY keeps the food fresh, is the brine.

Use a reasonable amount of salt in the brine. Honestly, salt is NOT bad for you! Your body requires it - too little and you die! If you are not eating much in the way of processed foods, salted brined foods provide a necessary source of essential salt. Recommended amounts vary widely, so look up many recipes, and experiment with many amounts to see what works best for you and what you like best. Go with your tastebuds - they KNOW whether you need salt or not.

Then, watch your food. If it is more than a few months old, just run the tests:

Appearance, Smell, Texture, and Taste. In that order. The first three will always tell you if the last is worth the risk.

Living foods die. It is the nature of life. There will never be a way to assure that they will never spoil, if they are still living. The great benefit of fermented foods is that they are still living foods (the ingredients are dead, but the fermentation process creates new microbial life in it). As such, they can die, and when they do, they become unhealthy for YOU to eat - then it is time to give them back to Mother Nature, and let her compost them down for plant food. Keep things in their proper order!

We have forgotten how to use and judge living foods. But you CAN do so. It really isn't hard. You may read this, and it may feel unfamiliar. You may not quite know what I mean. But if you SEE it, or SMELL it, you WILL KNOW! The first time, you will instantly recognize and know, "Ah! THAT is what she meant!".

Leftovers from almost a year ago, proved a great benefit in a time of need, because I learned how to check to make sure it was still good.

Where to Store Foods

The traditional way of storing these foods long term was a root cellar. Temperatures were generally between 40 and 60 degrees in an unheated basement or root cellar. Foods fermented in the fall were expected to last until spring without significant break-down of quality. And they did.

Our modern choice may be a root cellar or unheated basement. More often, it is a fridge. Since the temps are on the cooler side, things store well there and for extended periods. Putting them in the fridge is just a variation on a very old theme.

Please Don't Freeze!

Recently I've noticed a book circulating, and various posts online, encouraging the practice of freezing lacto-fermented foods.

My first reaction was, **"WHYYYY?".**

There is absolutely NO benefit to doing so that is worth the trouble, and you lose virtually EVERY element that you want from lacto-fermented foods anyway!

1. You destroy the probiotics. Very few bacteria and fungus strains survive freezing and thawing. You just blitzed all the wonderful health benefits you labored to produce! Ok, so a few survive. Big deal. If all you want is a few, go buy commercial yogurt.

2. You lose the crunch and freshness of the vegetables. That lovely snap and bite of good kraut, zesty dills and crunchy asparagus. Freeze them, and they go to flop. Rubbery. Unappealing. If you want marginal food, buy canned. The whole point of making it yourself was to achieve something extraordinary. Not marginal.

3. It takes as much (or more) power to freeze foods as to fridge them. It takes none at all to root cellar fermented foods. If you repackage them you may save some space, but not a huge amount. No real significant benefit here.

4. It wastes time - no matter how you do it you have to take the time to thaw them. If you repackage them before freezing, it wastes even more. A convenience food goes from being fast and easy to being something you have to plan ahead for, or which you have to waste power heating before you use it.

5. You have to use it all soon after you thaw it, or it turns to spoiled goo. That's right, once it comes out of the freezer it is ripe for contamination by opportunistic nasties, so it will spoil within a week or so of thawing.

So not only is it detrimental to the value of the food, it isn't at ALL a convenience or time saver. It backfires all around!

The wonder that is lacto-fermented food is bursting with freshness, life, and convenience. **Stick the jar in the fridge. When you want some, dig out what you need, and stick the jar back in the fridge. How hard is that?** And it keeps for months (if it lasts that long), letting you use it as you like, no advanced preparation. SOOO nice for hurry up meals, unexpected guests, and your teenager's surprise growth spurt (peanut butter and dill pickle sandwich anyone?).

Why spoil all that by taking an extra, unhelpful step? Rather mind-boggling that anyone ever thought it had any advantage, isn't it?

"It takes genius to simplify the complicated. It is more common for people to complicate the simple."

DON'T Repack the Jars!

A popular manufacturer of fermentation jars insists that you must repack the jars when you have removed some of the food. They advise that you transfer it to a smaller jar when you have used some of it. Their logic is

that you need to reduce the headspace to “avoid excess exposure to air”.

While this advice is lucrative for them, since it requires that everyone who buys a large jar then must buy a series of smaller jars to “do it right” according to their theory, it is COMPLETELY WRONG, and fails on scientific fact.

The headspace in the jar is irrelevant, since the food is kept below the brine, or since the top layer of the food protects it anyway (with thicker ferments).

Removing the food from the jar, and transferring it to another jar INTRODUCES far more air into the jar than just leaving it alone where it is! Not only does it EXPOSE every bit of the food to air during the transfer, but it incorporates air pockets and bubbles into the food as it is placed in the new jar!

Repacking the food into smaller jars as you use it is COUNTERPRODUCTIVE, and should be AVOIDED unless you just really NEED that bigger jar for something else.

Use what you need. Dunk foods in brine again, OR, press down more solid foods so they do not have air bubbles. Stick it back in the fridge. It will be just fine!

Store your foods in a cool place, with limited light, and they'll last surprisingly long, and keep you nourished the whole time.

Myths About Airtight Fermentation

As the debate rages over whether fermenting should be done with an airlock, or without one, we keep hearing many myths repeated over and over concerning anaerobic bacteria and aerobic bacteria. There are many - repeated by people who have not followed the science through to its logical conclusion, or who have simply read something on a website produced by someone selling an airlock system, and have believed it, without realizing that only half of the story is being told.

Ok... so lets see if we can address some of the issues.

Myth: Pickles require an anaerobic environment, so they need an airlock. *This is false.*

Fact: Pickles merely require that the food be kept below the brine in order to ferment properly. It is the BRINE that does the fermenting, not the presence or lack of air on the surface.

Myth: Kefir must be fermented in an airtight environment. *Completely false.*

Fact: Kefir ferments wonderfully in any kind of container, lidded or not. It was traditionally fermented in skin bags, which were not airtight - if they had been, they would have exploded, because kefir releases a LOT of gas as it ferments.

Myth: Air moves through water, so the brine is not anaerobic. *This is completely irrelevant.*

Fact: It has nothing to do with good pickling. The salt in the food inhibits the growth of microbes other than the desired ones, or cultures put into the food grow faster than opportunistic cultures (yogurt and kefir) and create an acid environment before the harmful microbes can get a foothold. Acid then prevents the harmful microbes from multiplying in sufficient numbers to cause harm. This is true in open fermented and in airlock fermented foods. The presence of air is only relevant on the surface, not under the brine, due to the acid, and the high salt. Salt further inhibits air movement through the water. (This myth was created by a company selling jars with water-locks. Ironically, if their claims of air moving through water were valid, it would make their water-lock completely useless since air moves through IT also!)

Myth: Alcoholic Beverages are fermented using airlocks so it must be better. *This is also false.*

Fact: First, alcoholic beverages were traditionally fermented in either open vats, or in barrels with a hole at the top to let gasses and scum out (and many are still fermented this way). They were done this way for more than 6500 years. Airlocks have only been used in very recent history, and are still not used in all brewing, and are typically only used after the initial ferment is established. Besides that, the goals of brewing and the goals of pickling are very different. One aims to concentrate alcohol, the other aims to preserve by the development of an acid environment. One is a high carbohydrate environment which seeks to use yeasts to turn sugars to alcohol. The other is a high salt environment which seeks to pickle and preserve the food by encouraging bacteria to create an acid environment. Indeed many alcohol ferments do NOT store well like pickled items do.

Myth: The best cultures are anaerobic. *Far from true*.

Fact: Actually, some of the most dangerous microbes in the world are anaerobic. In fact, the most deadly of all, botulism, is an anaerobic germ. It is happily inhibited by acid, so it is not a risk in most fermenting situations (it may be where oil is used on top of a ferment because the oil can encapsulate some of the food before it is acidified, and the food can then grow botulism). It is the salt and acid environment, NOT the presence or absence of oxygen on the surface which keeps deadly germs from growing - both aerobic and anaerobic pathogens are inhibited by this. There are plenty of good aerobic microbes, which don't proliferate well in most fermented foods (but they are responsible for the creation of apple cider vinegar and several other types of fermented foods - good aerobic bacteria!).

Here's a few of our unwelcome friends who are all familiar anaerobic bacteria:

- Strep throat, Scarlet fever, necrotizing faciitis, rheumatic fever, urinary tract infections, pneumonia, dental caries, the plague & meningitis are all caused by facultative anaerobic Strepptococcus species.
- Clostridium spp. that cause intestinal gas, gangrene, botulism food poisoning, & tetanus.
- Bacteroides spp causes abdominal & liver infections.
- Fusobacterium spp that cause abcessing wounds, pulmonary or intercranial infections.

Just because they are anaerobic does not mean they'll grow in your ferment, UNLESS you fail to follow good fermentation rules (salt brine on veggies, and keeping the food under the brine). The point here is that claims that anaerobic bacteria are good, and aerobic bacteria are bad, are completely false.

Myth: Water lock systems are "airtight". ***This is false.***

Fact: Waterlock systems allow the passage of air BOTH WAYS. They simply provide a slight pressure barrier which does not allow the FREE CIRCULATION of air. As long as the air pressure inside is greater than the air pressure outside, the system releases air only in one direction (which it will do when a proper ferment is established - it will release carbon dioxide which will increase the pressure in the jar). Brewer instructions on the use of waterlock systems recommend that the water lock be filled with something other than water, in case it is "accidentally" drawn in, instead of out. It does happen, even under circumstances in which it theoretically should not (usually because of failure to produce a proper ferment). Further, air moves through water - slowly - and the water lock is filled with water. It is not much, and it is slow, but it does move into the container this way. Some air will always be introduced through the waterlock, simply because it IS a waterlock. This information does not apply to a one-way valve, it does not allow air back in because a one-way valve is designed to tighten the seal when outside pressure increases.

Myth: Airlock systems have to be airtight. ***This is false.***

Fact: It is not necessary that they be airtight, only that they allow air release in a way that does not allow air circulation in both directions. This means that the jar lid does not need to seal tight - it only needs to provide sufficient seal to not allow free air circulation in an **equal pressure** environment. And that doesn't take much! A mason jar lid will do that just fine (in general, even a plastic one). The difference between holding air under pressure, and holding air with no pressure, is dramatic. It does not take much of a seal to hold under zero pressure difference. **Some people fear that if the edge of the lid is not airtight, that air will circulate there while pressure is released from the airlock.** ***Again, irrelevant.*** Air pressure is equally high THROUGHOUT the entire container. This means that even along the edges, if air pressure is greater INSIDE than OUTSIDE, air will move only one way - out. An airlock always requires a minimum degree of pressure from inside prior to releasing gas - so under proper fermentation conditions, the pressure inside should always be greater, meaning air will only move one way through other small gaps as well. You have to have a fairly large gap (one large enough to release gasses without the airlock ever being used) for air to actually circulate, such as a large chip in the jar rim, or a piece of food caught on the rim. This is true of waterlock and one-way valve systems.

Myth: Vinegar is fermented with the cap off, therefore it is an "aerobic" ferment. ***This is also false***.

Fact: Vinegar is initially an aerobic ferment, which creates an alcoholic beverage, after which it moves through the alcoholic phase into a vinegarization phase. The second phase REQUIRES aerobic processes, to develop acetic acid, but only the surface of the vinegar is exposed to the air. Now... if air only moves through the top few inches of liquid (and that is on a curve - less and less with greater depth), then only the top portion is in any way aerobic, and that very little because oxygen simply cannot move well through water. This is science folks - the same science that the water lock people are saying prevents it from being "anaerobic". Of course, their "science" does not include variances for things like density and salt in the water, which both dramatically reduce air movement through liquid (and even cider is more dense than water). That said... ONLY the top few inches are in any way "aerobic", and not enough so to allow the proliferation in any great amount of microbes that will significantly alter the lactic acid production in the container. Apple cider vinegar in fact has lactic acid formed by lactobacillus, it just has more acetic acid by the time it is finished. So what is responsible for the

distinct vinegariness? Merely the transformation of sugars and alcohol to acid (partially the same things responsible for the vinegary flavor of pickles, though the processes involve more than one kind of acid). Alcohol rises in a liquid. It rises to the top, where aerobic bacteria from the air can work on it near the surface. They facilitate the process, and are in no way harmful. The transformation of hard cider to vinegar takes longer than the original fermentation period - because the aerobic microbes do not survive and proliferate as well, and they can only work at the top of the jar.

Myth: Foods fermented in an airlock system are anaerobic. Not true.

Fact: Small amounts of oxygen are always present - why do you think manufacturers of airlock systems still insist that you keep the food under the brine? (Because they know that this is what REALLY ensures success.) As soon as you open that lid, your culture has become "contaminated" with opportunistic microbes, and flooded with air. If you stir it, air is incorporated and often trapped in the food. Indeed, WATER ITSELF is not anerobic, and is constantly releasing oxygen molecules as they separate from hydrogen molecules. This has always been true, and is typically NOT a problem, if you don't mess with it during the first few days when the ferment is establishing itself. Salt and acid have more to do with inhibiting the growth of unfriendly microbes than any type of lid. Keep it under the brine, and keep the salt balance right on pickled foods, and it really doesn't matter!

Myth: An anaerobic environment will prevent the growth of mold. *This is also false.*

Fact: Recent research has shown some strains of mold that will grow in an anaerobic environment (in fermented foods, specifically - verify this by Googling "anaerobic mold"), and which require only the presence of carbon dioxide (plentiful in fermentations). Further, since no ferment EVER stays completely anaerobic, molds will eventually grow if mishandled or if opened repeatedly and exposed to molds (which are in the air). Additionally, the ferment, as a living food, eventually passes through the phases of good microbial growth, and into one of decay at the end of the life of the ferment (in the fridge, it may take 6-24 months to reach that point), and at this stage, MOLD WILL GROW, no matter what kind of container it is in. The goal of "zero mold" is no more practical than for you to try to clean the mold out of the air. It simply cannot and will not ever happen, and does not NEED to, because the majority of mold is not harmful, and will not proliferate to any great extent in your fermentations anyway, if you treat them right.

Conclusion

The greatest affect on fermented foods has NEVER been the kind of lid you put on it. It has ALWAYS been the method you use aside from the lid!

It does not even have to do with sanitation - ferments done under VERY unsanitary conditions have been shown to not have proliferations of harmful microbes - because the salt inhibits their growth, or the cultures that are being grown simply grow too fast and overpower the opportunistic bad guys (kefir and yogurt are examples).

A maker of sourdough says that if you keep the environment in the jar right - properly fed and cared for (food it likes, temperature it likes) - the sourdough stays happy and grows the right things. If you neglect it or toss in stuff that it does not like, it quickly gets "sick" - because the wrong things are encouraged to grow. This is true (based on scientific principals which I do not have time to break down here), and it is true regardless of the kind of lid - traditionally sourdough was kept in a lidded pot, wrapped in oilcloth, or kept in a jar with a cloth over the top. It was open to airborne microbes all the time, but the care of it is what kept it healthy.

This is true of all fermenting - how diligent you are about feeding your kefir, how diligent you are about NOT messing around with your pickles during the first few days, and how well you attend to the rule of sufficient salt, and keeping foods UNDER the brine, have FAR more effect on fermentation than the kind of lid you are using.

When the conditions in the food itself are correct, the bacteria and yeasts that you want proliferate faster than

the unwanted microorganisms, and they then create an environment in which the harmful microbes cannot thrive. Some WILL survive - just as you are breathing good and bad microbes every day, there will always be good and bad ones in your food. Bad ones only cause harm when they completely take over. Even with properly fermented foods, that WILL eventually happen, unless you sterilize the food (killing the good stuff).

Fermented foods are Living Foods. As such, they need to be fed to keep living. You don't feed pickles, so eventually the good microbes run out of food, and die off. Nasty beasties gradually move in after that - they eat the leftovers. If this did not happen, your food would be dead food, not living food. Keeping a lid on the jar, and keeping it under the brine will help to slow down the deterioration processes, but it will not stop it. Eventually the good guys will run out of food and die, and once that happens, the food will degrade.

If anyone tells you that you have to have a certain piece of contemporary equipment to ferment foods successfully, then they either have something to gain, or they don't understand the science as well as they think they do. It isn't as simple as declaring that you need this kind of environment and this little gadget can guarantee it. They are focusing on minutia, and ignoring the more critical elements, which are the things that have allowed fermenting to become a tradition through thousands of years, BEFORE they had that nifty new (and expensive) gadget.

Can an airlock help you ferment more successfully? Maybe - in certain circumstances, for certain climates, and certain personalities.

Is it necessary? No.

Unequivocally NO.

What it is, is CONVENIENT. It keeps you from having to vent the containers or risk a messy encounter with built-up gas. **It is EASY.** Because you don't have to worry about a potential explosion (of food, generally the glass does not break!), or the cat trampling on it, or fruit flies getting into it. So let's be honest about what we are selling! We aren't selling "science", we are selling CONVENIENCE (and so are all our competitors!).

You be the one to choose. If an airlock system helps you ferment foods more predictably, great. But if you are trying to get started and need to make do, go right ahead, and know that you aren't doing it "second best" and you aren't taking risky shortcuts. You are just using sound scientific principles to preserve food, just as your ancestors did.

In Case You Still Have Questions

(A reprint of another article we wrote on this topic.)

A jar does NOT need to be airtight to create an anerobic environment!

Proper fermenting requires that only one criteria be met:

Brined foods need to stay under the brine.

OR

More solid foods need to stay in an environment where gasses get out faster than they get in.

In fact, proper fermenting necessarily PROHIBITS an airtight environment. If it were airtight, gasses could not escape.

Air can get IN, just as easily as it can get OUT of a water-lock airlock system.

It DOESN'T do so very much, because of AIR PRESSURE.

As long as the air pressure INSIDE the jar is greater than the pressure OUTSIDE the jar, gasses will move one

way.

Air is not like a mischievious child. It does not try to dance in and out anywhere there is an opening. It is well-behaved. **It follows rules.**

If air pressure is equal, it will slowly drift back and forth in a lackadaisical exchange, IF there is an opening large enough to allow it – a VERY slow and lazy movement of molecules driven by minute air currents.

If air pressure is greater on one side than the other, air is PUSHED, from the HIGH pressure area, to the LOW pressure area. Bigger gaps allow this to happen at a faster rate - if there is even a plastic to glass, metal to glass, rubber to glass, or even glass to glass (where the fit is smooth) contact, air will not move significantly without a difference of pressure. **The tighter the fit, the greater the pressure required.**

An airlock works by putting a minimal barrier in the way, so the pressure has to be greater before large amounts of gas move. When pressure reaches a certain level, air can be forced through. In general, with fermenting, OUTSIDE air pressure will never be greater than INSIDE air pressure, so when gaps exist, gasses will move ONLY in a single direction... except for the transfer of some air through the water, which is a second issue.

This means that in most instances, a jar with a loosely capped lid will work just as well as an airlock in keeping gasses from building up inside, while keeping outside air out, **if you can get it at just the right tension**.

A One-Way Valve airlock (like the Fermenta Cap Airlock Valves) is DIFFERENT than a water airlock. It is a one way valve which allows air out, but which closes tighter with increased outside air pressure, does not let air circulate through any medium (this is what we created for Fermenta Lock). It simply lets the gas out, and stops entry of air from the outside. It does not need to be airtight, because it is designed to move air only in one direction, unlike a water lock which lets air move either direction through the water (again, it is relying on air pressure INSIDE being greater than OUTSIDE to prevent large amounts of air movement, but due to using water, does not prevent air from entering the jar and cannot in any way be classed as "airtight").

Open Fermenting, when done correctly, also works just as well as closed fermenting, because the food stays under the brine, where insufficient air is able to circulate to promote the growth of bad microbes. Oxygen has more difficulty moving through salt water than it does through fresh water, so the salt brine on the foods helps stop the air from getting to the foods in the brine, which is one of the reasons that the growth of unhealthy microbes is inhibited. Salt brines also limit the growth of unhealthy microbes in other ways - many bad microbes simply cannot live in a saline environment.

Even closed fermenting (with an airlock or valve) REQUIRES that the foods stay under the brine in order for them to properly ferment. If various manufacturer claims about fermenting requiring an airtight environment were true, then it would not matter whether the food was under the brine or not - the microbes could not survive either IN OR OUT of the brine, so there would be no need to sell such things as Dunkers and to give elaborate instructions on keeping food under the brine, nor to insist repeatedly that it be made to do so. The system, being a system, simply provides people with a step by step which they feel obligated to adhere to – it is the SYSTEM (the instructions) not the fancy jar and water lock, that helps improve success.

Fermented foods will store better in a tightly capped jar - after the need for gas release is past, a tightly capped jar in the fridge will store them perfectly well. Again, it is not necessary that the lid be "airtight", for the same reasons it is not necessary to have an airtight lid during fermentation, even if you want "anaerobic conditions".

Remember, air moves according to PRESSURE. As long as the seal is sufficiently tight to prevent air movement under EQUAL internal and external pressures, you're good. Canning lids, by their nature, tighten into a seal when external pressure is higher than internal pressure. So outside air won't really get in – but they are also designed to release pressure when inside pressure rises (as it does during canning).

If inside pressure is greater, the gas build-up will just slowly vent. No problem, because then the inside of the

jar is filled with gas, not air, and that is what you want anyway. Fermented foods that have not been killed by canning will continue to slowly ferment and release minor amounts of gas, even in the fridge. That is ok, and a good and healthy thing.

Airlocks are a rather new invention in the history of fermentation - only used within the last few hundred years, primarily for brewing, and even then, not exclusively. Most alcohol was open vat fermented, or fermented in casks with an open hole to let out gas and scum buildup. People have been fermenting foods for many thousands of years, and only using airlocks for at most, a few hundred. So just what is the traditional method here? Whose tradition, and how far back?

It is also important to point out that some types of foods MUST have broader air circulation than a lidded jar will provide. They need a cloth or something else that allows two-way air circulation, in order to ferment properly. Vinegar is one such item. Air circulation is important for these items. This is why a cloth over the top is the traditional way of doing these fermentations. Airlock systems are inappropriate for these items.

If you choose to use an airlock system, it helps to understand the principles under which it operates, so you know when to use it, and when a regular lid will be sufficient, and when a cloth or cotton cap over the top is a better option. And please don't feel superior because you are using an "airtight" system, because you aren't.

If you choose to open ferment brined foods, it is also important to understand the basics of good fermentation - keep the food under the brine, observe it from the OUTSIDE as much as possible, and keep out of it unless you are using it - don't fuss with it during the initial fermentation period when you are not actually using it. When fermentation is completed to your satisfaction, put on a tight lid, and pop it into a cool location for storage.

There is NO "One Right Way" to ferment foods. Many ways work, and they can be affected by location, individual circumstances, available food supplies, and other factors. There are MANY right ways to do it. Pick the one that works for you.

Good fermenting tools can help you to ferment foods more easily and to streamline a predictable routine more quickly, but if you are having to make-do with something less perfect than you wanted to be using, take heart! Our ancestors had to do the same thing, and they did so successfully for millennia. Get what you can, piece by piece, and simplify one task at a time if you need to.

If you want easier tools to use, we recommend:

Get Fermenta Dunk, and Dunk Extender from FermentaCap.com first (easy to do, since the Dunkers come with a free Extender). Because keeping the food under the brine is most important.

After that, get what you feel will help you most for the things you ferment - Fermenta Lock, Fermenta Fido, or Fermenta Crock. If you want to buy just the Fermenta Lock Replacement Valves and drill holes in your own lids, you can do that too (and we will happily send you instructions for drilling either plastic lids, or Fido lids). The choices are yours for how YOU ferment foods.

Don't Bother Buying Starters

Starter cultures for pickling are generally either unneeded, or counterproductive. Of course, this chapter does require a disclaimer - that some things DO in fact require a starter of some kind. And a few things do better with one.

The first thing I need to explain is a general misconception among new fermenters - a misunderstanding caused by the use of whey in so many fermentation recipes. **"Lacto-fermentation" does NOT refer to the presence of any milk product in the ferment!** It refers to "lactobacillus". A category of bacteria that proliferate in old fashioned brine cured or cultured foods. Lactobacilli will grow perfectly happily without the whey.

In general, lacto-fermenting happens best when you just let Nature do her thing. She usually does - that is how fermentation processes were discovered to begin with. But it isn't as simple as saying NEVER, or ALWAYS. There are some rules though.

Many recipes recommend whey as a starter. Some recommend specialized starter cultures. Other fermentation processes typically have standard recommended cultures - yogurt, buttermilk, etc. And many fermentation specialists say to never use a starter - but in fact they do not mean it, they just mean don't use whey, usually. **We have to break them down to understand what needs a culture, and what does not.**

So the first rule is that MOST fruit and vegetable ferments do NOT need a starter. ALL cooked food fermentations do BETTER with a starter. SOME milk fermentations REQUIRE a starter to get the right flavor. Meat and Eggs need either HIGH SALT, or an already Fermented Brine. Grains can sometimes benefit from a starter but do not require one.

- **Milk fermentations** - Raw milk will generally ferment nicely without a starter. It won't taste like yogurt, sour cream, or kefir though. To get things that taste like those, you need higher concentrations of specific types of microbes. Hence, many milk ferments are best with a starter, of the type of thing you are trying to culture. In general, a spoonful of whatever it is that you are trying to make more of, as long as it has live cultures, will do the trick for each cup of milk you are culturing. Buttermilk may or may not taste right if cultured without a starter, and depends on several factors. Too many to cover here. In general, if you are using pasteurized milk, you MUST use a starter (even if just a bit of a previous successful batch). If you are using raw milk, it depends entirely upon your taste preferences (because it already has a lot of lovely healthy bacteria).
- **Vegetable Fermentations** - Usually these occur very well without a starter. If you end up getting food that has been treated in some way (even some organics have been), it may interfere with the fermentation process. In that case, a starter culture may help. Generally, it is not needed, and whey, specifically, may be counterproductive. **The best starter for vegetables is some brine from a previous batch.** Raw Apple Cider Vinegar makes a reasonable second choice.
- **Cooked Food Fermentations** - These lack the necessary natural microbes to predictably ferment, and are likely to mold. I DO recommend a starter for these. The type of starter used depends on the type of food being fermented - generally take the starter from a previous successful batch, OR something which contains similar ingredients. For cooked sauces and condiments, a vegetable brine is a good choice, and Raw Apple Cider Vinegar is also acceptable.

- **Fruit Ferments** - These ALWAYS produce substantial amounts of alcohol (as does anything with any kind of sugar, honey, or syrup), so I only do them if I am pushing them through to a vinegar stage. Again, they ferment fine on their own without any kind of starter if you are using clean raw food (by clean I mean not contaminated with chemicals). On occasion, you may need a starter, especially if you are using cooked fruits or pasteurized juices. The best starter is a fruit based ferment - Raw Apple Cider Vinegar is a good choice.
- **Meats and Eggs** - These are risky items to ferment, and should ALWAYS be done with either a high salt brine (technically not fermentation, but curing), or previously fermented brine. Far less risky when you use homegrown meats or eggs, and in general, the historic fermentation methods did not involve plopping the food into salty water and letting it ferment, anyway (this is how curing is done, not how fermenting of meats or eggs is done). Typically they were added to a brine that had been previously fermented (such as one including vinegar). I have not studied meat curing methods sufficiently to be able to make recommendations other than that it is wiser to avoid trying to culture the meat in a fresh low salt brine. Meats that were cured and preserved in salt brines were always done in brines with very high salt content - enough that the meat had to be soaked prior to use to remove the majority of the salt. For eggs, simply use brine from pickles.

- **Grains** - The principle grain ferment that we are concerned with is sourdough starter. I don't mess with alcoholic ferments. Sourdough can be done either WITH, or WITHOUT a starter. There is some controversy over whether it does better with or without one, and whether a specific starter will retain individual characteristics. That said, what IS generally agreed upon in the fermentation world, is that you SHOULD NOT USE COMMERCIAL YEAST as the starter! It is also generally agreed that whey or other non-grain starters are unnecessary and generally counterproductive. Dried sourdough starter may be used, or you can culture it "wild". We have had very good success with wild cultures - simply letting a flour and water mixture ferment, and feeding it regularly. The only time we had poor success is when using some marginal wheat (with drought burn on the kernels), which produced a very moldy sourdough. Good wheat, either whole or refined, fresh milled or commercially stripped of the germ, will generally produce good sourdough.
- **Beans or Starchy Vegetables** - These are vegetables, but they BEHAVE like fruit during the fermentation process. They produce substantial amounts of alcohol, due to the high carbohydrates in them. They do best WITHOUT a starter, UNLESS they are cooked, in which case a starter may be very helpful. A dab from a previous batch is the best option if you DO choose to use a starter. Secondary options would be Raw Apple Cider Vinegar, or Whey if you have nothing else.

The second rule is to use a starter that is most compatible with the ferment. Vegetables to vegetables, fruits to fruits, milks to milks, grains to grains. The exception is Eggs, which are done in a pickle brine, this being the traditional method of pickling eggs. Raw Apple Cider Vinegar is the closest thing we have to an "all purpose" starter, and it does not work for milk.

The reason we do like with like, is because various food categories allow specific types of bacteria and yeasts to culture. While there IS some commonality, the microbes that grow best in milk are NOT the same ones that grow best in vegetables or grains. Having milk by-products in your sourdough, vinegar, or pickles is not the best option for keeping the food fresh for extended periods either, since milk degrades faster than vegetables, fruits, or grains in a fermented storage situation. This is one of the reasons why whey is not a good starter to use for things other than milk cultures.

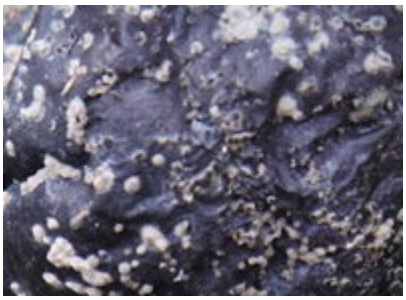
So as a general thing, skip the whey in your pickles or kraut. It isn't needed, and actually does more harm than good. If you cannot get good quality organic produce and have to use treated foods that don't pickle

predictably, then use a starter from a similar food group to boost the predictability of your ferments.

Some companies sell fairly costly fermentation starters. Unless you are having problems with ferments (due to water quality, food quality, or other things you cannot control), they are not needed, and they generally do not work as well as advertised. But hey, when a food creates itself, selling a thing to create it is a pretty safe bet!

Mother Nature will be only too happy to help you create good food for your family.

Recognizing Spoiled Foods



Many people worry when fermenting and pickling foods at home, regarding spoilage of food - what if, they wonder, the food spoils, and I don't notice, and I eat something harmful?

One of the reasons that fermenting has survived as a preservation method for thousands of years, is that it is pretty easy to tell when something is good, and when it is not.

Trust your senses:

If it **LOOKS** strange - odd color (often gray), moldy, or otherwise disgusting. It should look like FOOD.

If it **SMELLS** strange - odd smell, or bad smell is a tip-off that something is not right. It should smell like FOOD.

If it **FEELS** unusual - squishy, slimy, or way too soft. Some foods do get softer over time even when still healthy, but mushy is not good. It should FEEL like the food that it is supposed to be.

If it **TASTES** bad, or if the taste makes you queasy - generally one of the other senses will tip you off, but if you put something in your mouth that isn't right, just spit out out and rinse your mouth with water. Honestly, people pretty much never get to that point unless they just aren't paying attention to their other senses - because bad food always has some other tip-off that it isn't right! It should TASTE like food.

In the majority of food poisoning cases, there was something not right about the food, which the consumer ignored while eating it. The flavor was off, or the color was not right, or something which caused them to think something was wrong, but which they ignored.

Trust your senses. You'll notice a common theme there - Food looks, smells, tastes, and feels like FOOD. If it doesn't, then don't eat it!

With fermented foods, it is usually pretty easy to tell when it is not good. Most spoilage happens at one of two times:

- **During the initial ferment.** Something is wrong right from the start. This means that it goes bad usually before you've even had a chance to sample it. The kind of spoilage that happens here is very visible - typically involving mold, a layer of nasty stuff on top of the ferment, or other very visual indicators that something hasn't worked correctly. Often it is due to contaminated food, hot temperatures, insufficient salt or brine coverage, or something else simple, so it is not only easy to detect, it is easy to correct.
- **During storage** - usually after prolonged storage. In this instance, you made so much that you aren't using it regularly. It has been shoved to the back of the fridge, probably in a half-filled container, or it has been left on a shelf in the basement or root cellar and not looked at or used in a few months. Usually, it just got stored a little too long, or at too high temperatures, or in a container with too much airspace for too long a time period. Spoilage of this kind is also generally easy to detect - and will more often involve slimy, mushy, bad smelling gook, and may arrive one day in your kitchen, in the hands of a child, who is asking, "Mom? Is this supposed to look like this?". This type of spoilage is also easy to

avoid, and one of the easiest ways to correct it is by making small batches of things you don't use frequently, so they get used in a timely manner. Proper storage – food kept under the brine, cool temperatures, and checking them once a month - also helps to eliminate spoilage during storage.

With fermented foods, there is pretty much never an instance of spoilage serious enough to actually make you sick that is not detectible by more than one means. So if your nose doesn't work as well as your neighbor's, do not fear. Your eyes and hands will tip you off instead.

This applies to traditional salt and acid fermentations, and to milk or fruit based fermentations. **We do not recommend fermenting vegetables without salt.**

Trust your senses! Pickle with confidence.

Reasons for Spoiled Foods

Spoilage is a concern of many people, especially when they are just getting the hang of pickling and fermenting foods. It DOES occur. It is detectible when it happens. But what causes it?

Spoilage CAN occur from a range of sources. But the most common causes are actually NOT the things people think they would be.

Foods are most likely to spoil during two specific phases:

1. During the beginning phase, when the ferment is just getting started. This will be noticeable right away - the ferment never really develops the characteristic pickled or sour smell. Instead, it gets a funky smell (ok, so there just isn't another word for it... if you smell it, you KNOW). It is NOTHING like the sharp smell of properly fermented foods. It is musty or odd, or something that just makes you wonder exactly what happened.

There are a number of potential causes for this, but only FOUR primary causes. (We used to have only two, but two new ones have cropped up due to food industry issues.) Surprisingly, it is NOT because you forgot to wash your hands, or because you did not sterilize your containers. The first two have minimal affects - people used to brine foods under appallingly unsanitary conditions and it worked very well.

> **NOTE:** Salt amounts CAN affect the ferment IF there are other quality issues. In ideal circumstances, vegetables may be fermented without salt, but salt is one of the things that helps to compensate for less than ideal circumstances. So if you are having issues with fermentation, salt is something you do not want to compromise on – put in the recommended amounts, because it can aid in establishing a ferment where other conditions are not as controllable.

The primary causes for failure of the ferment to properly establish in the first place, include ONE that is a method issue, and three that are quality issues:

Failure to submerge the food. All of the food must be held under the brine. With kraut, a heavy weight must be placed on it to press the juice out of the cabbage and keep the cabbage pieces under the liquid. Failure to do this is the number one User Error issue.

So Rule #1 is: Keep the food under the brine!

Spoiled Food. If your food is starting to mold, do NOT use it for fermenting. You need good fresh food for fermenting. Even if you trim off the moldy parts, and wash it well, there is a very high chance that the foods

you are handling have already been contaminated with a high degree of mold spores. It actually takes a lot to spoil a batch, and usually in combination with other factors. Sometimes a stronger salt brine CAN compensate for food that is on the edge, sometimes not, depending on the food, the water quality, the temperature, and the cussedness of the molds involved.

So Rule #2 is: Good fresh food that is not starting to spoil already.

Water. NOT well water - untreated water is NOT the cause of the majority of water caused spoilage (contaminated well water is only rarely an issue, though plumbing problems can cause other contamination issues, but they'll be severe enough to sicken family members). Chlorinated or chemically contaminated water is the major culprit. Chlorine and other chemical contaminants in water are designed to KILL bacteria and fungus. That is why they are there. They aren't picky about WHERE they kill those microbes (in the water, in your gut, in your foods, etc). In a ferment, that often means that they will kill the good bacteria, and let only the really resistant nasties thrive - and after so many years of government requirements for chlorine in municipal water, there are some really mean resistant beasties thriving in chlorinated water, and living in your kitchen. You get a yucky ferment instead of a good one if your municipal or community water happens to be over-chemicalized, or inhabited with resistant microbes.

This is not a simple thing - some water has so little chlorine, and few enough resistant strains that the good beasties grow anyway and you get a good ferment in spite of it. Sometimes a stronger salt brine will help compensate, sometimes not. Sometimes a Brita or Pur type filter will be sufficient, sometimes not. On occasion, municipal water is so contaminated with chlorine and other chemicals that no amount of filtering will clean it enough to get a good ferment. In general, winter ferments are more likely to succeed with municipal water than summer ferments - because pathogens are more rampant in warmer temperatures, water levels tend to drop in the summer, concentrating the contaminants, and some municipalities will compensate at times in the summer with extra chlorination.

Boiling the water only partially helps - chlorine tends to evaporate slowly out, but many places are adding chloramines, which do NOT evaporate.

So Rule #3 is to use clean water - good fresh well water, or cleanly filtered water.

Preservative contaminated food. That's right, there are preservatives sprayed on your produce, and no labeling requirement to indicate that they are there! If you purchase non-organic pickling cukes with the spines removed, or cabbage from the grocery store, or other vegetables from the produce aisle in the grocery store, chances are, it has been treated with some kind of preservative. EVEN MOST ORGANICS ARE TREATED WITH CHLORINE, but organics still usually have a better chance of not spoiling in a ferment if they are fresh enough. Preservatives on your produce may cause foods to spoil, even when you do everything else right.

Detergents used to "clean" foods will also cause this problem. DO NOT USE VEGGIE WASH on your foods if you are fermenting! Plain clear UN-CHLORINATED water is the best choice for washing, NO detergents.

So Rule #4 is to purchase FRESH food, LOCALLY if possible, ORGANIC if not possible.

2. At the end of the storage phase. A ferment will progress through many phases of bacterial and yeast life. As one form of food is consumed, the microbes that consume that food will multiply, thrive, and then die off. As

they do, they are replaced by the next cycle that consumes either what the first batch did not consume, or the byproducts from the first batch. The food may progress through many phases of this kind. Eventually the food sources for healthy microbes wears out, and there is nothing left but fodder for the unhealthy ones, which will take over, resulting in a fairly marked and rapid spoilage of the food - mold, slime, squishy feeling, gray color, and unpleasant smells, all of which tell you this is no longer food.

All ferments eventually spoil!

The problem is when they spoil too soon. After only a few weeks, or a few months. Good ferments, properly stored, should last 4-9 months if stored in a root cellar, and FAR longer if stored in a fridge.

There are THREE main factors that affect this. Again, it has less to do with the finer points of handling, and more with the biggies.

Temperature: This is the most influential factor. Cool temperatures, down to about 40 degrees, keep ferments fresh longer, as a general rule. There are some that don't thrive at low temperatures, but they usually STORE best at lower temps. Your typical kraut, pickle, or condiment ferment stores best between 40 and 50 degrees.

Freezing will kill some of the bacteria, and leave it ripe for infestation by nasties when it warms back up, so don't let them freeze in storage. Higher temperatures mean that the fermentation progression just happens faster - sometimes WAY faster, so keep them cool to help them last.

Keeping the Food Under the Brine: Again, this is a prime factor. Keep the food dunked, and it will be preserved much better. Small bits usually are not the issue. Big bits are. If they stick out of the brine very much, they'll mold before they cure, or degrade faster after they cure.

Brine Strength: More salt generally means it stores longer (to a point). Successful ferments can be achieved using a wide range of salt concentrations, but as a rule, the heavier salt concentrations lead to a longer storage life. Salt can also help to offset other factors that may be less easy to control, but usually only to a certain extent - it can't compensate for everything, and it can't do it indefinitely. Eventually even the saltiest of foods will be overtaken by opportunistic microbes that do not have your best interests at heart.

Fermenting is NOT as complicated as it may seem at first. There really are only a few things that you absolutely HAVE to get right. The rest is artistry - improving on a good thing, simplifying or increasing the predictability in your results. The factors listed above are the key elements in controlling spoilage. Everything else is just a nudge factor.

SPECIAL NOTE: Airlock lids and anaerobic environments are NOT discussed in this article, because they are NOT critical factors regarding spoilage. SOME individuals MAY be sensitive to specific bacteria or yeast types that proliferate less readily in an airlock environment, but as a rule, an airlock is NOT required to prevent spoilage.

From a CONVENIENCE standpoint, an airlock DOES make the process SIMPLER, because you do not have to vent the jar, and you MAY be able to be less picky about keeping things completely submerged (we are still testing this, and this statement is only based on preliminary observation and customer comments, not side-by-side testing). Generally an airlock is NOT required to eliminate or SIGNIFICANTLY reduce spoilage in fermented foods.

What Kind of Insane Person Gives Their Children Alcoholic Beverages?

What kind of insane person even RECOMMENDS doing so?

Stand back, I'm in no mood to be tactful on this topic. If you can't take it, you might want to stop reading this now.

If a person claiming to be a nutritional expert came to you and told you that beer was good for your children, and wine would help them be healthier, and that you should just dilute your beer by half with juice, and give that to your children, would you do it?

Authors of fermentation information across the US seem to think that this is not just acceptable, but somehow GOOD. An article on the WAPF site dismisses all concerns about alcohol, and publishes numbers for alcoholic content which cannot be verified by any source which has actually tested the content (sources which have tested them have found them to be VERY much higher - and don't quote me that sad excuse for science by Kelly the Kitchen Kop either, because she HEATED the liquid before she tested it, completely invalidating her results since alcohol evaporates RAPIDLY when heated and does not need to even boil to evaporate). **I am sorry about naming names here, but these are the two most often quoted INCORRECT sources of information on alcohol content in sugary ferments.**

After condemning the evils of sugar, the authors recommend alcoholic beverages as a safe and healthy alternative! Am I the only person out there who is flat out appalled and shocked by this?

I am so shocked by this that no matter how many times I see it the shock value never diminishes! They would risk addicting their children to alcohol, damaging their brains, livers, digestive systems and immune systems far more than sugar ever did, and they would risk burdening their babies with Fetal Alcohol Effect or Syndrome, or with neural tube defects (which are affected by alcohol - including anencephaly which is a fatal condition), because they also advocate usage by pregnant women! **They would risk having CPS remove their children from their homes all to be able to say they and their kids really LIKE drinking an alcoholic beverage!**

These articles recommend giving children (and pregnant women) **kombucha, water kefir, beet kvass, fermented sodas (with sugars in them), fermented fruit juices, fermented fruits**, and other beverages and foods which are KNOWN (and have been known through history) to produce potentially intoxicating levels of alcohol.

> **NOTE: I am NOT citing sources for percentages on these.** This information is SO EASY to find, by a simple Google search, that there is NO REASON for me to cite sources, and **I do NOT want you to take my word for it or trust my sources.** I want you to FIND OUT FOR YOURSELF. Go check my facts (don't use fact checker websites, they are not accurate - just do a Google search for alcohol content of whatever).

Now... why do I compare those with beer?

Two reasons:

1. The level of alcohol which is determined to be "potentially intoxicating". The US government regulates all foods with an alcohol content of over .5%. This is the level they have determined is sufficient to intoxicate if sufficient amount is consumed, and which is of an amount that you CAN consume enough to intoxicate. For children, the amounts required to intoxicate are far lower. Beverages with lower alcohol percentages are not considered to be alcoholic.

Remember that the majority of kombucha brands were pulled from the shelves of stores (in 2010) because levels of alcohol were too high to be sold except as alcoholic beverages? Recipes were then changed, with

bacteria added, fermentation strictly limited (second ferments no longer done), and carbon dioxide added for fizz (since **natural fizz is the result of much higher alcohol levels**). Levels tested up to 3% alcohol. That is equivalent of light beer (most beers are 5%, stout beer can be as high as 8% - the WAPF article lists beer as 8% but this is completely inaccurate since beer ranges from 3-8%).

Home fermented sodas, including root beer, ginger ale, and others, have an alcohol content that can range barely under .5% (generally no fizz under that level) to as high as 11% alcohol OR MORE, depending on how long it is fermented prior to bottling, exact temperatures of the room prior to bottling, exact amounts of sugar and other ingredients, the amount of time it stays in the bottle, the temperature the bottles are stored in, the amount of headspace in the bottle, whether the ferment is open or closed and WHEN it is open or closed, etc. **There are SO MANY variables that you CANNOT follow a recipe and say, "Oh, they said it will not be alcoholic." and know this is true! It is far MORE likely to be alcoholic than not!**

> **NOTE:** Some say that fermenting in a closed (airlock) container limits alcohol content. Not true. If you ferment during the first TWO WEEKS in a closed container, the alcohol content will be SLIGHTLY LOWER at the end of those two weeks. **If you KEEP it in the closed container, the alcohol continues to concentrate and gets stronger and stronger.**
>
> An OPEN ferment to start will build alcohol slightly faster, but then will evaporate it faster, and convert it to acetic acid (which does not happen in a closed ferment – and it will taste SOUR, and NOT be fizzy when that happens). Hence, brewers OPEN ferment for the initial phase, then CLOSE ferment to concentrate the alcohol. The opposite process will REDUCE the alcohol SOME, but will NOT eliminate the risks, and won't provide ANY assurance that your sugary ferments are not alcoholic.

- **If you ferment sugars, which includes ANY kind of carbohydrate based sweetener, or starchy vegetable or grain, it WILL create alcohol – scientific fact, folks! It is UNAVOIDABLE!**
- **Whey INCREASES alcohol content, it does NOT decrease it (because of sugars in the whey).**
- **Salt does NOT reduce alcohol content, it only affects flavor and rapidity of acid creation.**

Water kefir and fermented juices are in the same category, having similar sugar amounts. In fact, the water kefir we experimented with smelled so strongly alcoholic that we could not even taste test it, and we followed the instructions on the amount of molasses and sugar to add (and sugar, molasses, honey, fructose, and any other carbohydrate based sweetener that WILL ferment and create alcohol!).

Beet kvass is known to have an alcohol content over the legal limit of .5%, and is only listed as a non-alcoholic drink in a few countries which have much higher legal limits for classification of alcoholic beverages. It is usually between .5% and 1% WHEN MADE IN A CONTROLLED ENVIRONMENT, and is usually much higher when homebrewed, depending on same factors as other alcoholic ferments.

So, we are dealing with KNOWN higher amounts, in combination with an UNKNOWN process in your home which in most circumstances WILL result in an alcoholic content that is high enough to present real concerns.

2. The degree to which they advocate diluting them, and the strength at which they are using them.

If you have kombucha that is 2% alcohol, and you dilute it 50%, then you are not far off from giving your child beer diluted 75%. Would you do it?

If you have soda that ends up on the high end of the alcohol content scale, and you dilute it 50%, then you are still giving them the equivalent of beer, or light beer. Would you do it?

And since sodas are usually NOT diluted, nor are fermented fruit juices, or fermented fruit sauces, these things may have very high alcohol content, and are not any different than giving your children beer or wine coolers.

The biggest issue here is the fact that YOU DON'T KNOW. Are you just ok with giving a child, whose brain is still developing, a beverage which has a high probability of having sufficient alcohol to affect brain

development?

Roll the dice. Pick a drink off the shelves of a store blindfolded, not knowing whether it is juice, water, beer, or wine. Give it to your kids! There is no difference!

Yes, Child Protective Services WILL consider these things to be alcoholic. Yes, they WILL treat you the same as if you have given your children beer or wine. Yes, you CAN lose your children because of these things. And NO, this is NOT a reason for the entire fermentation world to let out a collective cry for secrecy! This is a reason to STOP GIVING CHILDREN ALCOHOLIC BEVERAGES, whether made at home or not!

But that isn't really the point. The point is that research on alcohol and developing bodies and brains is well established, and it is illegal to give your children these things because our society knows and recognizes the harm that it causes. What caring parent would casually dismiss this and brush it off as being of no concern, simply because they learned how to make a neat new thing that they think tastes pretty good? Pride in making such a thing, or even a belief that it might be helpful to an adult body (evidence suggests otherwise, but whatever) is NO reason to dismiss the danger to children from these beverages and foods.

Is that such a difficult thing? Is that such a difficult truth to accept? (You see, I told you I had lost patience with it!)

Root beer and ginger ale are no longer fermented commercially in the US. They are made by adding carbon dioxide as other sodas are made. They are specifically made that way because it is impossible to develop sufficient carbonation while keeping it under the legal limit for regulation as an alcoholic beverage.

Honestly, what makes people think they can do so at home without accurate equipment, if it is impossible for commercial companies who control every single aspect of the ferment?

I am beyond disgusted with those who promote this. I can understand those who have been deceived continuing to do so because they have been assured by a source they trust that it will cause no harm. But SHAME on those sources! **SHAME on those people who continue to claim that these things are safe or beneficial for children or pregnant women!**

We SHOULD be outraged! We should, as a community of people dedicated to health, be disgusted and NOT TOLERATE people who make these claims! We should as a group, demand that they STOP IT.

They can risk their own children's health, safety, and custody if they choose, but they have NO RIGHT to tell other people that they are in no danger if they do the same!

Surprising Alcoholic Ferments (NOT for children!)

If a fermented food or drink is tingly or fizzy on your tongue, or if it has an alcohol "burn", then it is UNSAFE for children, pregnant women, individuals on medications that conflict with alcohol, recovering alcoholics, people who are reactive to alcohols, and those who practice health codes that prohibit alcohol consumption.

The legal definition of "alcoholic" is any food or drink containing higher than .5% alcohol. This is right at the point where significant carbonation is detectible in liquid beverages (milk beverages fizz at a slightly lower level), and this is the level at which the government has determined that an individual MAY become intoxicated with sufficient consumption (and where it is a danger to children - and hence, to pregnant women). In other words, liquid fermentations will begin to "fizz" or "tingle" right about the point where they become unsafe for children, and where the US government classifies them as a potential intoxicant. **This is why**

modern sodas are carbonated by pressurized gas methods, and not by fermentation.

All of the following foods or beverages form significant alcohol. The sugars in the foods and drinks create alcohol during the fermentation process. If a food contains carbohydrate based sugars, IT WILL FORM SIGNIFICANT ALCOHOL. Basic rules of fermentation - sugar converts to alcohol.

Scientific studies on commercially fermented kombucha, sodas (root beer, ginger ale, and other fermented sodas), and beet kvass, show the alcohol content to be between .5 and 11% alcohol. Averages are 1-3%.

ANYTHING with equivalent SUGAR, and equivalent fermentation times, will form the same levels of alcohol. In water kefir, it is the sugars which enable fermentation - water, by itself, cannot ferment, it has to have something to work on, and when sugar is all that is added, you are producing an alcoholic beverage.

SUGAR is defined as “ANY carbohydrate based sweetener”.

- Sugar
- Turbinado
- Raw Sugar
- Agave
- Fruit Syrups
- Fructose
- Sugar alcohols (xylitol, erithorbitol, sorbitol, etc)
- Honey
- Molasses
- Sorghum
- Other carbohydrate based sweeteners

This is a PARTIAL list of foods and beverages which can produce potentially intoxicating levels of alcohol.

Drinks

- Kombucha
- Fermented Soda
- Water Kefir
- Fermented Ginger Ale
- Fermented Root Beer
- Beet Kvass (higher than sodas)
- Herbal Kombucha
- Fruit Juice
- Sugared drinks
- Over-fermented milk Kefir (very fizzy - carbonation suspends in milk sooner than in thinner liquids, so only very fizzy milk kefir is significantly high in alcohol)

Foods

- Fruits (including cranberries)
- Tomatoes (including tomato salsa or sauce)
- Beets

- Squash
- Carrots (generally ok in vegetable blends where there is less than 30% carrot)
- Potatoes
- Sweet Potatoes
- Other Starchy Vegetables
- Grains
- Flower blossoms

How to Get Rid of the Alcohol

- Add the sugar (or the fruits or starchy vegetables) after fermenting non-starchy vegetables, to prevent it forming (for sweet pickles or fermented condiments). Let it meld for three to seven days under refrigeration to blend the flavors and let the sugars permeate the fermented foods.
- Vinegarize it (open ferment it until the alcohol converts to acid). Ferment two weeks in a closed fermentation (to slightly reduce alcohol formation), and then open ferment until the alcohol is fully converted to acid.
- Evaporate it (let it sit in a shallow dish until the alcohol evaporates). This can take several days in the fridge.
- Cook it out (fast evaporation - heat it and stir it until alcohol evaporates). This takes between 5 and 10 minutes to heat out all the alcohol, depending on total volume. This also destroys the helpful microbes.

Things You Should Not Ferment for Health

A few years ago, the wine industry looked for a reason to market wine as a health food. They studied health statistics across the world, and discovered that France and Italy had lower heart disease rates than the United States. (Of course, so do many other nations... but France and Italy are the ones they wanted to pay attention to!). France and Italy have higher than average wine consumption. So wine began to be marketed as a heart healthy substance, and they acredited this to the "antioxidants" in it.

Funny thing about that study. **France and Italy differ from the US in many ways. They eat more fresh vegetables year-round, they eat fresh fermented foods that have not been pasteurized, and their eggs are handled differently making them less prone to superbug contamination. But to the wine industry, there could only be one answer - it had to be the wine!** Actually, grapes have more antioxidants than the wine, and they also have probiotics. Yeah, that's right, fresh foods contain probiotics too. The natural bacteria and fungus that grows on and in fresh foods, that aids digestion and improves our health.

It wasn't the wine at all.

The lacto-fermentation world has done the same thing with fermented foods. They have failed to distinguish between those foods that contain alcohol, and those that do not, and to identify the ones that are really helping. **Foods that DO NOT contain significant levels of alcohol have a FAR higher benefit to the body than those that do.**

Now, some people will say that ALL fermented foods have alcohol. This is true. But **NOT all fermented foods are ALCOHOLIC**. Many are - far more than most avid fermenters are willing to acknowledge.

For the purposes of distinction, alcoholic foods are defined as those having an alcohol content near or above the legally recognized level for alcoholic beverages. This is .05% alcohol content, as recognized by the US

government as amounts high enough to produce intoxication, and illegal for consumption by minors.

Foods with an alcohol content close to this point will have the following characteristics:

1. They will smell of alcohol, or they will smell "yeasty" like beer. The boozy smell may be unmistakable for many people, or difficult to detect for others, depending on their sensitivity to it. Many people who routinely consume alcohol CANNOT DETECT THIS SMELL.

2. They will have a fizz or tingle on your tongue. Carbon dioxide will NOT suspend in liquids normally, unless they are under significant pressure (like commercial sodas). It WILL suspend (dissolve) into liquids that have significant alcohol content. That "carbonation" tingle, or the fiery burn of strong alcohol, is evidence of significant levels of alcohol in a food or drink. The finer the bubbles, the higher the alcohol content, and the effect can range from coarse soda-like bubbles, to a fine alcoholic burn where the bubbles are so fine they are not distinguishable as bubbles. This is the time honored method for detecting unwanted alcohol content in foods that are not supposed to go alcoholic (we just forgot about it in modern life, because of the availability of carbonated beverages which are pressure carbonated).

3. They have been fermented with sugar, OR they include some kind of starchy carbohydrate. This includes fruit or fruit juice, cane sugar, unrefined sugars, agave, fructose, honey, sugar alcohols, and ANY OTHER carbohydrate based sweeteners, potatoes, grains, etc. If it has been fermented with simple carbohydrates, it WILL go through an alcoholic phase, characterized by the fizz - this is not a "maybe" thing. **Sugars or starchy carbs in foods WILL produce HIGH AMOUNTS of alcohol as they ferment! ALWAYS.**

ANY fermented fruits or juices, kombucha, fermented sodas (including but not limited to ginger ale and rootbeer), water kefir with or without fruit juice added, and fermented salsa with tomatoes (tomatoes have sufficient sugar), fermented potatoes, fermented grains, etc, all contain ALCOHOLIC levels of alcohol. Yes, this is provable... Ginger Ale and Rootbeer, made by fermenting, have an alcohol content of .05 to 11% (**.05% is the level considered to be the minimum needed to produce sufficient carbonation to be identified as a soda**). The potency depends on the length of fermentation and other factors. Longer ferment means higher alcohol content.

Other fermented beverages with sugar contain similar amounts of sugar, and therefore WILL develop alcohol at a similar rate and level. **This point is indisputable - the science behind this is very clear and so simple that you cannot misunderstand that this is so.**

Alcohol is not an All or Nothing kind of thing. The levels will vary from item to item. **The presence of suspended carbonation is an indicator of significant alcohol levels, and a good measurement of whether the alcohol is enough to cause harm. With alcohol though, more of it, means more harm.**

In fermented foods that have minute amounts, the probiotics and nutrient content provide enough benefit to offset any minor damage by the alcohol. **Once you get to the point of being able to DETECT the alcohol through non-scientific means though, it is high enough so that the damage it is doing is equal to, or MORE than the benefit it is offering.** ELIMINATING alcohol is an unrealistic goal, and isn't the point at all. Keeping it to UNDETECTABLE levels (cannot smell or feel it on the tongue) is the goal.

How does alcohol cause harm?

- **Nothing can live in alcohol.** It has been used historically as an embalming and preservation fluid because it stops growth and decay.
- **Alcohol is used in the medical field as a sterilizing fluid.** It kills microbes on contact. This is NOT a 100% solution that is used, either. Standard is about a 50% alcohol content solution.

- **The higher the alcohol level in your ferments, the lower the helpful probiotic content.**
- **The higher the alcohol content, the more cells it will kill passing through your digestive tract** - it kills fast growing cells especially well, which includes both the natural and necessary bacteria in your intestines, and the cells that line your entire digestive tract. Alcohol is a known irritant to ulcers, Crohn's Disease, Celiac, IBS, Colitis, and other forms of Inflammatory Bowel Disease.
- **The higher the alcohol content, the more alcohol circulates in your bloodstream** - alcohol in the bloodstream kills living cells, and is especially hard on neural cells which do not easily repair themselves, and on the liver, which is responsible for helping your body detox.
- **Even fairly low levels of alcohol consumption may lead to catastrophic harm to a fetus**, if alcohol is consumed by either the mother (during pregnancy) OR the father (prior to pregnancy). It has as much to do with TIMING as it does with CONTENT, and even very low amounts of alcohol consumption during critical developmental stages can be catastrophic (it is a contributing factor to anencephaly, and microcephaly, as well as Fetal Alcohol Effect and Syndrome).

There are foods that pass THROUGH an alcoholic phase (during which the bacterial content decreases as the alcoholic content rises), then vinegarize (the alcohol is gradually consumed by increasing populations of microbes), after which it will no longer contain significant alcohol. Apple Cider Vinegar is one such food, which is recognized as a supplement with strong health benefits - RAW ACV is once again alive with a wide range of probiotic microbes which are purely helpful. These foods are not a problem - **when the fizz is gone, the alcohol is reduced to safe levels** and generally the bacterial and fungal count will be correspondingly higher.

The alcohol may also be COOKED out of foods. This is why Sourdough Starter IS an alcoholic food, but baked bread is NOT. Of course, cooking the foods also kills the probiotics, so this is not a solution you'd want to use when you are going for maximum probiotic benefit. This MAY be a good option though, when you want to consume something with alcoholic content, and give your children a version of it that does not contain the alcohol. Just cook it until the boozy smell is gone, and make sure the tingle is gone after it is cooled down.

So... if you enjoy Kombucha, but do not want the alcohol, what do you do?

Ferment it as usual, but then let it OPEN ferment until the alcohol smell and fizz are gone (this can take days, or even weeks, depending on the recipe). You'll get a sour taste - just sweeten it up again with the sweetener of your choice when you are ready to drink it.

This same process can be done with water kefir, fermented juices, and many other foods, and they'll end up with a nice high probiotic count without the backlash of the alcohol.

It CANNOT be done for fermented sodas. You'll lose the carbonation. Sorry, no alternative here for fermented sodas. You can make soda for a party though, using dry ice.

If you've been trying to heal, and you seem to take two steps forward, two steps back, it may not be the fermentation method that is holding you back. It may be the KINDS of ferments you are relying on to heal.

Alcohol is NOT a helpful element in lacto-fermented foods and beverages. Yes, it DOES matter, and yes, it IS a significant amount in many kinds.

And whatever you do, PLEASE do not give your children ANY potentially alcoholic ferments. Not only are they especially vulnerable to the neurologic damage caused by alcohol in the bloodstream, you are just BEGGING for your children to be taken from you by Child Protective Services.

Enjoy your pickles and kraut and milk kefir (without the fizzies!). But avoid the alcoholic ferments if you want to supercharge your chances for good health.

How to Make Pickled Eggs, Sausage, or Mushrooms

Lacto-fermenting involves encouraging healthy bacteria and fungus to grow within a contained environment. Vegetables ferment extremely well because they already contain good starts of those bacteria and fungi.

- The problem with mushrooms is that they ARE a fungus. Their presence in a ferment will radically affect the balance of bacteria and other fungus in the ferment. Not in a good way!
- The problem with eggs and sausage is that they encourage the growth of other items that are not conducive to the growth of healthy microbes.
- Both are traditionally pickled with finished pickle brines, or with apple cider vinegar blends. They are NOT fermented fresh from water and salt brines (some are cured this way, but that is a different process and does not result in the lacto-fermented tanginess).

You can, of course, purchase pickled mushrooms, pickled eggs, and pickled sausage. The mushrooms are likely filled with chlorine because they've been watered with chlorinated water (and the mushroom fruits concentrate contaminants). The eggs are of unknown age, from chickens fed who knows what, and preserved with chemicals that were never meant to be consumed by humans. The sausage... well, if you don't already know what goes into commercial sausage, then maybe you don't really WANT to know. And that doesn't even touch on the quality of what the animal ate, or the chemicals used to cure the sausage!

When you want to KNOW the real quality of the ingredients, you just HAVE to make your own! Fresh, quality ingredients. Or specialty ingredients.

Pickled chanterelles or morels. Or your own homegrown Criminis or Oyster mushrooms, or maybe the Russulas you gathered yourself. Pickled bantam eggs, or Quail eggs, with specialty seasoning combinations (I'd love to have some Quail eggs to drop into my Pickled Salsa... OOoooooh!). Or Polish sausage made from homegrown pork, elk, or wild hog, or even a combination of duck and rabbit.

Certainly you can use Raw Apple Cider Vinegar and mix a cold seasoned brine for use with any of these (stir well to incorporate the salt or sugar), in order to create a live culture pickling brine (heat must be avoided, it will kill the ACV). But you have so many more options by following this simple method instead.

To ferment these specialty items, get a good vegetable ferment going that has the flavors that you want in your finished pickle. Once the ferment is well established (approximately two weeks, minimum), you can add the mushrooms, peeled boiled eggs, or sausage, either to the vegetable mix, or after removing the veggies - just add it to the brine.

Let the food ferment for another week or two, to develop a good pickle. They may be refrigerated during the pickling process (refrigeration is **especially important for eggs and sausage**).

If you are going for a SWEET pickle flavor, add your sugar immediately prior to adding your mushrooms, eggs, or sausage. Make sure you stir it in well, so that it is completely dissolved. This keeps the ferment sweet and sour, instead of creating a sour alcoholic brine (sugars added earlier will convert to alcohol and go sour).

My mother pickled eggs in the brine from her home canned pickled beets. This was a heat treated brine, so the bacteria was dead, though adding the eggs stirred up a bunch of new healthy stuff as the eggs cured. The eggs turned a lovely shade of purply red, and the beet brine was a lovely complement to the eggs. I do not use

beets in my fresh ferments though, because they are high in natural sugars, which go alcoholic, and that is not somewhere I'll go with food I feed my family.

One of these days I will ferment some beets and push it through to the vinegar stage (past the alcohol stage) and then sweeten it a little and toss in some eggs, to see if I can get the delicious result with more probiotics but without the alcohol that would result from a young ferment with beets.

Get all the goodies from the lacto-fermented brine, with the superior flavor of home cured foods, infused all the way through your freshly purchased ingredients, or through your own homegrown or gathered mushrooms, clean-fed chicken eggs, and homemade sausage (from home grown pork even!).

Dead food just can't taste like that!

Fermenting for Livestock

Recent studies have shown that there are benefits to fermenting animal feed. The information is somewhat confusing because they only present part of the findings, and not all. But many small farms are now using fermented or soaked feeds, and finding that it can significantly reduce costs.

The few studies that have been done indicate that animals need less feed when given soaked or fermented feeds, and that SOME nutritional elements are enhanced in the process. The same studies show that OTHER nutritional elements are REDUCED – the natural effect of digestion of some of them by the microbes in the ferment (which information is largely ignored).

We tried our own studies, on chickens and quail, and found different results than those reported on swine (the original studies involved swine).

So, what do you need to know to benefit from this, or to try your own experiments?

First, the difference between soaking and fermenting is not a clear line. It is an evolution. So we need to explain a very simple concept which applies to live grains.

If you soak live grains, it begins the process of sprouting. This alone will enhance nutritional values, and UNLIKE fermentation or simple soaking, SPROUTING will INCREASE nutrient levels, and will NOT decrease them somewhere else. It is ALL GAIN.

If you soak commercially formulated feeds, or dead grains (heat treated, rolled or cracked, etc), then all that is happening is that the food is rehydrating, and then after 18 hours or so, a fermentation process begins.

There are benefits to soaking, even without sprouting. Wet foods digest more easily. They take less energy to digest, so the animals need less feed since the food takes less calories to process. They can turn their attention to maintaining body temperature, and growing or producing.

After the food is rehydrated, or the grains rehydrated and begin to sprout, then at some point or other, they will begin a fermentation process (usually more than 18 hours).

Sprouted grains will gradually die as the fermentation process increases if they are submerged (mostly due to being submerged continually), so we move from one process to another with them. The kernel of the grain may continue to grow though, as they outside hulls ferment, so you can end up with both processes occurring at the same time for a significant amount of overlap time. Where that process is, and which stage it is in, is not really important as far as whether it can or should be fed to your livestock. At 2-3 days in, with live grains, you are getting benefits from both. Lower water levels (like we use) are more likely to encourage the sprouting process for a longer period of time.

Once the fermentation process begins with dead grains or commercial feeds, it is important to understand that you are beginning an ALCOHOLIC process. So you do not want to OVERFERMENT, or you may end up doing more harm to your animals than good, especially those that are breeding animals.

The recommended fermentation length is 2-3 days. We go on the short end of that, and we tend to use less water than what is recommended also, to keep the alcohol level low.

The original studies recommended about 10 parts water to 3 parts grain. We find that this is very soupy, and more difficult to handle, and encourages more alcohol formation.

Because we are ONLY fermenting grain (we do not use commercially formulated feeds for our production animals), I can't really comment on the best methods of fermenting layer crumble or gamebird feed. I can only tell you how we do the rough grains that we ferment for our livestock.

Our method is to fill a 2 gallon bucket about 2/3 of the way full of grain, and then pour on water sufficient to wet it thoroughly, but NOT so much that it completely covers the grain. We stir it and make sure that it is wet through and all clumps together (we don't get it soupy on top). That bucket gets set aside, and we feed from one that was done previously.

We add more water to each bucket as needed to keep the grain wet, even when we are using it – the top will dry out if there is not enough water, and the grains won't stick together anymore, so we add more water and stir. Each bucket lasts us about 2 days (we feed other things as well). As we get more poultry, we will move to larger buckets, or more buckets.

When the bucket is empty, we add more grain and stir it so that the bits of grain from the previous batch get stirred in and don't stay in the corners of the bucket, we add water, and start over again. We rarely wash the buckets unless we get a build-up of gray stuff in the bottom corners, and that only happens if we don't stir that out when we add more grain.

The advantages we have seen are pretty minimal, but significant enough to keep us doing it, initially. We later had to amend our routine based on growth rates and egg production.

We feed the same VOLUME of soaked or fermented grain that we do dry grain – but the soaked or fermented grain swells up, so it goes further.

Our quail are MESSY eaters. The messiest poultry we have ever seen! They squabble over the food and fling it in all directions, dragging it out of the feed container and seeming to prefer whatever is on the BOTTOM of the bowl even when it is the same thing as on the top of the container! They will routinely waste 50-75% of the grain that is put into their feed bowl.

When we wet the grain just prior to feeding, they waste a lot less. A noticeable difference. The grains cling together enough that they are not able to fling them around as much, so the benefit is purely mechanical.

When we ferment the grain, it ends up clumping together more than freshly wet grain, and they are not able to fling it this way and that way as much. **They waste even less this way than with freshly wet grains.**

As we switched our feed for our quail and chickens to 100% fermented, or sprouted grains, we noticed a change. The growth rates of the young quail slowed, and the egg production of mature quail became very sporadic.

On the other hand, the chickens seem to thrive on the combination of scrap veggies, sprouted grains, and fermented grains.

We added back in some grains that were soaked but not fermented for the quail, and things balanced out. Quail are apparently more dependent on whole grains in a natural diet.

Turns out those initial studies reported TWO effects.

- An increase in what were defined as “proteins” (vegetable proteins are incomplete, but this would be defined as complex amino chains).
- A DECREASE in what were defined as “amino acids” (we assume they meant shorter amino chains).

So what is happening is the short chains are being converted by the bacteria into long chains. There is no “increase in proteins” at all. Merely a conversion of the amino chains from one form to another.

For chickens, or pigs, this may make those amino acids more accessible. But for quail, who have evolved to live on a diet of raw grains, the conversion is not all positive.

We found that including fermented grains in their diet was not a negative thing. But they still needed the unfermented grains – and they still waste less, and do very well, on soaked grains (they use much less water this way also).

For sheer nutritional impact, and cost reduction, we are setting up so that we can depend more upon fodder (sprouted grains) than on fermented feed, because the cost savings and nutritional gain are many times what they are for fermented feed, and it is all gain, without the trade-offs.

Fermented livestock feed is one thing that we depend on now though, while we are getting other things in line, and it does provide us some benefit, though not entirely the benefit that the livestock studies indicated.

It is probable that the results we experienced with our quail apply to people also. That some kinds of fermentations have a negative affect for some people, and a positive affect for others, depending on heritage, and metabolism differences from one individual to another.

There are other things that are classed as fermented feed for livestock, that are traditional, and have a long history in farm country.

Silage is grasses and mixed forage vegetation, that is pressed into a trench or packaged into a plastic wrapped bale, which ferments without salt. It must be packed tightly enough to remove air pockets, and to squeeze some of the juice from the vegetation. It is covered and allowed to age. It smells like vinegar, and most animals love the stuff.

Some farmers also do apple cider pulp, or windfall fruits as silage, but this will produce an alcoholic ferment, until it ferments past the alcohol phase and into a vinegar phase (you can smell the difference). Which you prefer to do is a matter of personal preference and ethics.

Many herbs, forage plants, and garden scraps can be turned into silage if they are free of mold, green (not dried already), and sufficiently compactable to process as silage. Basically, silage is a salt-free fermentation of vegetation or vegetables, so it relies on some of the same principles as other fermentation, but adapted to an outdoor or low-tech method. The mold and contamination issues end up being somewhat different than they are with kitchen ferments.

If you are interested in making silage, there is a great deal of information online, and various methods which you can choose from to experiment with preserving green forms of livestock feed.

Since silage preserves some of the “green” nutrients in the forage, it can help livestock maintain better health, at a lower cost, than hay alone.

Whichever direction you pursue, fermentation of livestock feed has the potential to cut costs, while maintaining good health in your animals, but like all ferments, needs monitoring to ensure that it actually achieves what you intended it to achieve.

About the Author

Laura Wheeler is a 15 year veteran web developer turned farmer. She and her husband are the parents of eight children and an increasing number of grandchildren. Having grown up on a home farm, farming is less of a departure for her than it is a return to her roots. Her experience with product development, marketing, online and offline sales is extensive. She has consulted with small business startups through the entire 15 years she worked as a web developer as well.

Kevin and Laura invented and make the Fermenta Cap products in their home.

Laura is the author of more than 40 technical and instructional manuals, including more than half a dozen farm and gardening books (now available on **Amazon, for Kindle**). Titles include ***Real Food For Rabbits, Pigeons For Meat, The Edge of Eden, Growing Microgreens for Home and Farm, The Scavenger's Garden, Life from the Garden,*** **and** ***Starting a Mushroom Growing Business on a Shoestring***.

Laura is a strong supporter of polyculture farming, back to the land, natural farming, mushroom cultivation, and homesteading. She has recovered from Crohn's disease by changing to a more natural diet, and through her family growing as much food as they are able.

Books on more farm and garden topics are in the works.