

FREE GUIDE

Chamber Vacuum Fermentation

A professional kitchen technique adapted for home use.
Days, not weeks.

GREEN HOLMES
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Why the technique matters

Most people who try to ferment at home stop within a month. Not because the science is hard, but because traditional fermentation asks for a week of patience per batch, a crock taking up bench space, and a single flavour locked in from day one.

Chamber vacuum fermentation changes that. It has been used in professional kitchens for years, and the science that makes it work at restaurant scale works the same way at home.

The reason to do it is what it does to food. Acid against fat is one of the oldest moves in cooking, and a good ferment beside a rich plate makes that plate better tonight, in about ninety seconds. That is a complete reason on its own, and it was a complete reason for roughly four thousand years before anyone sequenced a microbiome.

The gut research is genuinely interesting and it is developing. It is also slower and quieter than the marketing around it suggests. Take the payoff you can taste, and let the rest happen underneath on its own clock.

Fermentation is biochemistry. Salt, time and beneficial bacteria do the work. The chamber vacuum only changes the conditions they work in.

WHAT A VACUUM ACTUALLY DOES

When you seal salted cabbage under vacuum, the rapid pressure change ruptures the cell walls of the vegetable. That mechanical breakdown releases the cell's own moisture, which combines with the salt to build the fermentation environment from inside the tissue. No added water or brine is needed.

With the cell walls broken and salt distributed through the tissue, lactic acid bacteria establish dominance quickly. They outcompete spoilage organisms before those have a chance to take hold, and the process begins in hours rather than waiting on days of slow surface diffusion.

Wastyk and colleagues, writing in *Cell* in 2021, reported that in their human trial it was consistent exposure to live bacterial cultures, rather than the complexity of the ingredients, that tracked with microbiome diversity. Their finding sits with a mixed literature, and better-blinded trials since have found smaller effects or none. Worth knowing, not worth overselling.

The three numbers that matter

This is a sealed, anaerobic method. It is safe when acid develops properly, which is exactly what the salt ratio and the vacuum are for. Get these three right and there is nothing to worry about. Skip them and you are guessing.

pH below 4.6. *This is the number that makes a ferment safe rather than merely sour. Below 4.6 the environment will not support the organisms that cause the problems people worry about in sealed low-oxygen conditions. Test strips cost a few dollars and read close enough for home use. Check once, on the first batch, so you learn what your own kitchen produces.*

Salt at 2 per cent of the trimmed weight. Weighed, not estimated. Too little and lactic acid bacteria cannot dominate quickly enough. Too much and you suppress the fermentation entirely and it never acidifies. Two per cent is the house default and 2 to 2.5 per cent is the safe operating range.

Below 4C once it is fermented. Refrigerate as soon as the tang is where you want it. Cold does not stop fermentation, it slows it enough to hold the flavour where you left it.

WHEN TO THROW IT OUT

Trust your nose. A good ferment smells sharp, clean and lactic, like a proper pickle. Discard the batch if any of the following turn up, and do not taste to check.

Sign	What it means
Fuzzy mould, any colour, black, green, pink or blue	Contamination. Not the same as kahm yeast. Discard the whole batch, not just the affected part.
Smells putrid, cheesy or of solvent	The wrong organisms established. Discard.
Bag never firmed or gassed and there is no sourness after 3 days	Fermentation did not start. Usually salt too high or a failed seal. Discard rather than extend.
pH still above 4.6 once it tastes done	Not acidified enough to be safe. Discard.
Slimy or ropey brine	Certain spoilage bacteria. Discard.

Food, not treatment. This guide teaches a cooking technique. If you are managing a diagnosed gut condition, are pregnant, or are immunocompromised, talk to your doctor before adding fermented food, and take their answer over anything you read here.

What you need

EQUIPMENT

Equipment	Notes
Chamber vacuum sealer	Not a suction or edge sealer. It must be a chamber unit.
Vacuum seal bags	Compostable bags work well. Purpose-made chamber bags are best.
Digital kitchen scale	Salt ratio is by weight. Guessing does not work reliably.
pH test strips	A few dollars. You only really need them for the first batch.
Sharp knife or mandoline	Consistent slice thickness gives even fermentation.
Large mixing bowl	For massaging the cabbage and collecting brine.

On chamber sealers: the technology differs from the edge-style vacuum bags sold in most appliance shops. A chamber unit evacuates the entire interior of the chamber, including the bag, and that pressure differential is what drives the brine into the tissue. An edge sealer removes air from the bag only and does not produce the same result.

INGREDIENTS

Ingredient	Amount	Notes
Green or white cabbage	900g, about one head	Outer leaves removed
Non-iodised salt	18g, 2% by weight	Fine sea salt or kosher salt

Salt ratio is the critical variable. Weigh the cabbage after trimming and calculate from that number, not from the weight on the label.

The method

01

Slice

Halve the cabbage and remove the core. Slice thinly and consistently, roughly 2 to 3mm. Consistent thickness matters for even salt penetration. A mandoline is useful but not required.

02

Salt and massage

Weigh the sliced cabbage. Calculate 2 per cent of that weight in non-iodised salt. Distribute it evenly and massage firmly for 3 to 5 minutes until the cabbage wilts noticeably. Some moisture will release. That is normal, and no standing brine is needed.

03

Pack the bag

Transfer the cabbage into a vacuum seal bag. Pack firmly to eliminate air pockets within the mass. The vacuum does the rest, so there is no need to cover the cabbage with brine or ensure submersion. Leave adequate headspace at the top for a clean seal.

04

Chamber vacuum seal

Place the filled bag in the chamber sealer. Seal at the highest vacuum setting available, typically 99 to 100 per cent. The brine will bubble during evacuation, which is normal. Seal while still under vacuum.

05

Rest at room temperature

Leave the sealed bag at room temperature for 1 to 3 days depending on ambient temperature and how much tang you want. Check daily. The cabbage shifts from pale to a slightly translucent, deeper colour as it ferments, and the bag firms as gas builds.

06

Check and refrigerate

When the tang is right, check the pH on your first batch. Below 4.6 and it is done. Refrigerate immediately. Fermentation slows dramatically in cold storage. Shelf life is 4 to 6 weeks sealed, and 2 to 3 weeks once opened.

Temperature sets the speed. Warmer rooms at 22 to 26C accelerate it, cooler rooms at 18 to 20C slow it down. In summer start checking at 24 hours. In winter expect closer to 3 days.

TIME COMPARISON

Days, not weeks

Traditional fermentation at room temperature runs 5 to 21 days depending on the ferment, the ambient temperature and how sour you want it. Chamber vacuum brings that down to days.

Ferment	Chamber vacuum	Traditional
Sauerkraut	1 to 2 days	3 to 7 days
Kimchi	1 to 3 days	5 to 10 days
Pickles	1 to 2 days	3 to 5 days
Mixed vegetables	1 to 3 days	7 to 21 days

Approximate, and they move with ambient temperature, salt concentration and how much acidity you are after. These ranges assume 20 to 24C.

TROUBLESHOOTING

When something goes wrong

Issue	Fix
Cabbage is dry after massaging	Massage more firmly, a full 3 to 5 minutes. The vacuum will break the cell walls and release moisture during the seal. If it still seems very dry before sealing, the head was probably old. Use a fresher one.
White film on the surface	Kahm yeast. It appears once the bag is opened and the ferment meets air. Harmless. Skim it off and reseal, or eat within a few days. Fuzzy or coloured growth is a different thing entirely, see the safety page.
Mushy texture	It ran too warm or too long. Cut the rest by half a day and check earlier next time. Keep bags out of direct sun and away from heat sources while they rest.
No tang after 3 days	Salt is probably too high and has suppressed the bacteria. Check the ratio against the trimmed weight. Also check the seal held. Discard rather than pushing on.
Brine leaked from the bag	Seal quality. Reseal and re-vacuum immediately, and check the bag for micro-tears before use.

Beyond the base

Once you have a consistent ferment, the question becomes what to do with it. The base itself, a mild and tangy cabbage ferment, works as a condiment, a side, or an ingredient in almost any cuisine.

The approach used in further Green Holmes protocols is to keep the base neutral and add compounds at the point of serving: fats, spices and bioactive ingredients that do not belong in the fermentation vessel. One batch then stays flexible across many meals.

Curcumin and gingerol are fat-soluble. They extract poorly in water and need a fat carrier to be absorbed in any meaningful amount. Adding them in an MCT oil base at serving, rather than during fermentation, preserves both the flavour of the base and the potency of the compounds.

COMBINATIONS TO START WITH

Pairing	What is in it
Recovery	Turmeric, cracked black pepper and a few drops of MCT oil. Piperine in black pepper raises curcumin absorption substantially. Good within a couple of hours of training.
Digestion	Caraway seed and a little minced raw garlic. Caraway is traditionally carminative. Garlic brings allicin and feeds beneficial bacteria.
Neutral	Good olive oil and fresh herbs, for meals where the ferment is a supporting player rather than the point.
Training day	Ginger and cracked black pepper. Gingerol has useful anti-inflammatory properties, and it tastes like it means it.

Old craft. New science. Built for now.

Field Notes, protocols and research at greenholmes.com.au