



nomiku  
**SOUS  
VIDE**  
PRIMER





# TIMELINE & HISTORY

## A History of Low Temperature and Sous Vide Cooking

"Sous vide cooking" is often used as a synonym for "low-temperature cooking in a sealed bag." This is wrong. Sous vide cooking is a kind of low-temperature cooking but a distinctive one with very specific techniques.

Low-temperature cooking uses temperatures below 100° C and a medium such as embers, oil, or water, but low-temperature cooking cannot be called sous vide without a vacuum. In fact, sous vide in French means "under vacuum" and refers to a wide range of techniques achievable in vacuum-sealed bags, such as texture modification, removing air from liquids, and storage.

The first person to record the low temperature cooking method was Sir Benjamin Thompson in 1802 when he attempted to cook a shoulder of mutton in his potato dehydrator. Finding the meat still raw after an hour, he simply dismissed the experiment and forgot about it until the next morning when he beheld something miraculous: the mutton was not only cooked perfectly but had an "uncommonly savory and high flavored" taste.<sup>1</sup>

Of course, many other cultures had already made similar discoveries, with different methods of preparation, such as slow cooking food in clay pots over a low fire, burying salt-crusted meats in an ash pit overnight, or wrapping food in leaves before cooking to preserve moisture content. All these methods produced tender and moist dishes that are impossible to achieve with high heat.

Modern sous vide cooking originated in Switzerland in the 1960s as a way to sterilize packaged food for distribution in the national hospital network. Cooks would hermetically seal meals and then slowly reheat them. In 1974, French chef Georges Pralus became the first to cook sous vide in a restaurant, putting his foie gras in a plastic pouch and poaching it in hot but not boiling water to prevent fat loss.

Dr. Bruno Goussault took sous vide one important step further by establishing new safety standards for low-temperature cooking that also maximized taste and texture. In 1986, he and Joel Robuchon teamed up to tackle the first large-scale all-sous-vide service for French train company SNCF. Goussault also went on to teach many American chefs and to this day provides sous vide meals across the United States through his company "Cuisine Solutions."

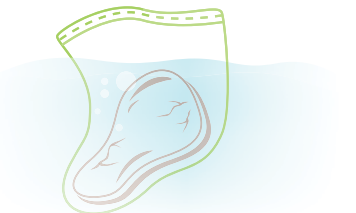
Thanks to Goussault's visionary work, sous vide has grown in popularity among chefs and home cooks who now can affordably use the method at home with the Nomiku.

<sup>1</sup> Sir Benjamin Thompson, *Essays, political, economical, and philosophical, Volume 3* (T. Cadell jun. and W. Davies, 1802), 18-20

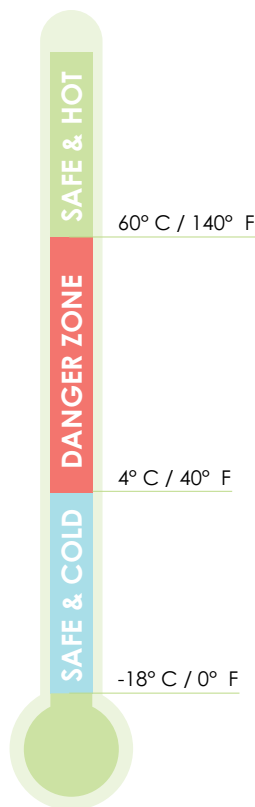
# SOUS VIDE SAFETY

Understanding the rules for and basics of low-temperature cooking are essential to cooking sous vide safely and effectively, so always follow these simple safety steps.

- 1 Think about safety before you cook. Buy professionally butchered proteins and the freshest food—including herbs—from reputable grocers and shops. And check the expiration dates on all packages. Doing this reduces the chances that unclean/contaminated food ends up in your bag.
- 2 Smell your food before and after cooking. The nose knows. If food smells off, then it is and should be thrown away.
- 3 Beware "The Danger Zone." You've heard the saying "keep hot food hot and cold food cold?" In the United States, this means keep food outside what the FDA calls "The Danger Zone"—the temperature range in which most bacteria can grow: 4° C (40° F) to 60° C (140° F). As part of "The Danger Zone" rule, the FDA also states not to leave food at room temperature for more than two hours.
- 4 Bag only properly chilled food and remove all air from the bag before cooking. When bagging with conventional zip bags, make sure to remove all air by sealing the bag underwater up to the zip seal. The barometric pressure of water will help to push out air bubbles naturally.



- 5 Follow all time and temperature requirements for individual recipes in this booklet and any sous vide recipe ([www.bagsoakeat.com](http://www.bagsoakeat.com) gives proper cooking times and temperatures for basic ingredients). Remember: every protein, not to mention different cuts from the same protein, cooks differently. Cooking sous vide at the proper temperature and time can also pasteurize your food completely.
- 6 When cooking for longer times, consider searing protein in a hot pan before bagging. This method adds flavor, firms up the outside of the food, and kills most bacterial spores on the surface. (The inside of meats and vegetables are sterile unless spoiled.) If a particular food can't be seared before bagging, gently sear (or blanch) it before serving. This final sear will also add flavor.



# Bacteria

In sous vide cooking, harmful bacteria are classified by their pathogenic danger levels, response to oxygen, and spore formation ability.

Pathogenic danger levels are measured by how infectious the bacteria are since all pathogenic bacteria are harmful. Oxygen response varies depending on if cooks use low-temperature cooking techniques with or without vacuum. In sous vide (under vacuum) cooking, aerobic bacteria become less of a concern because they cannot grow without oxygen in a vacuum. But the vacuum does not inhibit all types of microbes—especially ones that thrive in no oxygen environments like *Clostridium Botulinum* (commonly known as botulism). When *C. botulinum* cells are present in an anaerobic environment in vacuum bags and paired with incorrect use of low-temperatures in sous vide cooking, botulism can multiply exponentially to deadly levels. Not all bacteria die completely from cooking, many leave behind spores that have a protective coating that can only be sterilized using very high heat. Bacteria spores are like seeds and they are everywhere, even on a steak fresh off the grill and the air around you, but they are usually not a danger unless they are able to hatch and reproduce in temperatures of 4° C-65° C (40° F-140° F). Cooking sous vide correctly pasteurizes food but spores do get left behind; it is important to always handle your food safely even after the cooking process is done. The chart below shows some common bacteria found in food and their prevention methods.

## Clostridium botulinum:

<b>Pathogenic Danger Level;</b>	High, the botulinum toxin is one of the most dangerous neurotoxins known to man.
<b>Response to oxygen;</b>	Anaerobic, it will only grow in a vacuum environment.
<b>Spore Formation;</b>	Heat resistant. The spores can reactivate when placed in a low-oxygen environment.
<b>Symptoms;</b>	Occurrence is rare but can be fatal to humans. The botulinum toxin causes nausea, vomiting, diarrhea, fatigue, headache, dry mouth, double vision, muscle paralysis, and respiratory failure.
<b>Prevention;</b>	Botulinum toxin is typically found in underprocessed, canned, and fermented foods. Cooking or canning food to the required time and temperature will ensure safety. The cook-chill method is effective in preventing spores from reactivating.

## Listeria monocytogenes:

<b>Pathogenic Danger Level;</b>	High.
<b>Response to oxygen;</b>	Facultatively anaerobic, <i>Listeria</i> can grow with or without oxygen even in temperature as low as 0° C (32° F).
<b>Spore Formation;</b>	None.
<b>Symptoms;</b>	Fever, nausea, vomiting, and diarrhea. Influenza-like.
<b>Prevention;</b>	<i>Listeria</i> is usually found in contaminated foods that have been fermented. It can also be found in raw dairy, raw meats, and raw vegetables like cabbage. Avoid cross-contamination and cook to reach standard pasteurization time and temperature to ensure safety.

## Escherichia coli O157:H7:

<b>Pathogenic Danger Level;</b>	High.
<b>Response to oxygen;</b>	Facultatively anaerobic, <i>E. coli</i> can grow with or without oxygen.
<b>Spore Formation;</b>	None.
<b>Symptoms;</b>	Kidney failure, hemorrhagic diarrhea (bloody stool).
<b>Prevention;</b>	<i>E. coli</i> infection is usually found in contaminated ground meats such as undercooked hamburgers, raw unpasteurized milk, and unwashed produce. Avoid cross-contamination and cook to reach standard pasteurization time and temperature to ensure safety.

Staphylococcus:

<b>Pathogenic Danger Level;</b>	Medium.
<b>Response to oxygen;</b>	Aerobic, Staphylococcus cannot grow in vacuum.
<b>Spore Formation;</b>	None.
<b>Symptoms;</b>	Vomiting, diarrhea, cramps, fever, blood and pus in stools.
<b>Prevention;</b>	Commonly found in dairy products, raw meat, poultry, and food handled by people with poor personal hygiene. Avoid cross-contamination. Refrigerate properly and cook to reach standard pasteurization time and temperature to ensure safety.



Salmonella:

<b>Pathogenic Danger Level;</b>	Medium, however widespread.
<b>Response to oxygen;</b>	Aerobic, Salmonella cannot grow in vacuum.
<b>Spore Formation;</b>	None.
<b>Symptoms;</b>	Fever, diarrhea, vomiting, and abdominal cramps.
<b>Prevention;</b>	Usually found in contaminated poultry and eggs. Salmonella can be destroyed by sufficient heat and/or acid. It however can survive freezing temperatures. Avoid cross-contamination. Cook to reach standard pasteurization time and temperature to ensure safety.



Safety Review

Keep food cold until ready to cook and work in a clean environment at all times. Separate raw and cooked foods and avoid cross-contaminating foods by washing hands, utensils, and cutting boards after they have been in contact with raw meat or poultry and before they touch another food. Always put cooked meat on a clean platter. By following the best practices in food safety with correct time and temperature requirement in sous vide cooking, we can have the freedom to transform and enjoy ingredients safely. Additionally sous vide cooking is also the only method where it is possible to heat food to a relatively low temperature at safe levels, and hold it there long enough to pasteurize food without overcooking.

Cooking without Vacuum Sealing

Cooks can also achieve great results in low temperature cooking without vacuum sealing their food. This is beneficial with quick-cooking tender proteins like fish where the vacuum bags can damage delicate structures by overcompressing and causing unintentional deformation. Chefs have been using name-brand food-safe plastics to gently wrap and seal foods without vacuum sealing for decades. The introduction of air also prevents anaerobic bacteria from proliferating. Although this method deviates from the best practices in sous vide cooking where vacuum is an important component, the practice can be safe for quick-cooking proteins like fish and home cooked meals where food is served **immediately** after cooking. Make sure the bag is submerged at all times, put a weight on top as needed to keep the bag from floating. Temperatures can only be consistent if the bag is fully submerged. If the bag floats, the temperature inside becomes unstable and it may become a breeding ground for pathogenic bacteria.

## More on Temperature, Time, and The Danger Zone

Most temperatures for sous vide cooking are below The Danger Zone 60° C (140° F) but are still safe when done for the correct amount of time—as long as the temperature remains above 52° C (125.6° F). FDA Danger Zone rules are designed to kill bacteria quickly at higher temperatures rather than slowly at lower temperatures. But low temperature cooking can effectively kill bacteria when done correctly. In fact, pathogenic bacteria stops growing at 52° C (125.6° F). Above this temperature, they just die faster as the temperature increases.

Consider chicken breast. Cooked sous vide at 57.7° C (135.8° F and inside The Danger Zone), the breast has to be held for more than 81 minutes to be pasteurized; any shorter amount of time at that temperature will not destroy the pathogens. Raise the temperature and pasteurization occurs much faster: at 62.8° C (145° F and outside The Danger Zone), it takes just over three minutes to pasteurize the same piece of chicken.

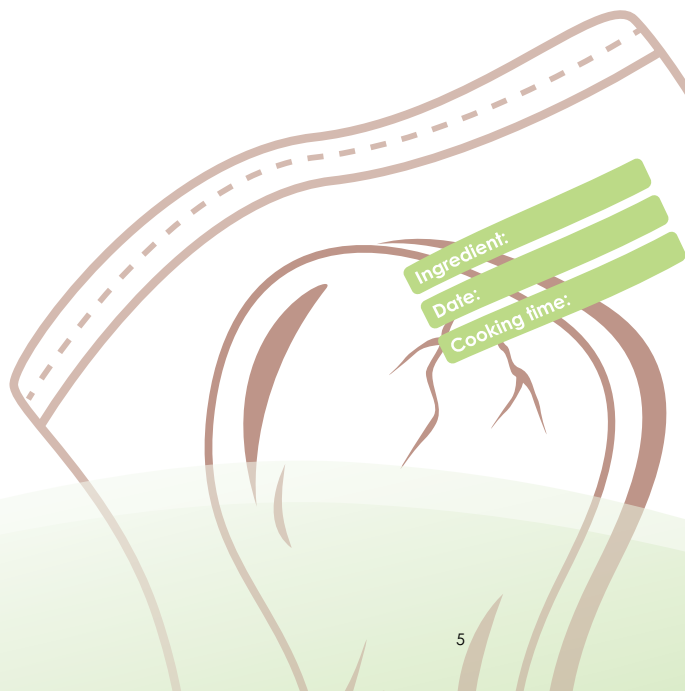
## Using the Cook-Chill Method

The cook-chill method—chilling cooked food as quickly as possible to a temperature below 3° C (37.4° F) after adequate pasteurization—is one of the best practices in sous vide cooking. It eliminates the time window that food can safely rest in The Danger Zone where harder bacterial spores can germinate and thrive. Chilling is normally done in an ice bath with a 50:50 ice to water ratio. Use a salted ice brine for even cooler temperatures (see “Freezing for Storage” for instructions).

Note: It may benefit the texture of some foods to “rest” in the bag and cool slightly at room temperature before chilling. According to Bruno Goussault, an early low temperature cooking innovator, chilling right away reduces the quality of many proteins and leaves their textures slightly tough. Cooling the protein allows them to relax from the heat and reabsorb their own liquid.

## Bags and Labeling

Always label your bags for storage. Use only food-safe plastic bags.



## Freezing for Storage

Freezing foods cooked sous vide is a great way to store pasteurized meals. Freezing generally reduces the quality of food through drip loss, which occurs when sharp ice crystals slowly form from a food's internal liquid. These crystals pierce and displace cell walls and damage texture. As a result, any food will lose liquid during thawing. However, this can be avoided when cooking sous vide by **quickly** chilling and thawing following the steps below.

First, portion your ingredients into serving sizes (e.g., rib roasts into steaks or whole fish into small fillets). Portioning helps the meal cook and cool faster.

Next, chill the food. Remember: **NEVER** place cooked foods straight from hot water baths into the freezer. This is not only ineffective for cooling food but also makes it ripe for spoiling because of the time it takes the center to cool. Hot food placed in the freezer also raises the freezer's ambient air temperature and endangers the entire freezer stock. Also check with a thermometer if your refrigerator and freezer are working at their intended temperatures.

The most inexpensive way for home cooks to chill and freeze foods fast is by using an ice bath described in the "cook-chill" method. For freezing, however, a salted ice brine is much more effective. It super-cools food at -19° C (-2.2° F).

### To make a salt brine:

In a large plastic container, combine 400 g (14 oz) of salt with one liter (1.1 qt) of warm water. Stir until salt dissolves. Add 1 kg (2.2 lbs) of ice. To make more brine, simply double or triple the amounts of salt, water, and ice. As the ice melts away, add more ice to keep cold (as the salt content is diluted, the chilling rate decreases). Once food is cold or slightly frozen, transfer the bags to the freezer for storage.<sup>1</sup>

## Thawing

Thawing foods fast helps preserve their texture and quality. In 2011, Harold McGee wrote in *The New York Times* about a new thawing method tested by researchers at the US Department of Agriculture. He noted the study found quickly thawing food in a circulating water bath at high temperatures resulted in very little quality loss:

"These water-bath times are so short that any bacterial growth would remain within safe limits. The water-thawed steaks actually leaked less juice than the air-thawed steaks."<sup>2</sup>

This is particularly good news for Nomiku owners. To thaw your food with the Nomiku, simply put the bag in the same temperature bath as the original recipe. If the food was frozen and sealed in smaller individual pieces, the temperature controlled water bath results in a much more even and quicker thaw. However, you should not thaw large items such as pork loin or rib roasts in your immersion circulator bath. Food at sizes above two servings must thaw in the refrigerator or in cold water below 4.4° C (40° F).

## Final Sealing, Cooking, and Storing Rules of Thumb

- Prepped food should be thoroughly chilled before sealing and cooked immediately or stored at 3.3° C (38° F) or below.
- If your meal is not for immediate consumption, leave the bag sealed and chill it in an ice bath to prepare for storage in refrigerator.
- Store cooked chilled food in a refrigerator below 3.3° C (38° F) or freeze. Thaw frozen food slowly in a cold-water bath, a refrigerator below 3.3° C (38° F), or in a circulated water bath at or above the usual holding temperature (around 55° C (131° F) depending on the ingredient).
- Refrigerated sealed foods should be eaten within a week.
- If the bag has been left at room temperature for more than two hours in the Danger Zone, discard immediately.
- Seal food once. Do not reseal leftovers that have been opened or left out.
- If the bag has been punctured in the bath, discard immediately.

To learn more about sous vide cooking, consult the guides and books written by experts like Harold McGee, Dave Arnold, The Cooking Lab, and world-class chefs like Thomas Keller and Joan Roca.

<sup>1</sup> Adapted from *The Cooking Lab, Modernist Cuisine, Volume 2* (The Cooking Lab, 2011), 260.

<sup>2</sup> Harold McGee, *A Hot-Water Bath for Thawing Meats*, <http://www.nytimes.com/2011/06/08/dining/a-hot-water-bath-for-thawing-meats-the-curious-cook.html> (June 2011)

# BACON BASKETWEAVE MAPLE PORK LOIN

**Cooking time:**

3 hours sous vide, 2 minutes searing

**Serves 4**







## Ingredients

1 (4 to 4 ½ lb, about 2 kg)  
**boneless pork loin roast**, trimmed

2 tablespoons (5 g)  
**fresh sage**, finely chopped

3 tablespoons (60 g)  
**maple syrup** (Grade B or amber)

3 **garlic cloves**, finely chopped

15 (about 1 lb, 500 g)  
**bacon slices**

1 tablespoon (15 g)  
**cider vinegar**

1/2 teaspoon (1 g)  
**black peppercorns**, crushed

1 teaspoon (5 g)  
**water**

**Kosher salt** to taste

## Best Practices

Cooking pork sous vide is one of the best ways to experience this wonderful protein as opposed to conventional methods for cooking that easily result in overcooked, grey, rubbery meat. In low-temperature cooking, lean pork cuts like tenderloin or chops can be circulated at 60° C (140° F) and held at that temperature for around two hours to ensure even doneness. (The current (2011) USDA rule is that lean pork must be cooked to 62.7° C (145° F). Other cuts of pork rich in fat and collagen like the belly or ribs take longer (from 4 hours up to 48 hours depending on gelatin content) and require higher temperatures from 60°–70° C (140°–158° F).

## Steps

- 1 Clip the Nomiku onto a pot and then fill it with water so the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Set the temperature to 60° C (140° F).
- 2 Rinse off pork loin and pat it dry. In a small bowl, mix the garlic, sage and 1 tablespoon maple syrup until combined and rub all over pork.
- 3 Create a basketweave pattern with bacon, and wrap the loin with it. See instructions on the next page.
- 4 Place the seasoned pork loin on the left (shorter side) of the bacon basketweave rectangle. Wrap the loin in bacon by rolling it tightly from left to right covering it with the bacon weave. Place the wrapped loin inside a food-safe plastic bag and vacuum seal. Once the Nomiku has reached its target temperature, place the bag in the water and allow it to cook for 3 hours. Make sure the bag is fully submerged—weigh it down with a plate, or similar if needed.
- 5 After 3 hours, remove the log from bag and drain. Bring a clean pan big enough to hold the loin to high heat. Test with water droplets, they should sizzle and evaporate immediately when dropped in. Gently sear the bacon-covered loin in the pan until all the sides are browned, at about 30 seconds on each side.
- 6 Rest the log on a serving plate while you prepare the glaze.
- 7 In a small saucepan gently reduce 2 tablespoons of maple syrup with 1 tablespoon of cider vinegar by half. After cooking, add salt and pepper to taste.
- 8 Glaze the loin with the maple and vinegar reduction and serve sliced.



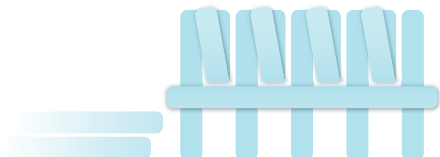


## Basketweave steps

Lay down 9 pieces of bacon side by side.



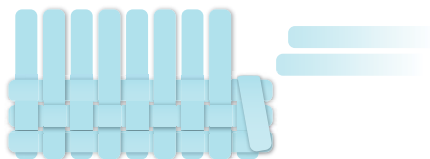
Fold every other piece of bacon in half and lay one strip of bacon across the middle. When pieces 2, 4, 6, and 8 are symmetrically folded up, place 1 strip of bacon across the middle.



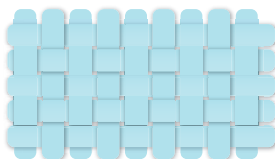
Now, straighten down pieces 2, 4, 6, and 8 and fold up pieces 1, 3, 5, 7, and 9. Lay a piece of bacon across 2, 4, 6, and 8. Repeat the pattern by folding down the odd numbered bacon and folding up the even numbered bacon. Continue pattern until the bottom.



Next, begin the process for the top portion by folding down all of the odd numbered bacon and place a strip across.



Repeat basketweave pattern with bacon until complete.



# BRINED ROASTED CHICKEN

**Note:**

This recipe requires at least 4 hours of time to brine

**Cooking time:**

1 hour sous vide and up to 12 minutes to crisp in oven

**Serves 4**





## Ingredients

### For the brine

- 1 gallon (4 L) **warm water**
- 3/4 cup (220 g) **kosher salt**
- 2/3 cup (130 g) **granulated sugar**
- 3/4 cup (200 g) **soy sauce**
- 1/4 cup (50 g) **olive oil**

### For the chicken

- 1 small, 2-3/4 to 3-1/2 pounds (1.2 to 1.6 kg) **whole chicken**, refrigerated
- 4 tender sprigs each of **fresh thyme, marjoram, rosemary, and sage**
- 1 tablespoon (15 g) **olive oil** (or preferred fat)
- 1 teaspoon (2 g) **black pepper**, freshly ground
- Kosher salt** to taste

## Best Practices

People often argue over which is more delicious, dark meat or white meat. There is no debate when it comes to sous vide: both will be delicious if handled the right way. Dark meat is darker in color because of the amount of exercise the dark bits got. Chickens and turkeys are always on their legs as their primary mode of movement so their leg muscles are darker in color (from a chemical compound in the muscle called myoglobin) compared to the feeble breast muscles that they barely use. In general, dark meat is also juicier than white meat because it has a higher fat content and around 8% collagen content whereas the breast only contains 2%. Thus, when cooking chicken parts sous vide, the temperature and cooking times will vary.

Cook breasts at 60° C (140° F) and thighs at 64° C (147.2° F) for 45 min to 60 minutes. Some of this is a matter of taste: longer cooking times make chicken meat break down and become mushy. Many cooks enjoy silky medium rare chicken breasts cooked at a lower temperature 58° C (136.4° F). Once you have found the texture you like, feel free to experiment further within safe cooking times and temperatures. Cooking chicken in brine also gives great results.

## Steps

- 1 Pour the warm water into a container that is twice the volume of the water. Pour in the salt, sugar, soy sauce, and olive oil. Stir until the sugar and salt have dissolved, then allow the brine to cool in the fridge.
- 2 Place a thoroughly refrigerated chicken, with giblets removed, in the brine. Cover and refrigerate for 4 hours up to overnight.
- 3 Clip the Nomiku onto a pot and then fill it with water so that the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Next turn the knob and set it to 64° C (147° F). Divide light meat and dark meat to be cooked at different optimal temperatures in best practices if desired.
- 4 Remove the chicken from the brine and pat dry. Discard the lump of fat inside the chicken. Approaching from the edge of the cavity, slide a finger under the skin of each of the breasts, making 2 little pockets and shove in one sprig of each herb in each pocket. Next use the tip of your finger to gently loosen a pocket of skin on the outside of the thickest section of each thigh and shove in one sprig of each herb for each thigh. Or stuff all herbs into cavity of the chicken.
- 5 Place the chicken in a food-safe bag along with 1 tablespoon of olive oil or other preferred fat, such as duck fat. Vacuum seal and place the chicken in the water bath once the target temperature has been reached. Make sure the bag is fully submerged—weight it down with a plate, or similar as needed. Cook for 1 hour.
- 6 Remove the chicken from the bag and pat it very dry inside and out. Be thorough — a wet chicken will spend too much time steaming before it begins to turn golden brown.
- 7 Preheat the oven on broil. Choose a shallow, flameproof roasting pan or dish barely larger than the chicken, or use a 10-inch skillet with an all-metal handle. Preheat the pan over medium heat. When hot, test with droplets of water, they should sizzle and evaporate immediately. Set chicken breast side up in the hot pan.
- 8 Place the chicken in the pan in the center of the oven and watch for it to start browning, no more than 5 minutes. The skin should blister, not char. After it browns breast side up, remove from oven and turn the bird over. Roast for another 3 to 5 minutes until the skin browns, then flip back over again to re-crisp the breast skin, about 2 minutes.
- 9 Lift the chicken from the roasting pan and set on a plate to rest for 10 minutes. Serve whole or sliced over a salad.



# DEEP FRIED EGG YOLKS

**Cooking time:**

1 hour sous vide and about 3 minutes for frying

**Serves 6**





## Ingredients

### 7 eggs

1/3 cup (40 g)  
**all-purpose flour**

1/2 teaspoon (3 g)  
**baking powder**

1 teaspoon (6 g)  
**sea salt**

### Canola oil, for frying

1/2 cup (50 g)  
**panko flakes**  
(Japanese bread crumbs)

**Kosher salt and pepper** to taste  
(or, optionally, **Old Bay** or **truffle salt**)

## Best Practices

Cooking an egg well is the ultimate test for all cooks due to the egg's temperature sensitivity – one degree can make all the difference. At 63° C, the yolk coagulates before the whites, and the whites fall away to reveal a perfectly round globe of thick sauce-like liquid yolk. At 64° C (147.2° F), just 1° C higher, the yolk sets into a malleable solid. Cooks can now make custards at 82° C (179.6° F) and scrambled eggs at 75° C (167° F) that used to be a bane to babysit and replicate good results.

## Steps

- 1 Clip the Nomiku onto a pot and then fill it with water so the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Turn the thermostat knob to 64.5° C (148.1° F).
- 2 When the Nomiku temperature has stabilized and has reached the target temperature, gently place 6 of the eggs in the water whole and cook for 60 minutes. Let the eggs cool in a bowl of tepid water for 10 minutes.
- 3 Working one by one, carefully crack a cooked egg into your hand and separate the whites from the yolk. Place the yolks in a bowl and set aside. Discard the whites.
- 4 Heat 1 1/2 inches of canola oil in a small saucepan until it reaches 182° C (360° F) (temp should not exceed 187° C (370° F)).
- 5 In a small bowl, combine the flour, baking powder and sea salt. In a second bowl, whisk the remaining (uncooked) egg. Spread the panko flakes onto a plate.
- 6 Gently roll each yolk in the flour mixture, then dip in the beaten egg, and roll in the panko flakes.
- 7 Fry yolks, four at a time, for about 30 seconds, or until light golden brown. Drain on a paper towel and sprinkle with salt and pepper to taste. Old Bay and truffle salt are also great seasonings, although probably not at the same time.

# DUCK CONFIT

**Note:**

This recipe requires 24 hours of marinating time

**Cooking time:**

6 hours sous vide and 4 minutes searing

**Serves 4**







## Ingredients

3 tablespoons (50 g)  
**kosher salt**

1 dried  
**bay leaf**

3 sprigs  
**thyme**, leaves removed

**black pepper**  
coarsely ground to taste

**4 duck legs with thighs**

4 tablespoons (50 g)  
**duck fat**

## Best Practices

To make duck confit with the Nomiku, all you need is a bag, a few tablespoons of duck fat, herbs, and salt to rub down duck legs and thighs. Cook at 82° C (179.6° F) for 6-8 hours for tender falling off the bone confit. Cooking duck breast is a matter of personal preference and is very much like cooking lean beef protein: 57° C (134.6° F) for an hour yields succulent medium rare breast; raising the temperature to 58° C (136.4° F) will yield a more traditional toothy texture.

## Steps

- 1 In a small bowl, mix the salt, crumbled bay leaf, and thyme leaves.
- 2 Rub each duck leg with the salt-herb mixture.
- 3 Divide the duck legs into two separate food-safe plastic bags. Lay the legs side-by-side and not on top of each other. Vacuum seal the bags, and put them in the refrigerator to cure for 24-48 hours.
- 4 Remove the duck legs from the bags and rinse off the salt. Pat the duck legs dry and set aside while you set up the Nomiku.
- 5 Clip the Nomiku onto a pot and then fill it with water so the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Turn the thermostat knob to 82° C (179.6° F).
- 6 Divide the legs and duck fat evenly into two food-safe bags (two legs per bag—do not rest the legs on top of each other.) When the Nomiku temperature has stabilized and has reached the target temperature of 82° C (179.6° F), place the bags into the water bath. The bags should not float. If the bags do float, weigh them down using a heavy plate. The food must be fully submerged to ensure proper cooking. Cook for 6 hours.
- 7 Remove the legs from the bags and drain, reserving the duck fat. Pat the legs dry with a paper towel.
- 8 Heat a cast iron pan over high heat. Pour the reserved duck fat into the hot pan. Once the fat smokes slightly, sear the duck legs in batches of two on each side for 30 seconds or until the skin is crispy and golden brown.
- 9 Plate and serve immediately.

# MISO SALMON

**Cooking time:**

20 minutes sous vide, 3 minutes sauce reduction

**Serves 6**





## Ingredients

- 1/4 cup (70 g)  
**white miso**
- 1/4 cup (70 g)  
**mirin** (sweet Japanese rice wine)
- 2 tablespoons (30 g)  
**unseasoned rice vinegar**
- 2 tablespoons (12 g)  
**scallions**, minced
- 1 1/2 tablespoons (8 g)  
**fresh ginger**, minced
- 2 teaspoons (9 g)  
**sesame oil**
- 6 6-ounce (170 g)  
**salmon fillets, with skin**, wild-caught
- Kosher salt** to taste

## Best Practices

Cooking fish to sous vide perfection involves temperatures entirely below 50° C and within The Danger Zone, and the cooking time is short; most fish recipes require just a little more than 10 minutes in the bath. By "Danger Zone" we mean low temperature not approved by the USDA and CDC, they do not recommend serving raw and low-temperature cooked fish to pregnant women and immuno-compromised persons such as infants and seniors.

Some fish, like sea bass and striped bass, require longer cooking times and higher temperatures. Salmon is perhaps the trickiest for low temperature cooking. It is delicate and has two different temperatures and cooking times that result in good texture. 50.5° C (122.9° F) for 12 to 15 minutes results in a classic salmon texture. But to experience salmon in a new way, lower the temperature to 43° C (109.4° F) and cook for 12-20 minutes. The flesh looks jewel-like, falls apart easily, and tastes very buttery. You can cook salmon at 44° – 49° C (111.2° – 120.2° F) but the texture becomes tacky and toothy.

## Steps

- 1 Combine all ingredients but the salmon in a large bowl and mix. Taste for salt.
- 2 Clip the Nomiku onto a pot and then fill it with water so that the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Next turn the knob and set it to 43° C (109.4° F).
- 3 Rinse the salmon and pat dry. Evenly divide the salmon into 3 bags, each holding 2 pieces per bag. Next, pour equal amounts of the mixture from step 1 into each bag and vacuum seal. Once Nomiku temperature stabilizes, put the bags in to cook for 20 minutes.
- 4 Remove the bags from the Nomiku and slice open the bags, reserving the liquid in a small saucepan. Plate the salmon. Simmer the sauce over medium-low heat for around 3 minutes. The reduction is ready when it coats a spoon. Taste the sauce for salt, then spoon over salmon.

# PORCINI AND ROSEMARY RUB STEAK

**Cooking time:**

3 hours and 15 minutes sous vide, around 2 minutes for searing

**Serves 4**





## Best Practices

Low temperature cooking can take inexpensive and/or hard-to-cook beef cuts and transform them into juicy pieces of perfectly cooked yumminess that can hold their own against more expensive “choice” cuts.

Not that you need to use inexpensive cuts when you sous vide, just be aware of what you are cooking. The percentage of connective tissue and fat content in a cut of beef determines its optimal cooking temperature and how long it takes to cook in your immersion circulator bath. Lean cuts like filet mignon (tenderloin) benefit from a lower temperature of 54° C (129.2° F) and take about an hour to cook a piece an inch thick. However, cuts like the cheek, ox tail, and short ribs require higher temperatures between 57-65° C (135-149° F) and longer cooking times (up to two days and beyond) to dissolve the tough connective tissues. That's because connective tissues have a lot of collagen. When cooked sous vide, collagen becomes softer and slowly melts into gelatin while the beef muscle does not overcook. This highly desirable effect is technically difficult to achieve in conventional cooking methods.

## Ingredients

2 2-inch-thick (about 3 pounds/1.4 kg total)  
**boneless rib-eye steaks**

1/4 ounce (7 g)  
**dried porcini mushrooms**

1 tablespoon (2 g)  
**fresh rosemary**, finely chopped

3 tablespoons (40 g)  
**olive oil**, divided

2 tablespoons (35 g)  
**kosher salt**

**black pepper**, coarsely ground to taste

## Steps

- 1 Clip the Nomiku onto a pot and then fill it with water so the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Set the temperature to 57° C (134.6° F).
- 2 Grind porcini mushrooms in a spice mill or coffee grinder to a fine powder. In a small bowl, mix 1 1/2 tablespoons of the mushroom powder with the chopped rosemary. (Reserve any remaining powder for another use.)
- 3 Rinse steaks; pat dry. Sprinkle mushroom-rosemary rub generously over both sides of the steaks, pressing to adhere.
- 4 Divide seasoned steaks into two bags and vacuum seal with 1 tablespoon of olive oil per bag. When the Nomiku temperature has stabilized, lower the bags into the water bath and cook for 3 hours and 15 minutes. Make sure the bags are fully submerged—weigh it down with a plate, or similar if necessary.
- 5 Take steaks out of the bag; drain and salt. Heat the remaining 1 tablespoon olive oil in large, heavy skillet (preferably cast-iron) over high heat. When skillet is hot and droplets of water crackle in the oil, sear the steaks until browned.
- 6 Transfer steaks to a plate and sprinkle with the freshly ground pepper; tent with foil to keep warm. Let rest 10 minutes. Cut steak into 1/2-inch-thick slices and serve.



# RACK OF LAMB

## WITH GARLIC AND HERBS

**Cooking time:**

20 minutes sous vide, and 6 minutes roasting

**Serves 4**





## Ingredients

### For the lamb

2 (8-rib) (each rack 1 1/2 lb/0.7 kg)  
**frenched racks of lamb**, trimmed of all but a thin layer of fat

3/4 teaspoon (1.5 g)  
**black pepper**, freshly ground

1 teaspoon (5 g)  
**vegetable oil**

### For herb coating

3 large (10 g)  
**garlic cloves**, regular, minced

1/4 cup (15 g)  
**fresh flat-leaf parsley**, finely chopped

1 tablespoon (2 g)  
**fresh thyme**, finely chopped

2 teaspoons (1.5 g)  
**fresh rosemary**, finely chopped

1 teaspoon (6 g)  
**salt**

1/2 teaspoon (1 g)  
**black pepper**, freshly ground

1 1/2 tablespoons (20 g)  
**extra-virgin olive oil**

## Best Practices

Rack of lamb and cuts like the loin and chop can all be cooked at 55° C (131° F) for 2-3 hours to yield tender and flavorful results. Cuts like lamb shank and neck are rich in collagen and should be cooked at 60°-65° C (140°-149° F) for 24-48 hours to melt the collagen into unctuous gelatin.

## Steps

- 1 Clip the Nomiku onto a pot and then fill it with water so the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Turn the thermostat knob to 65° C (149° F).
- 2 Divide racks of lamb, pepper, and oil into two food-safe bags. (Do not season it with salt until the rub because salt can leach moisture during low temperature cooking.) Vacuum seal.
- 3 When the Nomiku temperature has stabilized and has reached the target temperature, put the bags into the water for 20 minutes. Make sure the bag is fully submerged--weigh it down with a plate, or similar if necessary.
- 4 While the lamb cooks, put the oven rack in the middle position and pre-heat broiler to high.
- 5 In a bowl, mix together all ingredients for the herb coating.
- 6 Remove cooked lamb from the bag and onto a small baking tray coat the meaty parts of lamb with herb mixture, pressing to ensure it adheres.
- 7 Put the tray of lamb into the oven and roast on both sides for 2 minutes each or until outside is a deep brown. This should not exceed 4 minutes on each side.
- 8 Rest for 5 minutes on a warm plate before serving.

# BEST PRACTICES FOR FRUITS AND VEGETABLES

Fruit and vegetable cells begin to breakdown and cook at 85° C (185° F), and they tend to take a very long time, but the results are worth it. Vegetables benefit from low temperature cooking from a nutritional perspective because there is a lot less vitamin loss and oxidation that occurs compared to conventional cooking methods like boiling or pan frying where nutrition is leached out into the cooking liquid or fat. Fruits and vegetables stay bright and can retain an al dente texture.





# SHREDDED WHEAT ICE CREAM

**Cooking time:**

30 minutes sous vide

**Serves 4**





## Ingredients

### Shredded wheat ice cream

4¼ cup (1000 grams)  
**shredded wheat milk**, divided  
(see recipe on the next page)

5 teaspoons (15 grams)  
**tapioca starch**

1/2 cup (150 grams)  
**sugar**

1/4 teaspoon (3 grams)  
**salt**

6 tablespoons (92 grams)  
**egg yolk**

1¼ cup (300 grams)  
**heavy cream**

This recipe is by **Aki Kamo**zawa and **H. Alexander Talbot** of the blog “**Ideas in Food.**” They write: “we came up with this ice cream during a recent trip to Naples, Florida. It is a riff off of our cornflakes ice cream and, to be honest, is even tastier.”

## Steps

- 1 Put 2 cups (500 grams) of the shredded wheat milk into a pot and bring the milk to a simmer.
- 2 Pour the mixture into a blender and close with lid. Turn the blender on low and increase the speed until a vortex forms. Sprinkle the tapioca starch into the vortex and then puree the mixture for thirty seconds to fully disperse and hydrate the tapioca. Pour the milk into a Pyrex dish to cool. Reserve. Rinse the blender.
- 3 Put the sugar, salt and egg yolks into the clean blender and puree on high until they become light yellow in color and smooth in texture. Mix the cream and the remaining shredded wheat milk until combined and then pour the mixture into the blender with the egg mixture. Puree on low until blended.
- 4 Clip the Nomiku onto a pot and then fill it with water so the water is above the MIN line but does not exceed the MAX line and then plug the Nomiku in. Set the temperature to 82.5° C (180.5° F).
- 5 Pour the base into a vacuum bag and seal. Once the water bath reaches the target temperature, cook the base for 30 minutes.
- 6 Remove the ice cream base from the water bath and cut the bag open. Pour the ice cream base into a blender and puree on low.
- 7 Add the reserved thickened shredded wheat milk into the blender and increase the speed to medium high. Puree the mixture until completely smooth. Pour the ice cream base into a bowl set over an ice bath and cool completely. Freeze in an ice cream maker, according to manufacturer's instructions.

# SHREDDED WHEAT MILK





## Ingredients

### Shredded wheat milk

5 cups (250 grams)  
**shredded wheat**

6 cups (1500 grams)  
**milk**



## Steps

- 1 Pre-heat the oven to 350° F (177° C). Put the shredded wheat onto a baking sheet and cook for for twenty minutes until they are dark brown. Remove from the oven and let cool.
- 2 Put the milk into a large bowl and add the cooled shredded wheat. Stir the shredded wheat so that it is fully combined with the milk.
- 3 Refrigerate the milk for 15 minutes to allow the flavor to infuse.
- 4 Strain the milk through a fine meshed strainer, pressing on the soggy cereal to exude as much milk as possible. Discard the soggy shredded wheat and reserve the milk. It should yield 4¼ cups (1000 grams) of shredded wheat milk, if not add enough milk to reach 4¼ cups (1000 grams).



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