Modernist Cooking Made Easy

Sous Vide

The Authoritative Guide to Low Temperature Precision Cooking

By Jason Logsdon
Modernist Cooking Made Easy: Sous Vide

The Authoritative Guide to Low Temperature Precision Cooking

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Sous Vide Grilling
To my Mom,
who from an early age
gave me the confidence
to do anything I set my mind to
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I initially got my start in modernist cooking when I began exploring the sous vide process. I was fascinated with the process and hooked on learning more about the new types of cooking. Since then I've expanded into other modernist techniques and worked with everything from whipping siphons to pressure cookers and blow torches; created foams, gels and spheres; made barrel aged cocktails and brewed beer.

But the one technique I use on a daily basis is sous vide.

Although sous vide cooking is not as "sexy" as some of the other modernist techniques it has two huge advantages for both the novice and experienced cook. Most importantly it will allow you to significantly increase the quality and consistency of the dishes you create on a daily basis. And for those of you whose lives are harried, the sous vide technique also allows you to create remarkable meals while working around your hectic schedule.

Over the last five years I've cooked hundreds of sous vide meals and written four cookbooks on the subject that have brought sous vide cooking into tens of thousands of home kitchens. I've used it for fancy modernist dishes, simple everyday post-work meals, food for parties and barbecues and everything in-between. With the introduction of several low-cost circulators, sous vide is more accessible than ever to the home cook. I decided it was time to take another look at sous vide and write a comprehensive primer for cooks of all experience levels.

This book uses my years of experience to demystify the sous vide process, serve as a reference for more than 80 cuts of meat and vegetables, and provide a collection of inspiring recipes to get you on your way to sous vide success.

Sous vide is a simple and extremely effective way to cook. This book covers every step of the sous vide process, from seasoning, sealing, and temperature control to how to determine the times and temperatures needed to turn out great food. There are also extensive write ups for the main types of food including steak and red meat, pork, fish and shellfish, eggs, fruits and vegetables, and more.

Modernist Cooking Made Easy: Sous Vide
After reading this book you will be able to consistently prepare great food with a minimal amount of effort.

The bulk of this book is the more than 85 recipes it contains. Feel free to skim the recipes looking for something that inspires you, or turn to a specific recipe to learn all about how to cook the cut of meat it features.

I have provided images of many of the dishes but for larger, full color images you can go to:

MCMEasy.com/SVGallery

To stay up to date with sous vide, modernist cooking, and what I am working on please:

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Most importantly of all, remember to have fun!
SECTION ONE

UNDERSTANDING THE SOUS VIDE PROCESS
If you have any questions you can ask them in the Sous Vide Forums on my website. Just post your question and other cooks will weigh in with their answers.

You can find them on my website at: MCMEasy.com/Forums
Sous vide is one of the most popular modernist techniques and one that is pushing modernist cooking into the mainstream. From world class chefs like Thomas Keller and hit television shows like Iron Chef America and Top Chef to everyday restaurants like Panera, sous vide is popping up everywhere.

Sous vide can initially be an intimidating type of cooking and conceptually it can be very difficult because of its differences with traditional cooking. The various types of sous vide equipment, questions about vacuum sealing, and the science of the safety of sous vide can all play a part in confusing new cooks.

However, once you understand a few basics, sous vide cooking is one of the easiest and most foolproof ways to cook. In this book I'll give you the foundation you need to get started with sous vide including the basic process, the important safety information, and recommended setups you can use.

**How Sous Vide Works**

Sous vide, or low temperature precision cooking, is the process of cooking food at a very tightly controlled temperature, normally at the temperature the food will be served. This is a departure from traditional cooking methods that use high heat to cook the food, which must be removed at the exact moment it reaches the desired temperature.

The core tenant of sous vide cooking is that food should be cooked at the temperature it will be served. For instance, if you are cooking a steak to medium rare, you want to serve it at 131°F (55°C).

With traditional cooking methods you would cook it on a hot grill or oven at a minimum of 400°F to 500°F (204°C to 260°C) and pull it off at the right moment when the middle has reached 131°F (55°C). This results in a bulls eye effect of burnt meat on the outside turning to medium rare in the middle.

The same steak cooked sous vide would be cooked at 131°F (55°C) for several hours. This will result in the entire piece of meat being a perfectly cooked medium rare. The steak would then usually be quickly seared at high heat to add the flavorful, browned crust to it.

Sous vide was first used as an upscale culinary technique in kitchens in France in the 1970s and traditionally is the process of cooking vacuum sealed food in a low temperature water bath. This process helps to achieve texture and doneness not found in other cooking techniques, as well as introducing many conveniences for a professional kitchen. Sous vide has slowly been spreading around the world in professional kitchens everywhere and is finally making the jump to home kitchens as information and inexpensive equipment has become more prevalent.

As sous vide has become more popular and moved to the home kitchen the term now encompasses both traditional "under vacuum" sous vide and also precision low temperature cooking of any kind. Some preparations rely on the vacuum pressure to change the texture of the food but in
most cases the benefits of sous vide are realized in the controlled, low temperature cooking process, not the vacuum sealing. This means that fancy vacuum sealers can be set aside for home sealers or even Ziploc bags.

**Sous Vide Technique**

The actual process of cooking sous vide is very simple. You determine the temperature you'd like to cook your food to, say 131°F (55°C) for a medium-rare steak. Then you heat some water up to that temperature, seal your food in a vacuum bag or Ziploc bag and place it in the water until the food is heated through to the temperature of the water.

For foods that aren't tender (think pot roasts, short ribs, briskets, etc.) you can continue cooking it once it comes up to temperature until the food has been tenderized (sometimes up to 2 or 3 days!). Then just finish your food with a sear and you're all set!

I go into much more detail in the subsequent chapters but here is a brief look at each step.

**Pre-Sous Vide Preparation**

Just like many traditional methods, you often will flavor the food before cooking it. This can be as simple as a sprinkling of salt and pepper or as complicated as adding an elaborate sauce, spice rub, or even smoking the food. Depending on the type of seasoning it can either be rubbed directly onto the food itself or added into the bag with the food.

For a detailed look at flavoring the food and other preparation techniques please see the "Pre-Sous Vide Preparation" chapter.

**Seal the Food**

Once the food has been seasoned and is ready to cook it is added to a sous vide bag, the air is removed, and the bag is sealed closed. Removing the air results in closer contact between the food and the water in the water bath. This helps to facilitate quicker cooking since water transfers heat more efficiently than air. Sealing also keeps the flavor of your food contained and keeps the food from getting into your sous vide machine.

The most effective method of sealing food is with a chambered vacuum sealer but those are expensive and usually overkill for home use. I normally use regular Ziploc Freezer Bags, which work well for most foods, and sometimes I'll use a FoodSaver Vacuum Sealer for longer cooking foods or for higher temperatures. More information about sealing can be found in the "Sous Vide Sealing" chapter.

**Heat and Maintain the Water**

To cook the food you heat a quantity of water up to the temperature you will cook the food at. This temperature will normally be the same that you will want your food to end up.

There are many ways to heat up the water for sous vide cooking, ranging from your stove to expensive laboratory circulators. Luckily, there are more low-cost options available than ever and you can easily get started with sous vide cooking without spending a lot of money.

The temperature you cook the food will depend greatly on what it is. A detailed discussion of temperatures can be found...
in the "Determining Time and Temperatures" chapter and different equipment options are found in the "Sous Vide Temperature Control" chapter.

Cook the Food
Put the sous vide bag containing the food in the water and let it cook for the amount of time needed to either heat the food through, or to fully tenderize it. Depending on what you are cooking, this time frame can range from 15 minutes for some fish up to 3 days for short ribs and other tough cuts.

The "Determining Time and Temperatures" chapter looks closely at the different methods of determining cooking times.

Finish the Dish
To get a good finish and texture on your food, especially meats, it is almost always advisable to quickly sear it. This is usually done in hot pan, on a grill, or with a culinary blow torch. Some meals also call for other methods of finishing the food, such as breading and deep frying for chicken, or smoking for brisket.

You can also quickly chill the food in an ice bath which is ½ ice and ½ water and then refrigerate or freeze the food for later re-heating. More details can be found in the "Sous Vide Finishing" chapter.

RECOMMENDED SOUS VIDE SETUPS
There are many different options when determining your sous vide setup and what you decide on will depend a lot on your situation.

Trying It Out
If you are just getting started with sous vide and want to see if it's right for you, I'd recommend trying beer cooler sous vide or sous vide on the stove first. They are both great ways to try out sous vide with minimal financial commitment. I go into more details in the "Sous Vide Temperature Control" chapter.
**Recommended: Ready to Take the Plunge**
If you know you are ready to really use sous vide cooking, then this is the set up for you. I’d recommend one of the new low-cost immersion circulators, they range from $150-$300 and can do almost anything you’d want to do at home. I would start out using Ziploc Freezer Bags but a FoodSaver vacuum sealer is always nice if you don't mind spending the extra money. This is the system I usually use at home.

**Professional Setup**
If you are using sous vide constantly or are in a professional kitchen you'll want to go with a higher-end circulator. I highly recommend the PolyScience Chef Series. A chambered vacuum sealer will also help with prepping and storing foods in a working kitchen.
PRE-SOUS VIDE PREPARATION
Like most traditional cooking, the first step in sous vide is to prepare the food for cooking. There are countless methods you can use, from a simple sprinkling of salt and pepper all the way to pre-smoking, marinades, and complex spice rubs.

**Salting**

When cooking meat with almost any traditional cooking method the first step is to salt it. This is also true for items cooked sous vide for shorter amounts of time, less than 4 or 5 hours. I always salt short-term meat using about the same amount I would when grilling or pan searing.

However, for longer times there is more disagreement about what is the correct method. Meat that is cooked for longer amounts of time that has been salted loses a little more moisture than unsalted meat. Salting the meat also subtly changes the structure of the proteins on the outside, making the meat a little tougher and more "cured" tasting.

I personally find the flavor of salted meat beefier and richer tasting. Because of this, I usually lightly salt longer cooking items, using about a quarter as much salt as I would normally. Many people prefer the unsalted, slightly moister meat so they refrain from salting until after the meat has been cooked sous vide.

The difference between the two methods is very minor and you can’t go wrong either way. I suggest trying it both ways and see what you personally prefer.

**Seasonings, Spices and Herbs**

The addition of seasonings, spices, and herbs is another common method of adding flavor to both traditional and sous vided foods.

Dry spice rubs work great and can be used in the same quantities they are in traditional cooking methods. Woody herbs such as rosemary, thyme, sage, and bay leaves, also work great with sous vide. Dried herbs can also be used well in almost all sous vide cooking.

Pungent spices like fresh garlic and ginger are best not used in sous vide cooking. The lower temperatures the food is cooked at isn’t enough to mellow out the flavors, so they retain their sharp bite.

Softer herbs like basil and parsley work fine with shorter cooked items but don’t hold up as well over longer cooking times.

**Bagging with Sauces**

A great way to add flavor to your sous vide foods is through the addition of various sauces to the sous vide bag. The sauce will add flavor and permeate the food, similar to a flavor-based marinade.

This technique can be used to add strong flavors to the food. Using several tablespoons of BBQ sauce, hot sauce, teriyaki sauce, and other strong sauces is a great way to ensure the flavors transfer to the food.

Base flavors can also be introduced this way. I’ll often use a tablespoon of soy sauce, Worcester sauce, or other strong condiment to add base flavors to foods.

**Brining**

In traditional cooking, brining is a great way to maintain the juiciness of food, as well as to firm up the texture and introduce flavors. This is still all true in sous vide cooking, though it isn’t as apparent because the sous vide-only result is so good by itself.

Any food you usually brine will benefit from brining before cooking it sous vide, it is especially beneficial to pork and
Brining fish is also a great way to firm up the flesh and to draw out the albumin - the weird white stuff sometimes found on fish.

There are several ways to brine food and you should use the one you are most comfortable with. The easiest for me is a simple brine Michael Ruhlman made from ½ cup sugar, 1 cup salt, and 1 gallon of water. To this brine you can add spices and seasoning such as peppercorns, cloves, garlic, herbs, or any other flavorful aromatics.

Combine these ingredients over medium heat until the salt and sugar are dissolved then let them cool fully. You can also heat only half of the water initially and add the other half as ice to more quickly cool down the brine.

Once the brine has fully cooled, submerge the food in it and let it soak in the refrigerator for several hours. The length of time depends on the size and type of meat. In general:

- Pork chops - 1 to 3 hours
- Pork roast or loin - 12 hours
- Chicken Breast or thighs - 1 to 3 hours
- Whole chicken - 5 to 10 hours
- Fish - 15 minutes to 3 hours, depending on preparation style

Remember not to reuse the brine, it will be full of impurities from the food.

**PRE-SEARING**

It's common knowledge that sous vide foods need a sear after cooking to crisp up the exterior and add the wonderful Maillard reaction. Some people feel that doing a pre-sear of the meat will also help flavor it and allow the seared flavors to penetrate the meat. However, this is one of the more controversial questions around sous vide.

The undisputed benefit of pre-searing food is to sanitize the outside of the meat. A quick sear will kill any bacteria present on the surface. Another way to do this is to dip the sous vide bag into boiling water for a few seconds after bagging the food. This is more useful for items with longer cooking times where there may be time for bacterial growth.

Pre-searing also helps the food brown more quickly during the post-sear, though searing time usually isn’t too large to begin with.

The downside of pre-searing is that it adds another step to the process. Many people also feel that the pre-sear flavors do not penetrate the meat or add any additional flavors, making the additional step irrelevant to the final outcome.

There is no consensus on this issue, Modernist Cuisine and Serious Eats both say not to pre-sear while Chef Steps and The French Culinary Institute both recommend it. However, with the large amount of people looking into the issue and experimenting with it, I think it’s pretty clear that the flavor benefits, if there are any, are very minimal.

If you work in a Michelin starred restaurant where this minor flavor change is important, then running your own blind taste tests makes a lot of sense. For the rest of us cooks, doing a pre-sear probably won’t make a noticeable difference, so feel free to skip the step, unless you are trying to pasteurize the surface. And if you feel strongly that the pre-sear makes a flavor difference and don’t mind the extra step, by all means, give it a pre-sear!

**SMOKING**

Smoking food is a great way to add additional flavor and it can easily be used in conjunction with sous vide. Just
remember that you are adding smoke flavor to the food, not replacing a traditionally smoked food. These methods will work great if you want to add some great flavor to your food, though it’s still best to smoke it in a traditional manner if you want a super-smokey pork shoulder with a red smoke ring.

A key point to remember during smoking is to make sure the temperature of the food stays below the temperature you will be sous viding it. Otherwise the benefits of the sous vide process will largely be negated.

There are several good ways to keep the temperature down. The first is to use a cold smoker. Either a more professional setup or something like the PolyScience Smoking Gun. These methods only heat the food a minimal amount, if any. The Smoking Gun is usually better suited to post-sous vide smoking but it works well with more tender proteins such as fish.

The other way to keep the temperature down is to only smoke the food briefly. Because most smoking occurs around 200ºF (93ºC) you can usually smoke the food for at least 15 to 30 minutes before cooking it sous vide, especially if you start the smoking process with the meat taken directly from the refrigerator.

Using high quality liquid smoke is another way of adding a smoky flavor to your foods. When I’m in a hurry I’ll often put some directly in the bag before sealing it. It can’t replace traditionally smoked foods but it’s great in a pinch!

**Marinating**

Marinating foods before cooking them is another wonderful way to introduce new flavors. The traditional method of marinating a food then removing it from the marinade and cooking it works great with sous vide. However, I often get asked if you can sous vide a food while it’s still in the marinade.

While cooking a food in the marinade isn’t dangerous, there are several potential negatives.

A big issue is the question of timing. Many marinades call for specific amounts of time that meat should be in them. These times rarely line up with the amount of time the meat should cook for. This means something has to give time wise on either the marinade or the sous viding, and the end result won’t be as good.

To further complicate the matter, most marinades and brines are designed to work on raw meat. Once the food goes into the sous vide bath it quickly comes up to temperature and is fully cooked. A 1" (25mm) steak will be cooked through in about 50 minutes, meaning the marinade will be trying to work on cooked meat for most of the marinating time. The outside 0.4" (10mm) will be cooked in only 8 to 10 minutes. Once the meat is cooked, the protein has been changed and will be affected differently by the marinade or brine.

A final issue is that due to the sealed environment there is no evaporation, compared to braising, for example. This means alcohol based marinades, or marinades with high acidity don’t reduce during cooking and can take on bad flavors.

I usually just marinate my food ahead of time to be safe, but if you are in a hurry you can give it a shot and see how it turns out.

**General Pre-Sous Vide Tips**

**Cut Meat Down to Size**

Because of the amount of time it takes for the heat to penetrate, large pieces of meat don’t cook as evenly. The outside
layers might come up to temperature, and start tenderizing, 4 to 5 hours before the middle heats up.

For longer cooked items this isn't as big of a problem because the middle will still be cooked for a long time. If the middle of a chuck roast only cooks for 32 of the 36 hours the difference will not be noticeable. However, it can be very apparent in shorter cooked items, especially the more tender ones. If a beef tenderloin is sous vided whole, the outside might be cooked for 2 to 3 times longer than the middle, resulting in an overly tender outside around a perfectly cooked middle.

Unless I need the whole piece of meat for presentation purposes I'll cut roasts into 2" to 3" slabs (50mm to 75mm). This will help them cook more evenly while still allowing me ample room for post sous vide searing, slicing, and serving.

**Remove the Fat**
Since sous vide cooking does not get up to high temperatures, about 145°F to 150°F at the most for meats, it does not render fat nearly as well as other cooking techniques. When it comes to dishes cooked over a long period of time, such as short ribs or a roast, be sure to remove any extra fat from the meat before cooking it. This will result in a much leaner and more tender meat with a lot better texture.

**Easy on the Fresh Spices**
Because of the length of time sous vide cooking requires, especially for the tough cuts of meat, and the effects of the vacuum seal, fresh spices can come across much stronger than they would in a normal piece of meat. It’s better to err on the side of less and re-season after taking them out of the sous vide bath than to try and eat a dish that only tastes like rosemary or garlic.

**Turn to the Powders**
Using fresh herbs and spices instead of dried ones is normally a good idea when cooking. However, with sous vide it can be better to use the dried powders in some cases. This is especially true for things like garlic, onion, and ginger because the raw form of these can sometimes create a bitterness in the final dish.

**Pre-Sous Vide Bacterial Control**
While sous vide kills most of the dangerous bacteria present in beef, some people like to be extra cautious, especially for longer cooking items. They will first sear the meat or seal it and dunk it into a pot of boiling water for 15 to 20 seconds. This fully pasteurizes the outside of the meat and ensures nothing will grow during the sous vide process. I personally skip this step but many people swear by it.
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