Canadian Fermented Foods Initiative

FERMENTED FOODS

A GUIDE TO GOOD GUT LIVING



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Canadian Fermented Foods Initiative

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INTRODUCTION TO FERMENTED FOODS



Chef Connor Flynn

WHAT ARE FERMENTED FOODS?

Fermented foods are defined as foods made through desired microbial growth and enzymatic conversions of food components.

LIVE MICROBES PRESENT



Cheese | Yogurt | Kefir | Miso

Fermented Vegetables | Kombucha | Tempeh | Kochujang

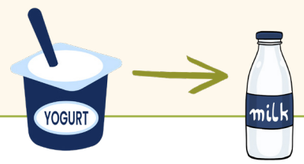
MICROBES KILLED OR REMOVED IN THE PROCESS



Vinegar | Bread | Soy Sauce | Sausage

EXAMPLE

Bacterial cultures eat lactose, producing lactic acid. This changes milk's flavor, texture and nutrients, turning it into yogurt.





There are thousands of fermented foods and beverages consumed globally.

*Not all fermented vegetables contain live microorganisms, cooking or canning can inactivate them. Some products like pickles can be fermented in a salt brine but can also simply be preserved in vinegar without fermentation.

WHAT IS FERMENTATION?

How it works

Microbes are the main players!

Bacilli

Lactic Acid Bacteria (LAB)

Acetic Acid Bacteria (AAB)

Filamentous Fungi

Yeasts

Fermentation is performed by a diverse group of microbes through biochemical reactions

anaerobic + aerobic

Metabolism

Fermentation is one of the oldest food preservation techniques, with roots tracing back at least 8,000 years.

Fermentation Process

1

Microbes like bacteria, yeast and fungi are either naturally present or intentionally added to fresh food products.





2

Microbes convert sugars and other compounds present in fresh foods into acids, gases, alcohol and other metabolites resulting in fermented food products.

Some fermented foods undergo further processing (e.g., pasteurization, filtration) that remove or kill live microbes, whereas others contain live microbes.

3





4

The fermentation process helps to improve nutrient availability and digestibility, gut microbiota diversity and immune modulation.

WHY EAT FERMENTED FOODS?



WHY EAT FERMENTED FOODS?

- ✓ Add flavour and variety to meals (think tangy, fizzy and savoury!)
- ✓ Help preserve food without synthetic additives
- ✓ Are part of many cultural traditions around the world
- ✓ Can introduce or support beneficial bacteria* in your gut
- ✓ May help with nutrient absorption and digestion

Beneficial Properties of Fermented Foods

Contain essential nutrients:

- Protein
- Carbohydrates
- Dietary fibre
- Antioxidants
- Vitamins
- Minerals

May be a source of beneficial microbes that improve:

- Nutrient availability
- Nutrient digestibility
- FODMAPs**
- Anti-nutritional factors
- Gut microbiota diversity
- Immune modulation

Source of beneficial metabolites

Canadians already eat fermented foods, but many don't know how these foods impact their health and the environment.

Fermentation can reduce food waste by extending shelf life and transforming surplus crops into value-added products.



*Fermented foods can have helpful microbes, but only those with proven health benefits are considered probiotics.
**FODMAP: Fermentable oligosaccharides, disaccharides, monosaccharides and polyols.

POTENTIAL HEALTH BENEFITS OF FERMENTED FOODS



POTENTIAL HEALTH BENEFITS OF FERMENTED FOODS

Fermented foods do more than taste great - they can also do amazing things for your health.

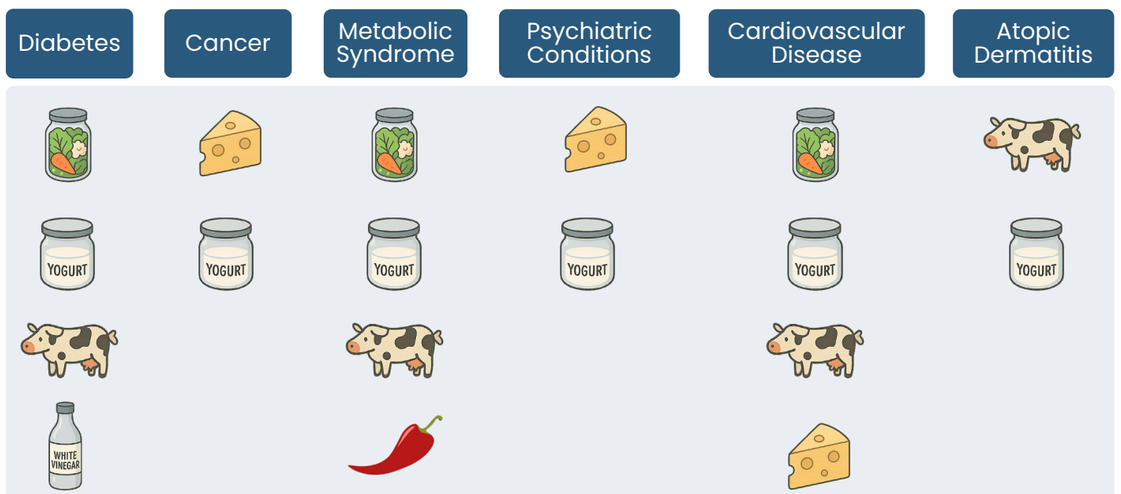


In a survey of over 4,000 Canadians, people who grew up with home-fermented foods often had lower body mass index (BMIs) and a stronger sense of well-being.

From your gut to your brain, science is beginning to show how these foods may help you feel better, stay healthier and even live longer.

Pre-clinical and clinical studies have found that consumption of certain fermented foods decreased the risk of some chronic health conditions.

Below is a graphical representation of various fermented foods and the health conditions they may help prevent or alleviate.



*revisit page 4 for icon legend.

Reference: Sampsell et al 2025

POTENTIAL HEALTH BENEFITS OF FERMENTED FOODS



1 Can support gut health and digestion

- Improve digestion
- Increase nutrient absorption, including iron, calcium and magnesium
- Increase bloating by lowering “FODMAP”

Example

Sourdough bread is often easier to digest because fermentation breaks down gluten (partially), FODMAPs and fructans which might cause sensitivity in many people.

2 Help regulate blood sugar

- Lower blood sugar levels and improve long-term blood sugar control
- Improved insulin sensitivity
- Reduce blood sugar spikes after meals

Did you know?

Sourdough bread and vinegar may lead to improved blood sugar control than their non-fermented counterparts.

3 Boosts immunity and reduce inflammation

- Reduce inflammatory markers
- Possibly help prevent infections like colds or pneumonia

Did you know?

Mothers who eat more fermented foods during pregnancy may lower the risk of eczema and allergies in their babies.

4 May support health function

- Lower low-density lipoprotein (“bad”) cholesterol
- Better blood pressure
- Improved blood vessel health

Example

In several studies, kefir helped reduce blood pressure, cholesterol and inflammation markers.



May support with mental health

- Help ease symptoms of anxiety and depression
- Influence the brain through the “gut-brain axis”
- Support mood via anti-inflammatory and microbiome pathways

Early research on fermented foods like kefir and kombucha shows promise in supporting emotional well-being.

Healthy aging and weight management

- Lower body mass index (BMI)
- Better weight control
- Improved metabolic health and lower chronic disease risk
- Improved emotional well-being

In surveys, Canadians who grew up eating home-fermented foods had better overall health outcomes.

May prevent some cancers

- Reduced risks of colorectal, bladder and breast cancer

This might be due to anti-inflammatory compounds and immune-regulating effects of certain microbial fermentation.



EATING FERMENTED FOODS



FERMENTED FOOD

BENEFITS

Can enhance food nutrient content and bioavailability while reducing food spoilage.

May increase gut microbiota diversity and may help regulate the immune system.

May reduce risk for certain chronic diseases when consumed regularly.

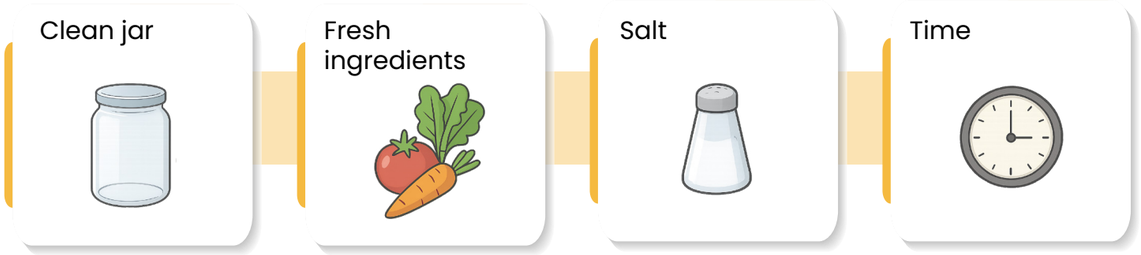
But more research is needed.

GUIDE TO FERMENTING FOODS AT HOME



HOW TO START

Fermenting at home is simple and rewarding.





Common Methods

Lactic acid fermentation

Used for veggies like pickles and sauerkraut.

Yeast fermentation

Used in bread, kombucha and beer.

Mould bases fermentation

Used in miso and tempeh.

Safety tips:

1. Always use clean equipment
2. Avoid mold (except in mold-based recipes)
3. If it smells truly rotten, toss it!

WHERE TO FIND FERMENTED FOODS

Fermented foods come in many forms, using different ingredients and techniques. Though store-bought options are convenient, modern production can involve shortcuts that affect quality and potential health benefits.



- Some products speed up the process with chemicals or add bacteria only after production, meaning the food hasn't actually undergone true fermentation.
- Authentic kombucha is created by fermenting tea with a symbiotic culture of bacteria and yeasts (SCOBY) and kefir is traditionally made by adding a 'kefir grain' to whole milk. However, most commercial kombuchas and kefirs use alternative processes that typically lack traditional microbes.
- Pasteurization extends shelf life but kills live cultures and while fermented foods with dead or removed microbes can still offer some benefits, they likely have different effects compared to those with live microbes.

How to recognize fermented foods with live microbes

- Identifying high-quality fermented foods requires reading labels carefully.
- Look for terms like "raw," "unpasteurized" and "contains live cultures".
- Alternatively, you can try making your own fermented foods at home to ensure they are made the traditional way.

Look for words like:

- Active cultures
- Raw
- Living
- Wild
- Unpasteurized
- With the mother

Nutrition Facts
Valeur nutritive
Per 1 bottle (330 mL)
pour 1 bouteille (330 mL)

Calories 19	% Daily Value* / % valeur quotidienne*
Fat / Lipides 0 g	0 %
Saturated / saturés 0 g + Trans / trans 0 g	0 %
Carbohydrate / Glucides 5 g	
Fibre / Fibres 0 g	0 %
Sugars / Sucres 5 g	5 %
Protein / Protéines 0 g	
Cholesterol / Cholestérol 0 mg	
Sodium 2 mg	0 %
Potassium 15 mg	0 %
Calcium 0 mg	0 %
Iron / Fer 0 mg	0 %

*5% or less is **a little**, 15% or more is **a lot**
*5% ou moins c'est **peu**, 15% ou plus c'est **beaucoup**

Ingredients: Filtered water, Water kefir culture, Concentrated organic lemon juice, Organic mango puree, Organic inulin, Raw organic cane sugar, Carbon dioxide

Ingrédients: Eau filtrée, Culture de kéfir d'eau, Jus de citron biologique concentré, Purée de mangue biologique, Inuline organique, Sucre de canne cru biologique, Gaz carbonique

EASY RECIPES OF FERMENTED FOODS TO MAKE AT HOME



Sauerkraut

Yield: 1 quart canning jar
Preparation Time: 15-25 minutes
Fermenting Time: minimum 14 days

Ingredients:

- 2 lbs (10 cups) of green cabbage
- 1 tbsp pickling salt
- 1 tsp of caraway seed
  (optional for traditional recipe)

Directions

1. Remove the first couple layers of outer leaves if they don't look the freshest.
2. Core the cabbage and rinse under cold water then shred or slice evenly.
3. Put cabbage in a large bowl, sprinkle with salt and caraway (optional).
4. Toss cabbage with salt, then pound and squeeze using a kraut smasher, potato masher or your fist.
5. You'll know it's ready when the cabbage volume halves and brine collects at the bottom. If not, keep going.
6. Pack cabbage and brine into a quart jar, pressing each layer so liquid rises and bubbles above the cabbage (should fit into one quart jar).
7. Place a weight or cabbage core in the jar to keep cabbage submerged under the brine (this is key to having a ferment that is free from bad microbial growth).
8. Leave at least 1 inch head space, after the fermenting weight is added to the top of the cabbage mixture. Place a fermenting top (pickle pipe, carboy, or regular canning lid and ring) on the top of the jar and loosely thread it on.
9. Place the jar in a cool to warm dark place for fermentation.
10. Check sauerkraut daily at first, then every other day to make sure the cabbage is submerged. Scoop out any cabbage or seeds that are floating. Taste after 2 weeks and ferment longer until the desired taste is reached.



Pro Tips

Ensure all of your equipment is washed thoroughly, including your hands, before beginning any fermentation recipe or method.

Salt cabbage and use your hands to mix and leave to sit for half an hour to an hour to allow the salt to draw out the moisture before smashing. This will result in less physical smashing and squeezing, which can be quite physically tiring.

If your sauerkraut smells strong even after a day, this is normal!

Sauerkraut takes 2–4 weeks to ferment, depending on the room temperature. Warmer temperatures speed up fermentation but can lead to a mushy texture, while colder temperatures may prevent fermentation altogether. The ideal range is 59°F-68°F or 15°C-20°C for proper and even fermentation.

Kraut-Chi

Yield: 1 quart canning jar
Preparation Time: 15-25 minutes
Fermenting Time: minimum 4 days

Ingredients:

- 2½ lbs (12½ cups) green cabbage
- 1 heaping tbsp pickling salt
- 1/2 cup gochugaru Powder (Substitute: 1/4 cup paprika and 1/4 chili powder)
- 1 tsp minced fresh garlic
- 2 tsp minced fresh ginger
- 3 stalks of green onion sliced thin
- 1 carrot, shredded or cut into matchsticks



Directions

1. Gently wash the cabbage with cold water and remove the outer leaves. Then, cut it in half lengthwise and cut a V-shape around the core to remove it.
2. At the 'V', cut the cabbage in half again. Flip the cabbage down on its flat side and thinly slice or shred using a cheese grater.
3. Combine cabbage, carrot, green onion, garlic, ginger and Gochugaru in a large bowl; sprinkle with salt. Use less Gochugaru for a milder Kraut-Chi.
4. Toss the cabbage and salt by hand to distribute evenly (wear gloves—chili can irritate). Then alternate pounding and squeezing the mixture using a kraut smasher, potato masher, or your fist.
5. It's done when the vegetables have visibly shrunk by half and there's plenty of brine in the bowl. If not, keep going!
6. Pack the cabbage and brine into a quart jar, compressing each layer so the liquid bubbles over. All the vegetables should fit in the jar.
7. You should have at least one inch of head space after the fermenting weight is added to the top of the vegetable/brine mixture.
8. Place a fermenting top (pickle pipe, carboy, or regular canning lid and ring) on the top of the jar and loosely thread it on. Place the jar in a cool to warm dark place during fermentation.
9. Check your Kraut-Chi every day for the first couple of days and every other day after that to ensure that the head space is correct and to make sure that there is no cabbage/vegetables floating above the brine.
10. After 4 days, taste your Kraut-Chi to check if you like the flavour. If you prefer more of a sour flavour, continue to ferment until the desired taste is reached.



Fermented Cucumbers

(Dill Pickles)

Yield: 1 quart canning jar
Preparation Time: 15-25 minutes
Fermenting Time: minimum 4 days

Ingredients:

- 2 lbs (10 cups) of 4-inch (10 cm) pickling cucumbers
- 1 tbsp dill seed or 2 heads fresh or dry dill weed or 3 sprigs of fresh dill
- 2 tbsp canning and pickling salt
- 1/8 cup vinegar (5%)
- 4 cups water

Directions

1. Wash cucumbers under running water, scrubbing to remove soil. Trim 1/16 inch off the blossom end (discard it) and leave 1/4 inch of stem.
2. Place half of the dill and spices at the bottom of a clean a quart jar.
3. Add cucumbers by stacking on their side with the jar horizontal, then top with the remaining dill and spices. Try to gently squeeze as many cucumbers in the jar as possible.
4. Dissolve salt in vinegar and water by whisking in a medium-sized mixing bowl, then pour into the quart jar over cucumbers.
5. Add the fermentation weight to keep cucumbers submerged. Make sure you have at least an inch of head space from the top of the brine to the top of the quart jar.
6. Store in a cool to warm dark place for 3–4 weeks until it reaches the desired taste.



Sauerkraut Coleslaw

Yield: 1 quart canning jar
Preparation Time: 15-25 minutes
Fermenting Time: minimum 4 days

Cabbage Base Ingredients:

- 2 lbs (10 cups) of cabbage
- 2 tbsp kosher salt
- 1 cup prepared sauerkraut, drained and roughly chopped
- 2 large carrots, julienned or grated
- 1/2 red onion, thinly sliced

Dressing Ingredients:

- 1/2 cup mayonnaise
- 2 tbsp apple cider vinegar
- 1 tbsp Dijon mustard
- 1 tbsp honey or sugar
- 1/2 tsp caraway seeds (optional)
- 1/4 tsp celery seed
- Fresh black pepper to taste



Directions

Prepare the Cabbage:

1. Place the shredded cabbage in a large colander and toss with the kosher salt, making sure it's evenly distributed.
2. Set the colander over a bowl and let it sit for 1-2 hours at room temperature to draw out the cabbage's moisture.
3. After the waiting period, rinse and toss the salted cabbage thoroughly under cold running water.
4. Using your hands or a clean kitchen towel, squeeze the cabbage in small batches to remove as much water as possible. The cabbage should feel significantly drier and slightly wilted.

Assemble the Coleslaw:

1. In a large mixing bowl, combine the drained cabbage, chopped sauerkraut (see recipe page 18), carrots and red onion.
2. In a separate small bowl, whisk together mayonnaise, apple cider vinegar, Dijon mustard, honey, caraway seeds (if using), celery seed and black pepper.
3. Pour the dressing over the cabbage mixture and toss thoroughly to coat everything evenly.
4. Taste and adjust seasoning as needed.

Rest and Serve:

Let the coleslaw rest in the refrigerator for at least 30 minutes before serving. The coleslaw will keep for 3-4 days refrigerated, though it's best within the first two days.



Marinated Bulgur Wheat Salad with Beet Sauerkraut

Serves 6-8 as a side dish or 4 as a main course.

Ingredients:

For the bulgur base:

- 1 cup fine bulgur wheat
- 1½ cups boiling water
- 1 tsp salt

For the salad:

- 3/4 cup beet sauerkraut, drained and roughly chopped
- 1/2 cup dried cherries or cranberries
- 1/2 cup sliced almonds, toasted
- 1/2 medium red onion, thinly sliced
- 4 oz feta cheese, crumbled
- 4 cups fresh baby spinach, roughly chopped
- 1/2 cup fresh parsley, chopped

For the Maple Vinaigrette:

- 1/4 cup extra virgin olive oil
- 3 tbsp apple cider vinegar
- 2 tbsp pure maple syrup
- 1 tbsp Dijon mustard
- 1 garlic clove, minced
- 1/2 tsp salt
- 1/4 tsp black pepper
- Pinch of red pepper flakes (optional)

Directions

Prepare the Bulgur:

1. Place bulgur wheat in a large bowl and pour boiling water over it. Add salt and stir.
2. Cover tightly with plastic wrap or a lid and let stand for 30 minutes until tender and the water is absorbed.
3. Fluff with a fork and let cool to room temperature.

Make the Vinaigrette:

1. In a small bowl or jar, whisk together olive oil, apple cider vinegar, maple syrup, Dijon mustard, minced garlic, salt, pepper and red pepper flakes if using.
2. Taste and adjust sweetness or acidity as needed.

Toast the Almonds:

1. Heat a dry skillet over medium heat.
2. Add sliced almonds and toast for 3-4 minutes, stirring frequently, until golden brown and fragrant.
3. Remove from heat and let cool.

Assemble and Marinate:

1. Add the cooled bulgur to a large serving bowl.
2. Add beet sauerkraut, dried cherries, toasted almonds and sliced red onion.
3. Pour the vinaigrette over the mixture and toss thoroughly.
4. Cover and refrigerate for at least 2 hours, or preferably overnight, to allow flavours to develop.

Final Assembly:

1. Just before serving, add the chopped spinach, fresh parsley and crumbled feta cheese.
2. Toss gently to combine.
3. Taste and adjust seasoning with additional salt, pepper or vinaigrette as needed.



Korean-Style Marinated Beef Rice Bowls

Serves 4

Preparation Time: 15 minutes
Marinating Time: 1 hour to overnight
Cook Time: 30 minutes

For the marinated beef:

- 1 lb iron steak, sliced 1/4 - inch thick against the grain
- 1 tbsp fresh ginger, grated
- 3 cloves of mince garlic
- Zest and juice 1 mandarin orange (or small orange)
- 1 tbsp of honey
- 1 tbsp of soy sauce
- 1 tbsp of fish sauce
- 1 tbsp of olive oil

For the rice and toppings:

- 1 cup jasmine rice, uncooked
- 1 tbsp butter
- 4 large eggs
- 1/2 tsp salt
- 1/4 tsp black pepper
- 1/2 cup matchstick carrots
- 1 cucumber, sliced into rounds
- 1 cup Kraut-Chi
- 1/4 cup green onions, sliced

For serving:

- 2 tbsp gochujang or Korean barbecue sauce
- 1 tbsp sesame seeds
- Additional soy sauce, if desired





Directions

Marinate the Beef:

1. In a medium bowl, combine sliced steak with grated ginger, minced garlic, mandarin zest and juice, honey, soy sauce, fish sauce and olive oil.
2. Toss to coat the beef evenly, cover and refrigerate for at least 1 hour or up to overnight for maximum flavour.

Prepare the Rice:

1. Cook jasmine rice according to package directions until tender and fluffy.
2. Keep warm until ready to serve.

Cook the Beef:

1. Heat a grill pan or cast-iron skillet over high heat until very hot.
2. Remove beef from marinade and cook for about 2 minutes per side, or until nicely caramelized and cooked to your desired doneness.
3. Transfer to a plate and let rest briefly.

Prepare the Eggs:

1. In a nonstick skillet over medium-high heat, melt the butter.
2. Crack eggs into the pan, reduce the heat to low and cook until whites are set.
3. Flip carefully and cook to desired doneness (runny yolks are traditional).
4. Season with salt and pepper.

Assemble the Bowls:

1. Divide cooked rice among four bowls.
2. Top each bowl with sliced marinated beef, matchstick carrots, cucumber rounds and kimchi.
3. Place a fried egg on top of each bowl.
4. Garnish with sliced green onions and sesame seeds.
5. Drizzle with gochujang or Korean barbecue sauce and serve immediately.

IDEAS TO INCLUDE FERMENTED FOODS IN YOUR DIET



Breakfast:

- Add sauerkraut or Kraut-Chi to scrambled eggs
- Top avocado toast with fermented vegetables
- Mix fermented vegetables into a hash potato dish
- Stir Kraut-Chi into fried rice made with leftover rice



Lunch

- Use sauerkraut as a sandwich filling or topping
- Add fermented vegetables to grain bowls or salads
- Mix fermented onions or carrots into wraps and burritos
- Top soups with a dollop of kimchi or sauerkraut
- Use fermented vegetables in a salad or salad dressing



Dinner

- Serve fermented vegetables as a simple side dish
- Mix sauerkraut into mashed potatoes
- Add Kraut-Chi to stir-fries last minute of cooking
- Use as a topping for grilled meats, fish, or chicken



Snacks

- Eat fermented vegetables straight from the jar
- Add to a cheese board with olives and pickles
- Mix into hummus or yogurt-based dips
- Top baked sweets with fermented vegetables

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THE PRESERVING CHEF
WITH CERTIFIED MASTER FOOD PRESERVER
CHEF CONNOR FLYNN



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thepreservingchef.com

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