



All About Fermented Foods:

How to Use These Powerful
Foods for Gut Health, Disease
Prevention, and Vibrant Living

Organix®

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Fermented Foods: Introduction

In *The Art of Fermentation*,¹ award-winning author Sandor Katz describes fermented foods as “the flavorful space between fresh and rotten.”

Now that doesn't sound very appealing, does it? Yet the truth is that the fermentation process creates some of the most intensely flavorful foods out there – while at the same time providing a wonderful tonic for total body health!

So how did the process of fermentation start in the first place? From Korean kimchi and Japanese soybean paste (called natto) to the lesser known foods such as Tanzanian togwa (fermented gruel) and Chinese douchi (fermented black beans), fermented foods are an integral culinary tradition of global cultures. Not only because of the need to preserve food but also for their incredible health benefits.

In fact, according to dietary nutritionist Robin Foroutan (MS, RDN, HHC),² the earliest record of the fermentation arts dates to around 6000 BC in what is known as the “Fertile Crescent.”

Today there is a resurgence of interest in fermentation, especially in the health benefits of particular fermented foods such as raw sauerkraut, kombucha, and supplements that can be nutritionally enhanced by the fermentation process.



This interest comes as no surprise as more and more individuals deal with food intolerances, bloating, and acid reflux, as well as more serious conditions such as Crohn's disease and IBS.

The great news about adding fermented foods to your diet is that along with helping to heal the gut, eating these foods can also reduce stress and fatigue, infuse your body with super antioxidants, boost your immune system, and may even play a role in helping to prevent many chronic diseases including autoimmune conditions and cancer.³

Scientists and consumers alike are expanding their understanding of the connection between the “gut microbiota” and the rest of the body's systems. We now know that one needs to maintain a healthy digestive tract in order to have a healthy immune system,⁴ healthy neuropathways,⁵ and a healthy constitution overall.



In this report you will learn about the chemistry of fermentation and common and not-so-common fermented foods. You'll also discover how some of these foods can play a direct part in helping to heal disease.

Wondering where beer and bread stand on the fermentation spectrum? You'll learn some fun facts about these two foods that may surprise you! Plus, you'll discover how the benefits of fermentation can expand beyond food.

There's a lot to cover, so let's dive right in!

Why We Need Fermented Foods Now More Than Ever

The next time you go to your local grocery store, take a look around you. You will probably see row after row of packaged foods, commercial meats loaded with nitrates, hormones, and antibiotics, conventional produce grown with fertilizers and pesticides, and aisle upon aisle of foods that contain hidden artificial sugars like “high fructose corn syrup,” “corn syrup,” “caramel color,” and “natural flavoring.”

The deli at your local grocers may feature a hot bar with chicken wings and rolled taquitos fried in trans fats.⁷ The bakery department likely contains tantalizing displays of “just baked” breads and pastries that may actually house harmful ingredients like potassium bromate.⁸

Looking at the common food choices alone, is it any wonder that most people have some kind of imbalance in their digestive system? The fact is that many of the ingredients found in “regular” grocery store foods have been shown to lead directly to gut flora imbalances and digestive system distress.⁹



Check out these facts about how the typical American eats today:

- ▶ The average American consumes 10 teaspoons of high fructose corn syrup a day, roughly 1 out of every 10 of their daily calories.¹⁰
- ▶ The average American spends \$1200 a year on fast food.¹¹
- ▶ According to statistics gathered by the American Beverage Association, the average consumer in the United States each drinks more than 54 gallons of carbonated soft drinks yearly.¹²

Still not convinced that there is an epidemic of bad eating habits that are directly leading to chronic gut imbalances?

Also consider that, according to a 2013 survey sponsored in part by NYU's Langone Medical Center,¹³ 74% of Americans experience some sort of digestive distress such as diarrhea, gas, bloating, or abdominal pain on a regular basis. Although some of these issues may be isolated, chronic gastric distress is often an indication of other disease processes at work.

The key to turning gut health – and health in general – around lies in recapturing the right balance of “good” and “bad” bacteria in your digestive system.

This balance affects every system in the body.

For instance, did you know that your intestinal lining contains more surface area than your external skin does and also houses over a billion nerve endings?¹⁴

This complex membrane acts a lot like the lining between the brain and the body and interacts with close to two dozen hormones, many of which play a role in brain and immune function. The lining of the upper GI tract contains about 80% of your body's total immune system cells.¹⁵

As science is discovering, the digestive system is not an isolated unit. It is a complex environment that has a hand in almost every function in the body – including everything from the creation of tissues to T cell function and the proper firings of key brain hormones for maintaining sound mental health.¹⁶

To put it simply, a healthy gut equals a healthy body! And one vital component of achieving and maintaining gut health in today's chaotic world is through adding probiotic-rich fermented foods to your diet every day.



The Importance of Probiotics

Fermented foods, first and foremost, are super-concentrated sources of healthy probiotics. Probiotic means “for life.” These microorganisms are living, healthy bacteria which can protect your GI system from pathogens like opportunistic viruses and parasites.

Bacteria of all kinds adhere to the lining of your gastrointestinal tract in much the same way that icing clings to the top and sides of a cake.¹⁷ Protocols that infuse your body with good bacteria (such as eating plenty of fermented foods) will ensure that good bacteria live along your digestive tract, not bad ones. There, good bacteria will “lie in wait” for opportunities to do their job in snuffing out pathogens that can otherwise spell trouble for your GI tract, immune system, and overall health.

Probiotics don’t just protect you from opportunistic bacteria. Certain probiotic strains are completely responsible for the production of mechanisms in the body needed for health. For instance, the production of the antioxidant *indole-3-propionic acid (IPA)* is dependant on the presence of the probiotic bacteria *Clostridium sporogenes*.¹⁸

According to researchers, probiotics also help to reduce the risk of infection, regulate immune responses, help reduce inflammatory response, aid in elimination and movement in the colon, can affect allergies, and reduce one’s propensity towards obesity.¹⁹

What is even more astonishing is that, according to research conducted at Scripps Research Institute in La Jolla, California, the collective mass of trillions of microbes that exist in the human gut represent hundreds of times more gene codes than is evident in the strictly “human” gene code.²⁰

This fact alone leaves one in awe of the importance of the gut microbiome for the functioning of a healthy human body.



Auto-Toxicity: The Foundation of All Disease May Start in the Gut

As far back as the early 1900s, Russian scientists suggested that most disease as well as the aging process in general came about as a result of a process called “autointoxication.” Autointoxication is the presence of gaseous substances in the gut, such as phenols, indoles, and ammonia, that can lead to deterioration and disease.²¹



Autointoxication happens for a variety of reasons. Lack of key enzymes to digest food, chronic overeating, eating the wrong kinds of foods, or slow digestion usually leads to undigested food particles that sit too long in the digestive tract. These particles begin to putrefy in the colon. It is in this process that gases like ammonia form, which not only irritate intestinal walls, but have been linked to autoimmune conditions, inflammatory conditions, and psychological conditions like schizophrenia. Autointoxication has also been linked to cardiac issues and high blood pressure.²²

While this topic is not pleasant, what's hopeful about all this is that there are key actions you can take NOW to turn this whole disease-causing situation around.

Improving gut flora with probiotics has proven to have many health benefits. In the late 1980s, British scientists stated that “there is good evidence that the complex microbial flora present in the gastrointestinal tract of all warm-blooded animals is effective in providing resistance to disease.”²³

And this is where fermented foods come in. Fermenting foods builds hefty colonies of bacteria that, when consumed, can be a boon for your digestive and overall health.

Fermented Foods 101

Fermentation is an anaerobic process for the most part.²⁴ This means that the microorganisms involved require little or no oxygen in order to obtain energy and reproduce. Within this environment, bacteria in a “substrate,” whether it be cabbage or milk, will convert sugars into energy for their metabolism.

Bacteria go through lactic acid fermentation. Yeasts, such as those that are used to make alcoholic beverages and most breads, undergo ethanol fermentation.²⁵



Practically every food containing some kind of complex or simple sugar can be fermented. Lactic acid fermentation, also called lacto-fermentation, is the most common kind of home fermentation. In many cases, such as with raw sauerkraut or kimchi, healthy *Lactobacillus* species grow in a salt brine. Salt prevents the growth of pathogenic microorganisms, pulling water as well as nutrients out of the initial food product.

In other fermentation practices, such as in making cultured yogurt or kefir, salt is not needed, but a culture starter may be utilized instead. However you do it, the process of lactic acid fermentation itself can significantly enhance micronutrient profiles of certain foods overall.²⁶

A 2001 study published in the *International Journal of Food Microbiology*²⁷ found that both lactic acid and yeast-based fermentation increased levels of key amino acid profiles in an in vitro study. While both forms of fermentation produced higher amounts of the amino acid lysine, lactic acid fermentation appeared to produce more.

Other studies have found an increase in key vitamins such as vitamin C²⁸ and A with lactic acid fermentation.

Amazingly, lactic acid fermentation can also produce new nutritional content that was not in the food prior to fermentation. These may include newly included vitamins, such as vitamin B12.²⁹

Finally, lactic acid fermentation can change the composition of “anti-nutrients” within a food and cause them to be ineffective. Anti-nutrients exist primarily in the form of phytic acid in grains and legumes. These plants use phytic acid’s ability to keep minerals, enzymes, and other nutrients “locked up” as a self-preservation method as seedlings. Through the process of fermentation, these nutrients can become “unlocked” and then be digested easily in the body.³⁰

Some fermented foods that use lactic acid fermentation include:

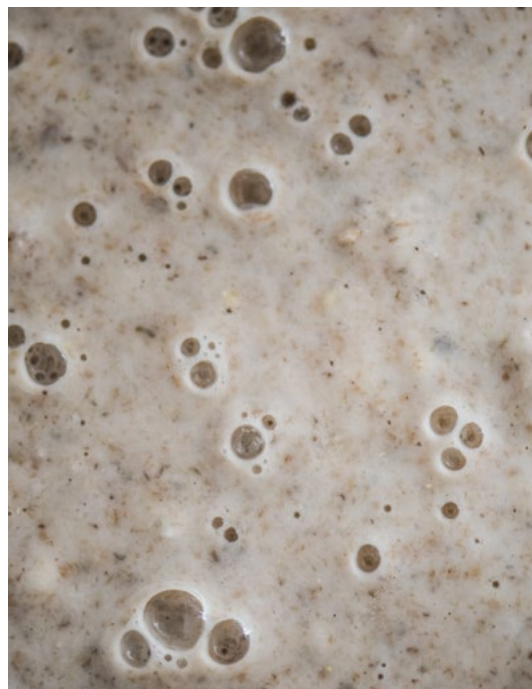
- ▶ Raw Sauerkraut
- ▶ Cultured Vegetables
- ▶ Cultured Yogurt and Kefir
- ▶ Fermented Soy
- ▶ Beet Kvass
- ▶ Kombucha and Vinegar, which contain both bacteria and yeast
- ▶ Soured Grains
- ▶ Sourdough Bread
- ▶ Sorghum Beer



Key Bacteria in Lactic Acid Fermentation

Lactic acid fermentation relies on lactic acid bacteria. These are a group of gram-positive bacteria which are non-spore forming and are usually rod-shaped. They produce some form of lactic acid as the “end product” of carbohydrate fermentation.

Without getting too technical, it is important to note that the lactic acid bacteria that will be helping you create tasty and healthy fermented foods are actually a diverse group of microorganisms that create their own metabolism in a variety of ways. In fact, you will probably have different kind of lactic acid bacteria in one jar of raw sauerkraut or one container of kefir, and this is a very good thing. Maintaining a diversity can help the bacteria stay strong and healthy in a wide range of conditions and temperatures.³¹



In addition, there are two different “categories” or “families” of lactic acid bacteria. According to researchers with the *Food and Agriculture Administration of the United Nations*,³² the first “family” of lactic acid bacterium are “homofermentative;” they produce lactic acid only. The other “family” are “heterofermentative” lactic acid producers. They produce about 50 percent lactic acid as well as small amounts of volatile compounds such as acetic acid, carbon dioxide, and ethyl alcohol.

Being informed as to the type of bacteria that is being produced in your fermented foods is important to know, especially if you want to avoid even small amounts of alcohol and other such compounds.

Here is some information on three of the most common types of lactic acid-producing bacteria you are likely to find in fermented foods. Remember that even heterofermentative bacteria are still considered “good” probiotics for your gut and overall health since they produce mostly lactic acid and the number of volatile compounds they create is very minimal:

Lactobacillus plantarum³³

L. plantarum plays a major role in vegetable fermentation since it produces high acidity. It can help with the absorption of nutrients and can alleviate cravings for sugar and carbs. Experts also agree that *L. plantarum* can protect your gut membrane from pathogenic bacteria colonies by secreting antimicrobial substances.³⁴ It is a very hardy probiotic, often surviving harsh rounds of antibiotics when other strains collapse. Research points to *L. plantarum* as a potential aid in calming symptoms of irritable bowel disease,³⁵ Crohn’s disease, and colitis.

L. acidophilus

L. acidophilus can help those with lactose intolerance since it produces lactase, the enzyme that breaks down sugar in milk. It is also a true friend to your small intestine. It has been known to “compete” with many “bad” bacteria strains such as *Escherichia coli* (E. coli), *Staphylococcus aureus* (golden staph), *Salmonella*, *Candida albicans*, and *Shigella*. Clinical trials using *L. acidophilus* twice daily have shown it to help individuals with various forms of functional bowel disorder.³⁶

L. bulgaricus³⁷

L. bulgaricus is produced through fermentation of dairy products and soy for the most part. It is a hardy probiotic that houses itself in the intestinal mucosa and can withstand the digestive juices of the stomach. It is known as a “symbiotic bacterium” because it lives in harmony with other helpful bacteria, flourishing when it is needed and reducing in population when it is not. *L. bulgaricus* can kill harmful bacteria by producing its own natural antibiotics.

Other kinds of Lactobacillus bacterium typically involved in fermentation are *L. caret*, *L. pentoacetis*, *L. brevis*, and *L. thermophilus*. Other bacteria strains involved include *Leuconostoc*, *Pediococcus*, *Brevibacterium*, *Propionibacteriaceae*, and healthy varieties of *Streptococcus* and *Candida*.³⁸

Each of these types and strains, as well as dozens more, have their own unique characteristics and benefits that can be investigated as you focus your own research on the fermented foods you wish to create, buy, and enjoy.

The 4 Most Common Kinds of Fermented Foods

Now that you have an idea of the kinds of healthy bacteria that may develop through fermentation, here is a list of some common fermented foods that contain these probiotic powerhouses:



Raw Sauerkraut, Kimchi, and Cultured Vegetables

Raw sauerkraut is made by using cabbage, a hefty amount of organic sea salt or pink Himalayan salt, and clean, filtered water.

One of the main bacteria associated with sauerkraut besides *Lactobacillus plantarum* is *Leuconostoc mesenteroides*. *L. mesenteroides* is an ideal bacteria to use with fermented cabbage because it can tolerate high concentrations of both salt and sugar, it grows rapidly at a range of temperatures and, most importantly, the compounds it produces help to inhibit the development of many kinds of pathogenic organisms.

Besides digestive health, raw sauerkraut can aid with a surprising array of other common ailments, including improving circulation, increasing energy, boosting the immune system, strengthening bones, lowering cholesterol levels, improving vision and skin health, improving cognitive function, and reducing inflammation.³⁹ Some studies also suggest that consuming raw cultured vegetables daily can help protect against certain kinds of cancer.⁴⁰

There is a good reason why millions of individuals choose to use cabbage as a base for their raw sauerkraut and cultured veggies. Cabbage is nutrient-dense, containing dozens of phytonutrients, vitamins, and minerals.

Cabbage also has some unique qualities. It is a cruciferous vegetable that has proven anti-cancer effects. It can protect against radiation poisoning and just half a cup of cooked cabbage contains 81.5 micrograms of vitamin K (half a cup of fermented cabbage would contain even more). Cabbage has been shown to reduce the risk of diabetes and obesity, help with heart disease, and contain anti-aging properties.⁴¹

Remember that by fermenting any food, you are boosting the nutritional value of ALL vitamins, minerals, amino acids, and other nutrients that exist within it, and may even be adding new ones. Of course, fermenting raw cabbage also eases digestion and absorption of this superfood.

By adding or substituting other vegetables such as carrots, garlic, soybeans, radishes, cauliflower, turnips, leeks, bok choy, fennel, beets, peppers, cucumbers, olives, and even some fruits like lemons and various kinds of berries, you can tailor-make your cultured vegetable experience to your own tastes and specific nutritional needs. And by adding key spices (and significantly more peppers), you will have the ingredients for a probiotic-dense, anti-inflammatory, and antimicrobial Korean kimchi as well.⁴²



Easy Raw Sauerkraut Recipe

Ingredients:*

- ▶ 1 or more heads of green or red cabbage
- ▶ Carrots (optional)
- ▶ Daikon radish (optional)
- ▶ Celery (optional)
- ▶ Fennel (optional)
- ▶ Sea salt, ground

Equipment:

- ▶ Food processor or cutting board & knife
- ▶ Large bowl
- ▶ Mason or canning jars and lids, sterilized

Directions:

1. Remove outer leaves from cabbage. Remove the core.
2. Wash, scrub, or peel other vegetables as usual.
3. Cut vegetables into large chunks that will fit into the food processor (if you do not have a food processor, cut all the vegetables into small pieces with a knife).
4. Empty cut up vegetables into a large bowl (glass is preferable).
5. Add ground sea salt to the vegetable mixture. Use 1.5 to 2 percent salt by weight of vegetables used. (e.g., for 100 grams of cabbage, use approximately 2 grams of salt.)
6. Use your hands to work the salt into the cabbage mixture for a couple of minutes until the vegetables begin to release a lot of their juices.
7. Squeeze and smooch the vegetables with your hands, ensuring that the salt is well distributed.
8. Pack the vegetable mixture into the sterilized glass jars. Make sure the mixture is pushed down and the juices are rising to the top.
9. When done adding vegetables, there should be lots of juice at the top of the jar. Be sure too to leave space in the jar for the juices to expand and bubble up.
10. Cover filled jars with a clean cloth held in place with elastic or twine.
11. Place jars in a bowl on the kitchen counter for a minimum of 5 days, more days in cooler weather. (The bowl catches any juices that may escape from the jar during the fermentation process.)
12. Once the sauerkraut has fermented, cover jars with sterilized lids and store jars in the fridge.
13. Enjoy your fermented vegetables daily!

*All ingredients should be organic





Cultured Dairy: Kefir and Yogurt

Cultured dairy is probably one of the most well-known and oldest kinds of fermented foods. In fact, one could even argue that all dairy is fermented in some way, with the exception of pasteurized milk. There is a huge difference, however, between commercially processed dairy and that which has been fermented using simple culture starters and traditional methods.

When it comes to yogurt and kefir, it's best to make your own. Without going into too much detail, suffice it to say that most non-organic, commercially processed yogurts are little more than junk food disguised as healthy food⁴³ and are best to be avoided. Some nutritional organizations, such as the Cornucopia Institute, are calling out yogurt manufacturers for misleading labels that claim "Live and Active Cultures" when the probiotic content of these products is actually extremely low.

In addition, many commercial yogurts contain sugars (sometimes in the form of GMO-derived high fructose corn syrup), artificial colors, flavors, and additives that will encourage opportunistic (bad) bacteria to grow in your gut.

Commercially produced cheese is no better. Cheese producers often use additives such as sorbic acid, yellow #5 and #6, and carrageenan to bulk up and add color to their products.⁴⁴ Again, these substances will do more harm than good in your digestive tract and are often a source of gas, bloating, and intestinal inflammation.

Naturally-fermented organic dairy is another story altogether. Fermented or “cultured” dairy relies on lactic acid fermentation, either through using a small amount of actual yogurt or kefir or a culture starter. There is abundant research⁴⁵ to support the many nutritional benefits of cultured dairy:

- ▶ Contains high levels of folate⁴⁶
- ▶ Depending on the milk source, can contain high levels of biotin, the amino acid thiamine, pyroxidine, B vitamins, and riboflavin⁴⁷
- ▶ Besides *Lactobacilli* and other common bacteria strains, fermented dairy contains several other probiotic strains⁴⁸ including *Leuconostoc citrovorum*, *L. dextranicum*, *Streptococcus lactis*, *S. Cremis / liquefaciens*, and *Brevibacterium*



Folate, which has been shown to exist in cow, ewe (sheep),⁴⁹ and goat milk, is of particular importance, since it is a B vitamin that helps in the formation of new cells.⁵⁰ Folate is especially important for women before and during pregnancy.

According to the U.S. Centers for Disease Control, a woman needs 400 mcg of folate/folic acid (folic acid is the synthetic form of folate) every day.⁵¹ Studies have also shown that increasing folate can reduce a woman’s risk of breast cancer, especially for women who have more than one alcoholic drink a day.⁵²

Besides folate, cultured dairy, and in particular kefir, has been shown to have high levels of calcium, magnesium, vitamin K2, vitamin B12, helpful enzymes, and probiotics.⁵³ The 2008 “Hisayama Study” discovered that ingesting fermented dairy can even have a healing effect on periodontal disease.⁵⁴

Fermented kefir and yogurt is easy to make at home, and doing so will yield you the most health benefits. Most health food stores have culture starters for at-home yogurt and kefir. You can also start a new batch of cultured dairy by using a small amount of the previous batch.

And if you don’t do dairy, try using the same procedure to produce coconut kefir from organic coconut milk or coconut water. Coconut kefir⁵⁵ is gluten- and dairy-free, contains the same gut-healing probiotics as dairy kefir and heightened amounts of all the nutrients found in coconut, including a hefty dose of potassium.



Fermented Soy

Quality fermented soy products include organic, non-GMO miso paste, tempeh, natto, fermented soy milk, fermented tofu, and soy sauce. After decades of confusion around the dangers and benefits of soy, now fermented soy is being investigated seriously for its health benefits.⁵⁶

While the debate continues, it seems that most health experts agree that fermented soy products like the ones mentioned above have vast health benefits with few of the risks⁵⁷ associated with non-fermented, commercial soy.

While unfermented commercial soy is almost completely genetically engineered⁵⁸ and has become a cheap source of mass-market protein that shows up in dozens of processed food products, organic fermented soy products can be a real boon to your health.

You are probably familiar with tofu but some of the other fermented soy forms may not be as recognizable. Here is a quick rundown of a few and their touted health benefits:



Natto

This is a fermented soybean mixture that has a strong taste and sticky-gooey texture. It is made by soaking then boiling whole soybeans, then adding the probiotic *Bacillus subtilis* to the mixture and letting it ferment with time. Natto has a smell and texture that can be off-putting to the Western palate. Nevertheless, it is probably one of the most nutritious foods there is. In just one cup, there can be a whopping 31 grams of protein in addition to half of the daily recommended allowance (RDA) of magnesium, 22% RDA of selenium, 36% RDA of potassium, and 38% RDA of calcium. Besides vitamin K, natto also contains high levels of vitamin C, vitamin B6, folate, and riboflavin.⁵⁹



Miso

This is a salty paste made from different kinds of soybean (white and red are the most common). It is most often used for soups, dressings, and marinades. It is created by fermenting the soybean (barley or brown rice can also be used) with a fungus called koji. Miso has been shown to have anti-aging and cancer-preventative properties. It also boosts the immune system and helps with stress responses.⁶⁰



Tempeh

This is a fermented soybean cake with a savory, nutty flavor. Tempeh has shown to have high levels of protein, fiber, manganese, vitamin B2, magnesium, and calcium. A recent Malaysian study with postmenopausal women found that the bioavailability and absorption rate of the calcium content from tempeh was on par with cow's milk.⁶¹

Compared to unfermented soy, fermented soy is lower in potentially harmful substances⁶² and phylates that prevent mineral absorption. It is also easier to digest, providing it is made with organic, non-GMO soy. All genetically modified products are prone to upset digestive system balance. GMO soy has been shown in rat studies to reduce the number of digestive enzymes in the gut.⁶³

Besides being a sound alternative to commercial soy products, fermented soy products have some unique health benefits as well. Most fermented soy products are excellent natural sources of vitamin K2 (or menaquinone).⁶⁴ This kind of vitamin K is produced by the bacteria in the fermented soy and can benefit your body longer.

Some fermented soy products such as natto and miso have been shown to be great disease preventers as well. Natto contains nattokinase, an enzyme which has helped the Japanese people keep their blood pressure under control and prevent blood clots for over a thousand years. A 2008 Korean clinical trial found that nattokinase supplementation reduced both systolic blood pressure and diastolic blood pressure levels.⁶⁵

Natto also contains almost twice as much of the isoflavone genistein as tofu.⁶⁶ Genistein is considered a gentle phyto-estrogenic detoxifier that has been linked to cancer prevention and healing, especially for reproductive area cancers like prostate and breast cancer but also lung, skin, and gastrointestinal cancers.⁶⁷



SCOBY Drinks: Kombucha and Jun

What in the world is a SCOBY? Besides being a funny word, a SCOBY (also known as “the mother” amongst kombucha makers) stands for “symbiotic colony of bacteria and yeast.” A SCOBY is “symbiotic” because of the complex matrix of bacteria strains and yeasts that work together within it. One of the few evidence-based studies to look at this complex relationship was done by researchers from the University of New South Wales in Australia in 2004.⁶⁸

“The enumeration of each species present throughout fermentation of each of the four Kombucha cultures [studied] demonstrated for the first time the dynamic nature of the yeast ecology.”

The SCOBY is the main ingredient used to make the beverage kombucha. The first recorded use of kombucha was in the Tsin Dynasty in China around 221 BC; it was known then as “The Tea of Immortality.” Since that time, it has been a refreshing beverage as well as a health tonic in other part of Asia as well as Eastern Europe. The name “kombucha” comes from the Japanese, circa the 4th century AD. Kombucha made its way into the West just recently and has become an increasingly popular health drink.

Kombucha is made from black tea, sugar, filtered water, and the SCOBY (which looks like a mushroom and has the consistency of raw chicken). A “batch” of kombucha is usually allowed to sit for a period of one to four weeks. The longer it sits, the more sour and less sweet the taste is. The caffeine content of the tea will weaken with time as well. After a batch is made, a piece of the SCOBY called the “baby” can be detached from the “mother” SCOBY and used to make yet another batch of kombucha. Because the mother SCOBY produces a baby each batch, kombucha makers are usually willing to share to help you get started. Alternatively there are numerous sites on the web that sell starter SCOBYS if you want to try making kombucha at home.

There have not been that many studies on kombucha's nutrient content, but what has been discovered is impressive. Kombucha typically contains a number of healthy probiotic strains, some of which you may recognize by now. They include: *Acetobacter*, *Saccharomyces*, *Brettanomyces*, *Lactobacillus*, *Pediococcus*, *Gluconacetobacter*, and *Zygosaccharomyces* (a strain that is unique to kombucha⁶⁹). The yeast that exists in kombucha also contains vitamins, minerals, sterols, and proteins.

One glass of kombucha may contain:⁷⁰

- ▶ Several strains of probiotics
- ▶ High amounts of B vitamins
- ▶ Vitamin C
- ▶ Phytonutrients such as esters and polyphenols, coming from the tea base
- ▶ Lactic acid
- ▶ The enzymes lactase and invertase
- ▶ Gluconic acid, a liver detoxifier
- ▶ Usnic acid, which may help to fight against viruses
- ▶ Glucuronic acid, another detoxifier
- ▶ Sugar (amount depends on how long it brews)
- ▶ Carbon dioxide and carbonic acid (which gives it its fizz)
- ▶ About 0.5% ethanol (compared to 5% in a typical glass of beer)



A recent Eastern European study published in the *Journal of Medicinal Food*⁷¹ found that “...KT [kombucha tea] can efficiently act in health prophylaxis and recovery due to four main properties: detoxification, antioxidation, energizing potencies, and promotion of depressed immunity. The recent experimental studies on the consumption of KT suggest that it is suitable for prevention against broad-spectrum metabolic and infective disorders.”



According to anecdotal evidence,⁷² drinking kombucha may help with:

- ▶ Soothing and balancing the digestive system
- ▶ Detoxifying the body
- ▶ Reducing blood pressure
- ▶ Reducing inflammation
- ▶ Detoxifying the liver
- ▶ Helping with obesity and regulating appetite
- ▶ Reducing kidney calcification
- ▶ Enhancing the immune system
- ▶ Calming symptoms associated with menstrual cycles and menopause
- ▶ Improving respiratory function
- ▶ Reducing stress responses

Some individuals question the sugar content in kombucha, but remember that over time a lot of that sugar will be converted into bacterial energy. However, if you are concerned about even minimal amounts of sugar and caffeine, then kombucha may not be for you. On the other hand, many individuals have found that drinking kombucha can be a refreshing and healthy alternative to soda pop, especially if you are one of the millions who are trying to kick the sugary, carbonated drink habit.

When you are first trying kombucha out, go slow to see how it reacts with your unique digestive system. And if you make kombucha at home, remember to use a glass container to avoid leaching of metals or other substances that may contaminate the batch.

Besides kombucha, there are similar drinks that use the same SCOBY process and contain the same health benefits. Jun⁷³ (or “Xun”) is like kombucha, except that it is made using green tea and honey instead of sugar and black tea. Many mead (honey beer) and beer microbreweries will list a kombucha or jun offering on their daily or weekly menus. Kombucha and jun can easily be made at home and, of course, even conventional grocery stores now sell various brands of kombucha and similar probiotic drinks.

6 Lesser-Known Fermented Foods (and Why You May Want to Eat Them)

Fermented Wheat Germ



Wheat germ can be thought of as the “embryo” of a wheat kernel. As such, it contains concentrated amounts of dozens of vitamins and minerals⁷⁴ such as B vitamins, vitamin D, Omega 3s, protein, calcium, fiber, iron, magnesium, and manganese. To date, there have been dozens of studies that have verified the effect that fermented wheat germ has on cancer, mainly due to the presence of the yeast substance *Saccharomyces cerevisiae*,⁷⁵ aka nutritional yeast, which is also found in kombucha.

Saccharomyces cerevisiae is vital in the formation of the phytonutrient compound benzoquinone (DMBQ), which promotes healthy cellular metabolism and boosts the immune system. In a Hungarian study,⁷⁶ roughly 170 participants with colorectal cancer took a commercial form of fermented wheat germ for nine months, in addition to participating in traditional cancer therapies. At the end of the trial, only 3% experienced cancer reoccurrence while 76% showed metastasis reduction. Overall, there was a 62% reduction in morbidity when compared to normal standards.

Fermented Fish



Fermenting and pickling of fish products⁷⁷ has been a practice that has been used for preserving this rich source of animal protein for hundreds of years, especially in areas of the world where humidity levels and resources are not right for drying or salting. Nowadays, commercial fish products such as pickled herring, anchovies, and certain Asian fish sauces are what we are most familiar with. Herring and anchovies, as well as sardines, are rich in Omega 3s. In addition, these small fish are at the very bottom of the food chain so there is less of a risk of heavy metal toxicity.

As with any fermented product, humans can benefit from the probiotic content in fermented fish (and other meats) as well as greater nutrient value and better absorption. That being said, fermenting fish and other meats also comes with a greater risk of contamination with pathogenic bacteria, including *Clostridium botulinum*,⁷⁸ which forms a neurotoxin.

Vinegar



Vinegar is created by using both yeast and bacteria in a two-step process. Similar to kombucha, vinegars also have a “mother” (SCOBY), although is comprised primarily of *Acetobacter* bacteria. Although commercial white vinegars are processed using possibly harmful synthetic ingredients like petroleum,⁷⁹ natural, all-organic vinegars, such as apple cider vinegar (ACV), can be very healing. Studies and anecdotal evidence connect the consumption of a small amount of organically sourced ACV every day to lower blood pressure,⁸⁰ weight loss, and an improvement in the symptoms of diabetes. ACV contains many key minerals such as potassium and magnesium and it may even naturally enhance probiotics’ benefits as well.⁸¹

Olives



Olives are a fruit and an unusual one at that because they contain high amounts of monounsaturated fatty acids. This is the good kind of fat that is associated with decreased inflammation, reduction in heart disease, and balanced cholesterol levels. Olives and olive oil also contain many disease-fighting antioxidants, including oleocanthal. Cancer biologists at Hunter College and Rutgers University in New York City recently discovered that this powerful phytonutrient has the ability to rupture cancer cell walls, leading to cancer cell death.⁸² Most olives that are not turned into olive oil must be fermented before eaten to remove their hardness and very bitter taste.

Beet Kvass



Beet kvass is a probiotic drink made from beets. It has its origins in the traditional Russian “kvass” beverage typically made from scraps of wheat or rye bread that are fermented with water, starter culture, and a little salt. Kvass has recently reached the West in the form of beet kvass. Beets themselves have long been considered a great source for cleansing the blood.⁸³ The naturally occurring nitrates in beets converts into nitric oxide in the body, which helps lower blood pressure. Beets also contain betaine, a protector against oxidative stress.



Fermented Grains

If you've given up bread and grains and think you can never eat grains again, think again! We already learned about the protective properties of fermented wheat germ. Other forms of fermented grains (called "sour grains") contain similar benefits. Fermenting grains through the lactic acid process can also neutralize the phytic acid content within them, allowing key minerals to be absorbed.⁸⁴

If you do not suffer from a severe *Candida* overgrowth or celiac disease but have been avoiding grains because of mild to moderate intolerances, fermenting your grains beforehand may be a way that you can incorporate them into your diet again. The fermentation process also breaks down gluten molecules as well, making them easier to digest.

What About Beer and Bread? That's Fermented Too, Right?

Some foods and drinks just get a bad rap. When it comes to grain products like bread and alcoholic beverages, however, this is for good reason. The way in which beer and bread is manufactured in commercial products just spells bad news for your gut and overall health.

For example, did you know that the flour-bleaching process that goes into commercial bread production in the United States utilizes dozens of chemicals that are banned in other countries? Some of these chemicals include benzoyl peroxide, chlorine, and potassium bromate.⁸⁵ The creation of the bread itself may include the addition of GMO-derived high fructose corn syrup and preservatives like calcium peroxide, mono and diglycerides, GMO-derived soybean oil, and azodicarbonamide.

Azodicarbonamide is often referred to as the "yoga mat" compound⁸⁶ because it is used to make many non-foodstuffs in addition to over 500 different kinds of bread products in the U.S. Some food companies have begun removing azodicarbonamide from their products since it has recently been connected to respiratory problems.⁸⁷

While commercial bread remains a smoking gun when it comes to health, slow-fermented sourdough bread, on the other hand, is a nutritious food you may want to consider.



In fact, according to sourdough bread expert Vanessa Kimbell, many people who consider themselves mildly or moderately “gluten intolerant” are actually reacting to the chemicals that go into commercial bread processing. She cautions that each person is different but also points to the fact that nowadays there seems to be commonalities between individuals who have a mild to moderate intolerance:

“Ironically, commercially produced whole grain bread, generally perceived as ‘healthy,’ is often the worst thing a person with a wheat intolerance should eat.”⁸⁸

Getting sourdough bread from an artisan bakery or baking sourdough bread the old fashioned way at home ensures that the phytic acid in the grain has broken down, allowing enzymes, minerals, and vitamins to be absorbed by the body. This process uses water and flour or a mild lactic acid bacteria starter which will promote the growth of wild yeasts and bacteria over a period of several days to a week. The end result is a bread that is much easier to digest. Sourdough’s condensed nutritional density is why it has been a staple in so many cultures for centuries.

The main probiotic strains that exist in sourdough bread are *Kazachstania exigua*, *Saccaromyces cerevisiae* (wild yeast), *L. Plantarum*, *L. San Franciscas*, and others. Earlier in this report you learned about the benefits of *Lactobacillus* probiotics. *Saccaromyces cerevisiae* is a source of folate. *Kazachstania exigua* is also sometimes used in the making of kefir grains. In experiments using this yeast species in the production of wine,⁸⁹ it was shown to lower ethanol content in the final product.

What is the bottom line about bread? If it is made with organic ingredients, created using slow, natural fermentation, and you do not have severe *Candida* overgrowth or celiac disease, then it might be worth giving sourdough bread a try, especially if you are a bread lover to begin with and just haven’t been able to give it up!



But what about beer? Again, whether it is harmful or good for you depends on what kind of beer and especially on the manufacturing process that has gone in to it. Believe it or not, there are no FDA regulations in the U.S. requiring beer manufacturers to list the ingredients on their labels.⁹⁰ Because of this – you guessed it – major beer producers can get away with putting a laundry list of additives in their products.

So the next time you crack open a cold one from a commercial brewery, consider that you may be drinking the following chemical additives as well:⁹¹

- ▶ Urea
- ▶ Potassium sulfate
- ▶ Sodium benzoate
- ▶ Antifoaming agents
- ▶ Flavor enhancers
- ▶ Sodium citrate
- ▶ Tartaric acid
- ▶ GMO corn syrup
- ▶ Genetically modified malt, hops, and corn
- ▶ Amyloglucosidase enzyme
- ▶ Propylene glycol alginate
- ▶ Papain enzyme
- ▶ Liquid sugar (GMO)
- ▶ Potassium metabisulfite
- ▶ Sulphites



The good news is that if you stick with small-batch craft beers, you can avoid a lot of these additives. By visiting your local brewer, you can ask the brewer about additive content directly.

Are there health benefits to drinking beer? The jury is still out on that one. According to a study conducted by the *Fondazione di Ricerca e Cura* in Italy,⁹² drinking an average of a pint of beer a day can reduce your risk of heart attack, stroke, and heart disease by 31%. Depending on the source, beer may also have just as many antioxidants and higher protein and vitamin B levels as wine. It can also contain iron, calcium, and fiber.

For women, though, beer is a real Catch-22. A study published in the *New England Journal of Medicine*⁹³ found that women who had one alcoholic drink a day suffered less cognitive impairment than those who did not, possibly because small amounts of alcohol can improve blood circulation. On the other hand, other studies⁹⁴ have shown that women who have three drinks a week may have an increased risk of breast cancer by up to 15%.

A recent study published in the journal *Reproduction*⁹⁵ showed that the particular phytoestrogens found in beer hops may increase breast cancer risk, since this kind of phytoestrogen (8-prenylnarigenin, 8PN, or “hopien”) tends to bind with alpha receptors in the mammary area, not beta receptors like gentle phytoestrogens normally would.

If you want to explore using beer as a source of nutrition, then you do have options. First, you may want to take a look at organic sorghum beer. This drink has been made and used for hundreds of years in Africa and recent research has discovered that not only is sorghum 100% gluten free, according to a study conducted by the *Institute of Genetics and Biophysics* in Naples, Italy,⁹⁶ sorghum also contains more antioxidants than blueberries and is high in protein and fiber. The fermentation process, if done naturally, will enhance the grain’s nutrients while at the same time creating a decent tasting, gluten-free beer.

Your other option is ginger beer. Ginger beer involves some complicated steps, something called a “ginger bug”⁹⁷ that is similar to a kombucha SCOBY and at least a few weeks of fermentation, but the end result will be a refreshing tonic that British folks have relied on since the 1700s.



Why Your Supplements Should Be Fermented Too

If you have read this report all the way through, you now know that besides the probiotic benefits, fermentation also allows you to get an enhanced amount of vitamins and minerals from many foods. But did you know that many of these same fermentation benefits also extend to fermented supplements that are made from whole food (versus synthetic) sources?

If you are going to invest in quality supplements to take every day, doesn't it just make sense that you should get the MOST out of them?

By choosing fermented supplements, you may also be benefiting from good-for-you phytonutrients that can result from the presence of key probiotic bacteria. A study published in the *International Journal of Food Science and Nutrition*⁹⁸ discovered that fermenting fenugreek leaves enhanced levels of pyridoxine and ascorbic acid (vitamin C) that already existed in the plant as well as created hefty amounts of vitamin B12 that was not in the plant before fermentation.

Here are some other ways in which fermentation can enhance any vitamin, mineral, or herbal supplement:

- ▶ Enhanced antioxidant properties
- ▶ Increased bioavailability and absorbability of vitamins like C and B
- ▶ Increased bioavailability and absorption capacity for key minerals such as magnesium, calcium, and zinc⁹⁹
- ▶ A boost for anti-inflammatory substances like mushroom supplements
- ▶ Greater bioavailability for amino acids in green drink mixes and protein powders
- ▶ Enhanced ability for heavy metal chelators such as chlorella and spirulina
- ▶ Gentler on your digestive system
- ▶ Protection against spoilage



Remember that consuming fermented foods in any form can help your cells stay pliable and free of toxins. Consuming supplements that have undergone fermentation can help you get more nutrients out of each capsule you take! That is good for your health... *and* your pocketbook.



Conclusion

There you have it: everything you ever wanted to know about fermentation, and then some! We hope this report inspires you to do some creative fermentation of your own and to seek out the variety of fermented food options that are available.

Fermented foods are healthy and tasty. Most importantly, eating them can make a noticeable difference in your energy level, immune strength, and overall stamina and zest for life.

Go ahead and give them a try!

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