

# Lacto-Fermentation & Pickling — Workbook

This workbook accompanies the Lacto-Fermentation & Pickling course and turns each module into hands-on practice. Complete each exercise and worksheet with your own batches, real measurements, and tasting notes so that the scientific principles become personal knowledge grounded in your own kitchen. Every template is designed to be filled in as you work, not after the fact.

## The Science of Lacto-Fermentation

Apply the three-stage bacterial model, calculate brine ratios, and set up your sterilisation protocol before your first ferment.

### Exercise: Bacterial Succession Mapping

Draw the three-stage bacterial succession timeline for a typical sauerkraut ferment, then answer the reflection prompts below to confirm your understanding of the microbiology.

- At what pH does Stage 1 end and Stage 2 begin, and which organism drives that transition?  
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- Why does CO<sub>2</sub> production in Stage 1 benefit the fermentation, and what would happen if you capped the jar airtight at this stage?  
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- Name two environmental variables you can adjust to slow down Stage 2 and develop more complex flavour in a longer ferment.  
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- At what pH is a vegetable ferment considered safe from botulinum toxin risk, and what is the safety basis for that threshold?  
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### Worksheet: Brine Ratio Calculator — Your First Three Batches

Before starting each ferment, complete this worksheet to calculate the correct salt weight for your specific vegetable quantity. Use a kitchen scale for all measurements.

Batch name (e.g. Classic Sauerkraut)

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Vegetable weight in grams

\_\_\_\_\_

Target salt percentage (e.g. 2%)

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Calculated salt weight in grams (vegetable weight × percentage ÷ 100)

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Salt brand and type (confirm non-iodised)

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Actual salt weight measured on scale

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Difference between calculated and actual (should be <0.5 g)

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Notes on brine release after massaging (abundant / moderate / poor)

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### Checklist: Equipment Sterilisation Pre-Flight Checklist

- Wash all jars, lids, weights, and utensils in hot soapy water and rinse thoroughly
- Apply no-rinse sanitiser (Star San or white vinegar) to all surfaces; swirl and pour out
- Air-dry equipment upside down on a clean towel for at least 15 minutes
- Confirm salt is non-iodised and free of anti-caking agents
- Confirm water source — filtered or dechlorinated if using brine-submersion method
- Calibrate pH meter with pH 4.0 and pH 7.0 buffer sachets (or confirm pH strip range covers 2–7)
- Label jar with product name, date, and salt percentage before filling

## Sauerkraut, Kimchi, and Fermented Vegetables

Record your first sauerkraut and kimchi batches with daily observations, and document your fermented hot sauce development.

### Exercise: Side-by-Side Sauerkraut Comparison

Make two 500 g batches of sauerkraut simultaneously — one at 2% salt and one at 3% salt. Monitor both and record the differences in fermentation speed, flavour, and final pH at the same time points.

- On day 3, which batch is producing more visible CO<sub>2</sub> bubbling, and what does this tell you about the effect of salt concentration on fermentation rate?

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- Taste both batches at day 7. Describe the flavour differences — which is more sour, which is saltier, which has better texture?

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- At day 14, record the pH of each batch and compare. Does the higher-salt batch reach the same final pH, or does it stay higher?

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- Based on your results, which salt percentage would you use for a batch you intend to ferment for 6 weeks, and why?

### Worksheet: Kimchi Batch Record

Fill in this worksheet for each batch of kimchi. Complete stage measurements before and after salting to track water loss and final seasoning balance.

Cabbage variety and source

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Pre-salt cabbage weight (g)

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Salting method (overnight dry-salt / 2-hour brine wilt)

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Post-rinse cabbage weight (g)

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Water loss percentage (pre-salt minus post-rinse, divide by pre-salt, multiply by 100)

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Gochugaru amount (tbsp)

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Fish sauce or soy sauce amount (tbsp)

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Garlic (cloves, minced)

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Ginger (tsp, grated)

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Day 1 pH of brine

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Day 5 pH of brine

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Final fermentation method (room temp then fridge / fridge from day 1)

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Tasting notes at week 1

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Tasting notes at week 4

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### Checklist: Fermented Hot Sauce Go/No-Go Checklist

- Peppers are fresh, firm, and free of visible mould or rot before processing
- Brine calculated at 2% salt by weight relative to pepper mass
- Ferment has been actively bubbling for at least 3 days before testing pH
- pH reading is below 4.0 before blending and bottling
- Final blended sauce pH re-tested and confirmed below 4.0 (or below 3.8 for room-temperature storage)
- Bottles sterilised and labelled with pepper variety, date, and measured pH
- Any sauce above pH 4.0 is refrigerated and marked with a 2-week use-by date

## Kombucha and Water Kefir

Track your SCOBY culture health, record F1 and F2 parameters across multiple brew cycles, and build a grain-care routine for water kefir.

### Exercise: SCOBY Health Assessment

Inspect your SCOBY at the start of each new F1 brew and record the following observations. After three batches, use the data to identify any trends in SCOBY health.

- Describe the physical appearance of your SCOBY at the start of this brew: size, thickness, colour, and any unusual features. Is it different from the previous brew?

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- What was the pH of the starter liquid you used, and how does that compare to your target of 2.5–3.0?

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- What was the room temperature during this F1 fermentation cycle, and did the fermentation take more or less time than your previous batch?
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### Worksheet: Kombucha Brew Log — F1 and F2 Tracker

Record each brew cycle from F1 start through F2 bottling. This log will help you identify your optimal fermentation time and flavour profile across seasons.

Batch number

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F1 start date

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Tea type and quantity (g per litre)

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Sugar quantity (g per litre)

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Starter liquid volume (ml) and pH

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SCOBY description (size, appearance)

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Room temperature (°C)

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Day 7 pH

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Day 10 pH

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F1 end date and final pH

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F2 flavour addition (ingredient and quantity per 250 ml bottle)

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F2 start date

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F2 days at room temperature before refrigerating

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Carbonation level at opening (low / medium / high)

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Overall batch rating (1–5) and notes

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### Checklist: Water Kefir Grain Care Routine

- Strain grains through a plastic sieve (not metal) every 48 hours
- Rinse grains briefly with filtered or mineral water after straining
- Prepare fresh sugar water at 60–80 g sugar per litre of mineral water
- Add one piece of dried unsulphured fig or apricot per batch for minerals
- Confirm grains are plump and translucent — not flat, slimy, or broken down
- If grains appear sluggish, add a pinch of mineral supplement and raise temperature to 25°C
- Freeze a tablespoon of grains in sugar water as a backup culture after every 10 batches
- Record grain volume growth — healthy grains should roughly double in volume every 2–4 weeks

## Vinegar Pickling and Long-Term Storage

Document your quick-pickle and shelf-stable canning results, build your labelling system, and design your seasonal fermentation rotation.

### Exercise: Quick-Pickle Flavour Development Timeline

Make one jar of quick refrigerator pickles and taste at four time points to observe how flavour evolves as the brine penetrates the vegetables.

- Taste at 2 hours: describe the texture and the balance of salt, sweet, and sour. Does the brine flavour penetrate to the centre of the vegetable yet?  
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- Taste at 24 hours: how has the flavour changed? Is the vegetable softer or crisper? Is the brine more or less acidic-tasting than at 2 hours?  
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- Taste at 72 hours: at what point would you say the pickle reached its best flavour? What vegetable thickness or cut produced the best texture at this time?  
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- Compare your result with the quick-pickle formula from the lesson. Would you adjust the salt, sugar, or vinegar ratio for your next batch, and by how much?  
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### Worksheet: Canning Session Record

Complete this worksheet for each water-bath canning session. Accurate records allow you to reproduce successful batches and troubleshoot seal failures.

Canning date  
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Recipe source and name (use only tested recipes)  
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Vegetables or ingredients used and total weight  
\_\_\_\_\_

Vinegar type and confirmed acidity percentage (must be 5% or higher)  
\_\_\_\_\_

Brine ratio used (vinegar : water)  
\_\_\_\_\_

Number of jars filled  
\_\_\_\_\_

Jar size (ml)  
\_\_\_\_\_

Headspace measured (cm) — target 1.25 cm  
\_\_\_\_\_

Processing time (minutes)  
\_\_\_\_\_

Altitude adjustment applied (minutes added)  
\_\_\_\_\_

Number of jars that sealed within 24 hours  
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Number of jars that failed to seal (refrigerate immediately)

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Storage location and projected best-by date

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### Checklist: Annual Fermentation Rotation Planner

- List the 3–5 ferments you want to maintain as a regular rotation (e.g. sauerkraut, kimchi, kombucha)
- Assign each ferment a production frequency (every 48 hours, weekly, monthly)
- Map your cold storage capacity — measure available refrigerator shelf space in litres
- Identify which ferments can be stored in a cold cellar versus refrigerator
- Schedule your first batch of each seasonal pickle to coincide with peak vegetable availability
- Build in a fermentation holiday (2-week break) by preparing extra batches 3 weeks in advance
- Review and update your fermentation log after each season to capture what worked and what to change
- Share or swap surplus ferments with at least one other person to stay motivated and get feedback

### Your Action Plan

1. Buy a kitchen scale accurate to 1 g, a bag of non-iodised salt, and a pH strip kit (range 2–7) before your first batch
2. Make your first sauerkraut using the 2% dry-salt method with one head of green cabbage within the first week of the course
3. Log daily observations (bubbling activity, brine level, aroma) for the first 7 days in the Batch Brine Ratio worksheet
4. Test pH at day 7 and day 14 using strips or a digital meter; record in your fermentation log
5. Once sauerkraut is in cold storage, start a batch of fermented carrots or jalapeños using the brine-submersion method
6. Source a kombucha SCOBY and starter liquid (commercial raw kombucha or a local SCOBY share) and begin your first F1 brew
7. Complete one F2 kombucha carbonation cycle using a plastic test bottle alongside glass bottles
8. Order or obtain water kefir grains and run your first 48-hour cycle; record grain appearance and flavour at completion
9. Make a batch of quick refrigerator pickles and taste at the four time points described in the workbook exercise
10. Review all your batch logs at the end of the course and identify one variable to optimise in your next round of each ferment











