



FERMENTATION STATION



WHAT IS FERMENTATION?

It is **one of the oldest forms of food technology** and has been used for a long time as a way to **preserve the quality and safety of foods** throughout every native diet around the world. **The process creates a controlled environment of decay in which good bacteria flourish and act as a natural preservative.**

Fermenting is a **mostly anaerobic process, meaning without oxygen**, carried out by micro-organisms or cells that convert sugars and starches into other compounds, such as lactic acid, carbon dioxide and alcohol.

Fermented foods are teeming with good bacteria and are rich in digestive enzymes.

The abundance of digestive enzymes contributes to the processing of food in the body and the proper absorption of nutrients derived from food. There are many remarkable benefits associated with the consumption of fermented foods including; enhanced immune system response, digestive ease, reduction of sugar cravings, increased energy and better mood.

It must be noted that introducing fermented foods and new bacteria into the diet should be done slowly as there may be some gut-sensitivity involved.

As well as the health benefits to consuming fermented foods you are also extending the shelf life of food and consequently reducing food waste; thereby helping lower your foodprint!

FERMENTATION =

Food



Salt



Water



Time

Temperature

Bacteria involved in fermentation **functions best between 15-22C, i.e room temperature.**

Anything lower than this will take much longer and at the higher end of the scale things may ferment quicker



Try and use sea salt (Maldon is usually a good one) or a nutrient rich salt like Himalayan rock salt or Celtic sea salt. **As salt density varies it is best to weigh measures to ensure you are using the right amount:**

1 teaspoon= 5g of salt

1 tablespoon= 19g of salt

Be sure to keep everything you use as clean as possible to avoid contamination. Wash jars, utensils and crocks in hot water and a little washing-up liquid. Dishwashers are a brilliant way to ensure cleanliness!

Glass jars and ceramic crocks are best for fermentation; the sealable ikea jars work well as they allow for 'burping' easily. **Once food has fermented to your liking it can be decanted into smaller jars** and is best **stored in the fridge** where the fermentation process slows dramatically, preserving the food **for 6-12 months.**

Weights are required for a successful ferment to provide an anaerobic environment to prevent oxidation and mould. Food must be submerged under brine at all times.

Some ideas for weights include:

- **Cabbage leaf:** placing a cabbage leaf on top of your ferment and tucking the sides down works well. You may sometimes need a small weight to keep the leaf in place.
- **Rocks:** the right size and shaped rock will make a perfect weight. Be sure to boil first for 20 minutes to remove and competing bacteria
- **Baking weights:** placed in a cloth or fine mesh bag these can be used to ensure food remains submerged in the brine
- **Small jar or glass:** smaller in diameter than the lid of your fermentation jar, this can be filled with water to give it more weight.
- **Plastic bag with brine:** easy but can cause leakages (and therefore not the best option) so be sure to use brine solution not water.



Two basic methods of Fermentation:

You can use a **DRY SALT METHOD** creating a **brine using liquid extracted from the vegetables**- this is common for Kimchi and sauerkrauts. Basic process:

- **Wash** veggies well and use organic produce where possible. (if not then be sure to peel skins)
- **Cut** them up about the **same size**
- **Add salt** (weights vary according to recipe)
- Mix, **massage** or pound the vegetables with your hands **until they have released their juices**
- Add seasoning (think garlic, ginger, apples, and spices like coriander, bay leaf, chilli peppers, star anise etc)
- **pack them into a crock or glass jar**
- **Submerge** the contents to keep the oxygen out using a weight
- Leave to ferment from 3 days to 6 weeks



Or you can create a **BRINE SOLUTION** for **whole/ hard or chunky vegetables** to be **submerged** in. Brines of **2-3% salinity** are the most effective, anything higher than 5% will halt fermentation as it interferes with bacterial activity.

Brine ratios:

- 2% solution = 19g of salt per 1 litre of filtered water
- 3% solution = 28.5g of salt per 1 litre of filtered water

Fermented Carrot sticks recipe- Makes 1x1 litre jar

- 6 carrots, unpeeled and cut into sticks
- 1-2 garlic cloves, smashed
- 1 tbsp chopped fresh dill
- 2% brine solution



Step 1. Place the carrots, smashed garlic cloves and fresh dill into a clean 1- litre jar. Packing them vertically is the most efficient way to get a tight pack in the jar. Cover with the 2% brine to within 2.5cm of the top of the jar.

Step 2. Leave to ferment on the countertop for at least 2 weeks. Taste after this time and continue to ferment until you have achieved your desired flavour. Once you are happy with the taste and texture, you can tuck in. Store in the fridge for up to 6 months.

Some dry salting recipes

Classic sauerkraut

You're generally aiming for a total weight of 800g of cabbage to 19g of salt

- 2 heads of white or red cabbage (or a mix of both)
- 2 Tbsp sea salt
- 1 tbsp caraway seeds

Step 1. Remove the outer leaves of the cabbage and cut out the core, then shred the cabbage either with a knife or food processor. Try and keep the size uniform

Step 2. Place the shredded cabbage in a large bowl, add salt and massage it through the cabbage. Let it sit for 30-60 minutes until it starts to sweat. Add the caraway seeds. It should be quite wet now.

Step 3. Begin to fill your clean 2-litre jar or crock, taking a handful of cabbage at a time and pressing down very hard with your fist. More liquid should seep out every time you do this.

Step 4. Once filled it to within 2.5cm of the top to cover with a cabbage leaf and baking weight (or weighted object of choice) to ensure shredded cabbage is submerged- this is crucial to the fermenting process!

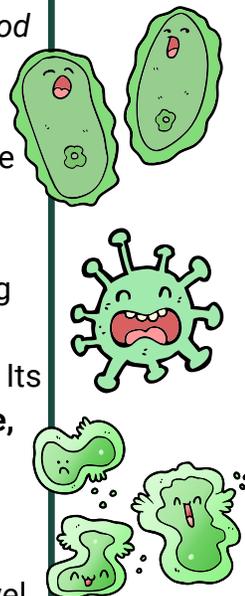
Step 5. Leave to ferment for 1-6 weeks **out of direct sunlight**, taste every few days until the flavour is to your liking. If fermenting in an airtight jar you will need to 'burp' the jar every few days to release the build up for carbon dioxide.

Step 6. When you're happy with flavour and texture, store the jar in the fridge. After a week good bacteria is considered established but if you want the maximum probiotics in your sauerkraut you will want to let it ferment up to 6 weeks. 20 days is best

The bacteria behind the process of sauerkraut fermentation:

The best quality sauerkraut is fermented for a minimum of 20 days- this time span ensures good flavor development, proper acidity level and complete consumption of all the sugars in the cabbage.

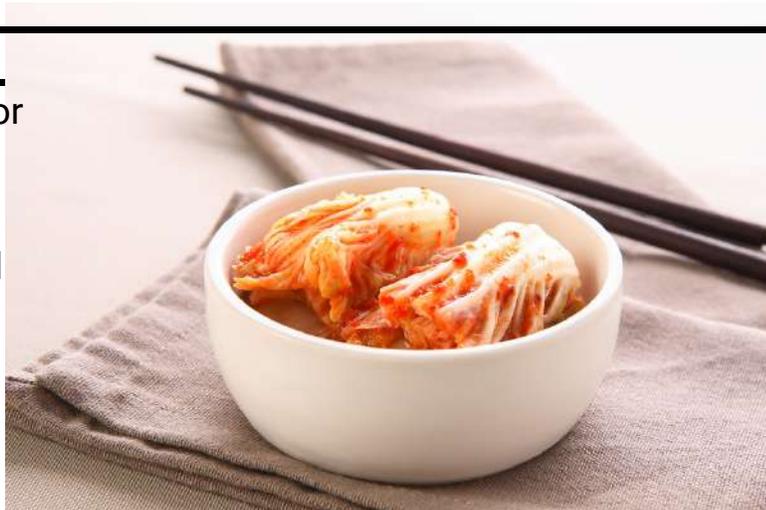
- The *L. mesenteroides* do most of their work in the first 3 days. They are the smallest of the three bacteria studied. They produce lactic acid, acetic acid (vinegar), ethyl alcohol and mannitol which all contribute to the characteristic flavor of high quality sauerkraut. They also produce carbon dioxide, hence the bubbles you see floating to the surface along with brine being pushed out of the jar.
- The *L. plantarum* does most of the work for the longest time period, from day 3 to day 16. Its only job is to eat sugar and produce lactic acid. **The lactic acid that acts as a preservative, supports digestion, inhibits growth of harmful bacteria, increases the bio-availability of Vitamin C, among other jobs.** Ideally, you don't want to stop the work of the lactic acid bacteria by putting your sauerkraut into cold storage before day 16.
- The *L. pentoaceticus* "finish-off" the sauerkraut during days 16-20 by lowering the acid level



Simple classic Kimchi

Makes 1x1- litre jar

- 1x1kg head of Napa cabbage, chopped or shredded
- 4 tbsp (72 grams) sea salt
- 250g daikon (Korean radish), peeled and Julienned
- 4 spring onions, trimmed and cut into 2.5cm pieces
- 3 carrots, julienned



For the paste:

- 2-3 tbsp fish sauce, vegan fish sauce or kelp powder
- 5-6 cloves of garlic peeled
- 2.5cm-10cm (depending on preference) piece of fresh ginger peeled
- 1-5 tbsp Korean red pepper powder (gochugaru) depending on the desired level of heat
- A splash of water for blending

Step 1. Remove the outer leaves of the cabbage and wash well.

Step 2. Chop cabbage however you like and place in a large bowl with the salt. Massage until it begins to soften then add just enough water to cover. Put a plate on top and weigh down with something heavy. Leave for one hour to kill off any potentially harmful bacteria then rinse thoroughly under cold water and drain in a colander.

Step 3. While the cabbage drains make the paste by placing fish sauce (or vegan alternative), garlic and ginger into a blender to form a smooth paste, then mix in the red pepper powder (to spice preference). Add a splash of water if necessary to help it blend.

Step 4. Gently squeeze out any remaining water from the cabbage and return it to the bowl. Add the daikon, spring onions and carrots, then mix the paste into the vegetables until they are thoroughly coated.

Step 5. Pack the Kimchi into a 1 litre jar , pressing down every handful until the brine rises to cover the vegetables, leaving 2.5cm of headspace. Add your desired weight and seal the jar.

Step 6. Let it ferment for 5 days. The brine usually escapes, so it's best to place the jar on a plate/ bowl to catch any overflow. Fermentation is complete after 5 days. Transfer the jar to the fridge, the flavour will deepen with time.

Step 7. Following the same technique you can experiment with different vegetables such as bok choy, brussel sprouts or cucumber.