EAT Cured MEAT

THE MAGIC OF SALTING, SMOKING & CURING

COLD SMOKING THEORY, PROCESS AND EQUIPMENT

MEAT - CHEESE - CREAM - EGGS - VEGETABLES - FRUIT - CHOCOLATE

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COLD SMOKING THEORY

Cold Smoking has been used for thousands of years successfully. Nowadays, you can find commercial and artisan cold-smoked goods everywhere. Europeans are still incredibly fond of the tradition. The United Kingdom also has a strong at-home cold smoking community. The 'process' is relatively straightforward, but it's the gaps of knowledge that this booklet will help you with.

This is a cumulation of 15 years of experience, many books, and learning from commercial cold smoking butchers.

The actual 'steps' are basic, the devil is in the detail.

1. Fully salt cure the meat, not applicable if non-meat
2. Form a pellicle on the meat
3. Setup a reliable cold smoking device
4. Cold Smoke food
5. Monitor the cold smoking regularly
6. Refrigerate and continue the following day if needed
7. Lose Target Weight

Cold Smoking technically is done below **30°C/86°F**, mainly **50-68°F / 10-20°C** is a safer range to cold smoke in.

Cold smoking cured meat that is 'dry cured' - means **salting and drying/smoking the meat in a cool environment.** The smoke vapor holds certain antibacterial and antimicrobial properties - this assists in preserving and keeping unwanted pests off it!

In essence, it's drying like 'dry curing' plus cold smoke for adding flavors and preservative effects.

You can cold smoke 'fresh meat' before grilling to try and add an angle of flavor. This does not preserve it unless you are going super basic when you do thin strips over a campfire and 'dry' the meat surrounded by cold smoke. This is an ancient survival style technique, however since there is no salt curing - unless I was forced too. I would not use this method, too many risks without salt in my opinion.

So for these modern times, you may just want to cold smoke meat without curing for a flavor boost. For most people not in peril or a survival situation, cold smoking the fresh meat can be used to add another layer of flavor.

If it's cured and cold smoked meat you want to make, it must be fully salt-cured or brined properly, more on this in detail later. **Inhibiting the meat with salt will deter the unwanted bacteria** from spoiling the meat, it slows down the spoiling process - but does not destroy all bacteria.

The apparatus/tools/equipment you use can be incredibly simple.

For the preserved cold smoked meat project (which is where we shall focus), certain conditions are favorable - **temperature, humidity & airflow** needs to be controlled or manipulated - more on this also later.

Above this temperature of 30°C/86°F, your cold smoked meat may start to cook, especially fish. It's also getting into a temperature where bacteria exponentially increase if they are present.

Most European guidelines (which are more advanced than many other countries) suggest cold smoke should be applied below 72°F/22°C. But that depends on which countries guidelines!

It takes 1 day (say 8 hours or 1 night as I often do) to 6 weeks depending on the meat recipe and level of smoke flavor you're after - for cured and cold smoked meats.

You can always have a mild cold smoke effect (after 4-8 hours), then continue to dry the cured meat. I only do about 8 hours of cold smoking for my garlic/juniper dry cured bacon (recipe included).

Types of wood will also vary outcomes slightly - more on this later too.

Starting with cold smoking vegetables or cheese is a good idea - These projects are like a **30-60** minute "flavoring" effect. Once you can get reliable cold smoke with a little airflow, look at maybe pre-smoking some steak for 2-3 hours uncured. Rest for a day and cook up the next day as a 'trial'

Cold Smoking Simply, smoke from the side into the kettle grill with a Smokai smoke generator.

Cold smoking vegetables salt and bovine cream.

Here is a table for Cold Smoking Guideline Approx Times (assuming 8 hours cold smoking a day)

Food	Approx. Cold Smoking Time
Dry Cured or Brined Bacon	1 day to 5 days
Cured and Cold Smoked Chicken	1-2 days
Dry Cured Salami	1-4 days
Speck (Lots of Variations)	15-20 days
American Country Ham	1 day (60 days of drying though)
Vegetables	30-60 mins
Chocolate	30 mins to 2 hours
Salt & Spices	Under 30 minutes
Fresh Meat just for Flavor	1-3 hours

WHY COLD SMOKE?

As mentioned above there are 3 main reasons and it depends on the project:

01

Flavor
(another angle of complexity)

02

Preservation

03

To Reduce Mold on Dry Cured Meats

> The real key I have found is less is more - you do not want to over smoke food
> **QUOTE - ME**

Flavor

Nothing compares to dry-cured @ home cold smoked bacon!

Curing and cold smoking ie. dry-cured cold smoking is what the focus of this booklet will be on.

It's about a deeper, and more intense flavor through this drying/ smoking process. It doesn't have to be overwhelming but it does become the center of the food experience, in my opinion.

If you look at something like 'speck' this is a very fatty piece of pork belly that is salt-cured and heavily smoked for hours. Then dried in cooler climates or in a DIY curing chamber. It is a tradition in Central and Eastern Europe to cold smoke it for up to 20 days.

The point here is smoke is the 'flavor' to a certain degree, take bacon for example. It's ain't really bacon without that smokey flavor - is it? My preference is definitely the milder smoke flavor for bacon.

When you're talking about long-term cold-smoked chunks of meat that are being cured like bacon or speck, the smoke helps the preserving effect which lasts months on months without refrigeration and temperatures that are cool or cold (especially in traditional European styles).

Preservation

I believe in the modern context, preservation definitely hasn't become such a factor. In this crazy world where more and more people are looking to "exit" the rat race, people are going off the grid more and back to some more traditional methods which this pertains to.

Of course, cold smoking has over 4,000+ years of history, it's been crucial for our race to preserve the precious protein through the leaner parts of the year. It's been theorized it goes back to the Bronze age. Another interesting theory is salt curing goes back to Ancient Egypt based loosely on salt-cured mummification!

Curing and cold smoking the meat adds a layer of preserving through the smoke vapor which holds antibacterial and antifungal properties – and also keeps the flies away.

Actually, I have always found dry curing or brined meat that has salt inhibition, and water activity reduction is not very popular with insects or bugs.

What I have deduced from this is that the mighty housefly is always looking for things that are spoiling or rotting. And when it comes to curing meat, the whole purpose is to avoid spoiling and rotting so therefore the bugs have less interest in the meat.

To Reduce Mold on Dry Cured Meats

I don't think this is a common technique used for either commercial artisan or the DIY home charcuterie meat curer.

Sometimes you get an excessive amount of good mold or the start of the 'not so good' or unwanted mold.

With cold smoked meats, you will find the cold smoking repels most mold growth - generally.

The first port of call is to wipe the unwanted mold with vinegar. I have found that basically any type of vinegar can be used whether it's white, malt, red wine, apple cider, balsamic (careful some of this stuff comes with high sugar content - don't use real Balsamic from Modena Italy - save that for your vanilla ice cream!).

After this wipe-down, I have quite often applied some cold smoke for 3 to 6 hours to knockback the growth of unwanted mold or an excess amount of white powdery penicillin mold.

So in the above situation, I'm talking about reacting to the growth on dry cured meat.

But what is quite common in Europe is to cold smoke the meat after curing. It's a drying process but it also really does limit any growth of good or unwanted mold. A lot of traditional cold smoking is done in wintery cold conditions, in this type of temperature even the good penicillin mold can't thrive or exist easily.

One of the most delicious salami recipes I use was translated by my partner and is incredibly simple. Cumin, garlic, pepper, and paprika dry-cured salami which is cold smoked for 3 days.

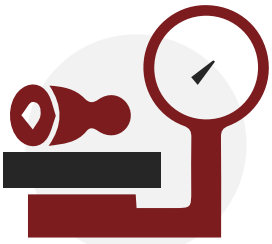
Then dried out for the appropriate weight loss (I'll have to put this recipe in a salami course eventually, best to do the whole muscle curing course first for the basics of dry curing meat).

So you can see cold smoke is a tool you can use when needed and, of course, it might create another layer of flavor as well.

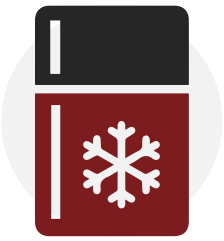
PRINCIPLES OF COLD SMOKING

For meat, these are some of the most important points I have learned for salt curing/wet brining & cold smoking meat:

Make sure you have fresh good quality meat



Weigh before curing and work out the finished weight (for equilibrium curing)

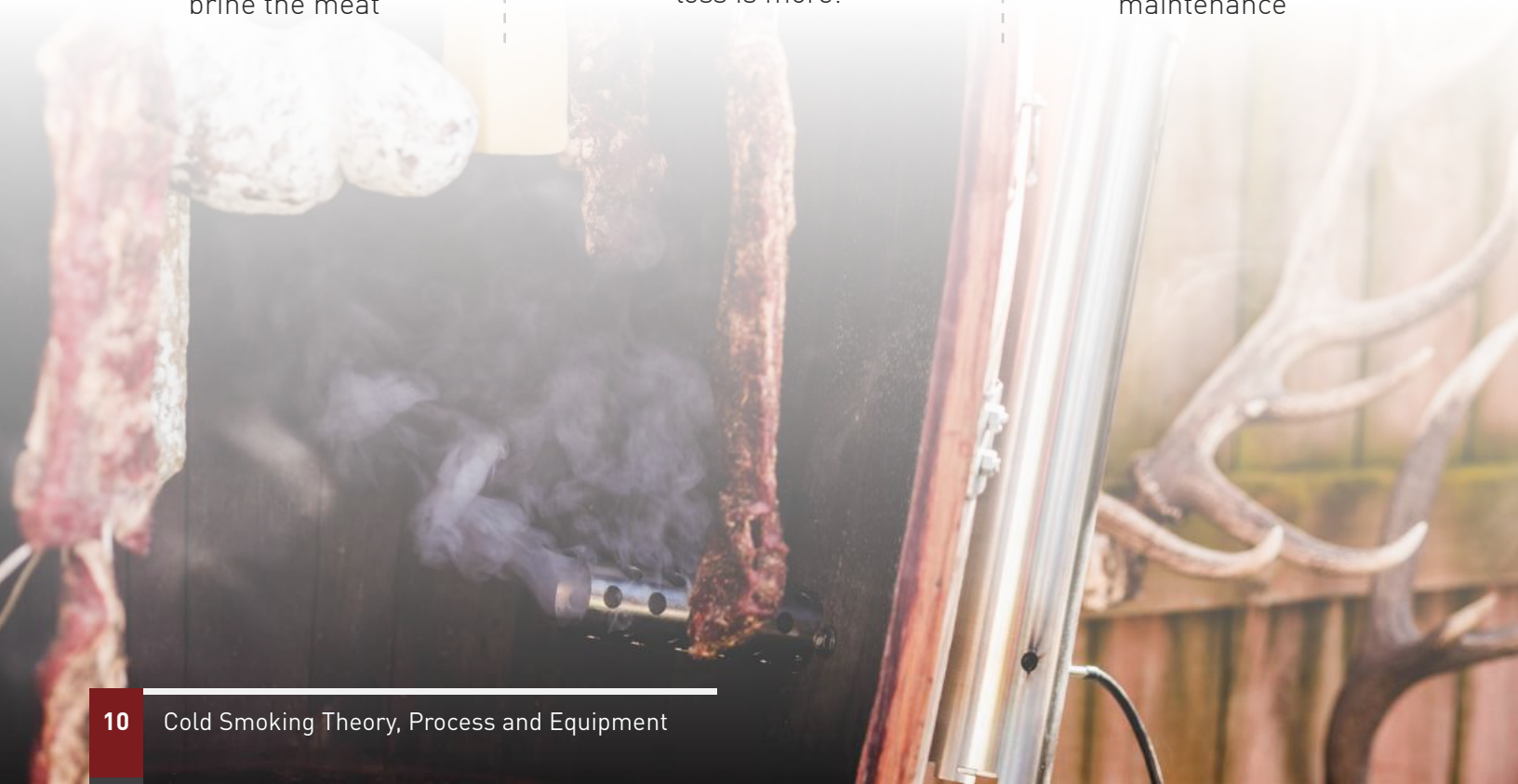


Make sure you have fresh good quality meat

Accurately salt cure or salt wet brine the meat

Choose wood that won't be too strong - less is more!

A reliable smoke method that isn't high maintenance



The “See - Through Smoke” Type

When it comes to the ‘type’ of smoke, lots of billowing clouds is not what you want. LOTS of smoke does not help anything and can lead to bitter tastes.

So here is a picture using a smoke generator (more on this later) it attaches to the side and pumps in cold smoke in.

The non-meat actually isn’t in there long, under 45 minutes (more on this later, too)

The key here is the smoke is translucent, light, and see-through.

I’ve had issues thinking I get more flavor with more smoke - this is just not the case.

The goal you should have is ‘transparent’ smoke, a bit like the Low & Slow BBQ style, however, cooking temperature heat comes into the equation with cooking/smoking Low and Slow BBQ.

Pellet tubes and maze smokers work really well for this, as long as you follow instructions and only start smoldering one end of the system. They give you long and reliable cold smoking, which is by far the easiest method I’ve come across. Using universal wood pellets help with the consistency of this cold smoke as well (more on the gear later)

Airflow

In Central and Eastern Europe, you see a lot of smokers with dampers or vents you can adjust. Airflow control or vents that can release more air or intake more air.

You've got to remember cold smoking cured meat is really a form of drying the meat. And you do need a little airflow especially for cured meat since your drying/smoking.

The smoker on the right picture has a vent on the top which can be opened and closed.

Using a commercial smoker (electrical, gas or charcoal - the big metal box above), I place the pellet tube underneath and let the smoldering cold smoke drift up.

For most of my home cold smoking, I use a 5 burner gas grill, remove the gas bottle and place a pellet tube carefully underneath. This does 'coat' the inside a little with the smoke vapor, but it does the job. As long as I don't use woods like manuka, which is a New Zealand native with a lot of 'tar' residue when you smoke (though is widely used).

I cold-smoke on a kettle grill sometimes, it has been rather DIY at times, wrapping the kettle grill legs, opening up the vent on the bottom of the kettle, and placing a pellet tube outside the kettle, directly underneath. Not ideal, but a quick way to cold smoke for a small amount of meat - unsophisticated but it works. It's the refinement of this unsophisticated craft that leads to sophisticated outcomes I feel.

A few times I had to add a tray of ice to keep the temp below 68°F/20°C.

Humidity

This is mainly for longer meat curing sessions and of course, depends on where in the world you are. I am based currently in New Zealand, in a temperate environment 9 months of the year and it's conducive to cold smoking, not only traditionally in winter. I get moist evenings which suit cold smoking quite often.

Generally speaking, unless you live in a tropical area, the higher the environmental temperature the drier the air. Therefore, the nighttime lower temperatures - produces humidity around 70-80% which is ideal for cold smoking bacon or salami etc. (Generalising)

After 4-5 hours, it will go out, and I hang it back in the DIY curing chamber or kitchen fridge for the next day. Under 20°C/68°F and over 50-60% humidity is better during the daytime for cold smoking or drying cured meat.

Humidity isn't so relevant with non-meat cold smoking but for meaty bits - that are smoked for days or weeks it's more important because you don't want the outside of the meat going hard.

Otherwise known as 'case hardening'. This is the same challenge that is applicable for 'dry curing' meat in or outside a DIY curing chamber

Weight Loss

With cured and cold smoking meat the acceptable level based on meat science books is 15 to 40% from start weight, it depends on the type of meat.

It's a little tricky to generalise but I'll try.

My preference is generally at least 15% weight loss for salmon or fish. Cold Smoked dry-cured bacon I'm aiming for around 25% weight loss depending on how fat/thick the pork belly is - 1-3 months, depends on thickness.

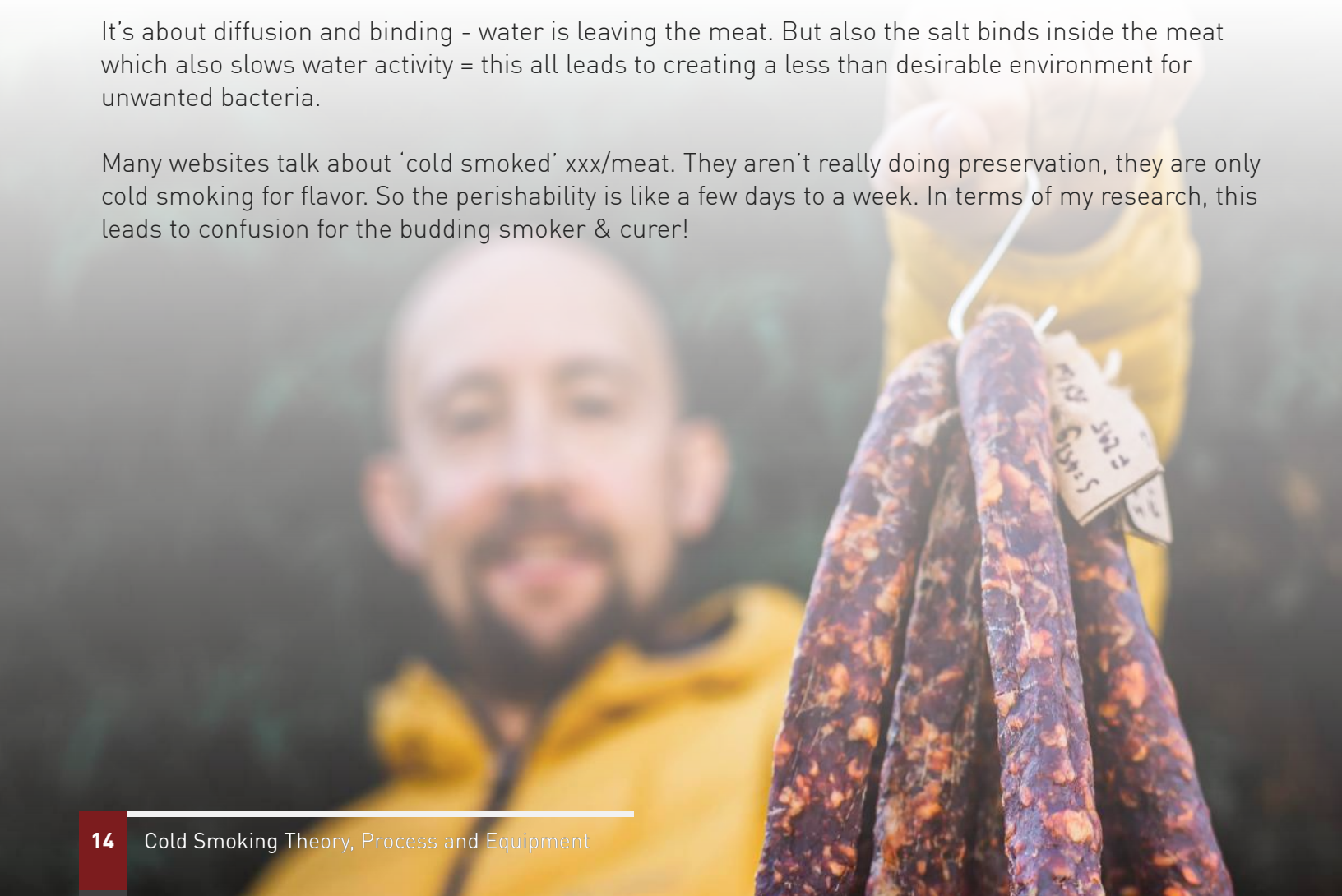
For anything, I'm not cooking and that is pork/red meat ie. whole muscle dry-cured meat, dry-cured salami - I wait until a minimum of 30% weight loss is achieved - just like the general guidelines for dry curing meat.

(I've seen recipes for dry-cured fish salami, but let's not complicate this)

The more you dry out cured and cold smoked meat the longer you're preserving the meat as well. Since less water activity (Aw), that is present in the meat will mean less chance for unwanted bacteria to spoil the meat.

It's about diffusion and binding - water is leaving the meat. But also the salt binds inside the meat which also slows water activity = this all leads to creating a less than desirable environment for unwanted bacteria.

Many websites talk about 'cold smoked' xxx/meat. They aren't really doing preservation, they are only cold smoking for flavor. So the perishability is like a few days to a week. In terms of my research, this leads to confusion for the budding smoker & curer!



If you are full salt curing the meat, then here are some guidelines as to weightloss of meat for proper cold smoked and cured meats.

At 5-30%, it depends on the preservation you are looking for.

You can dry bacon 5% - you cook it anyway.

Weight loss is part of the equilibrium, curing process, (these types of weight losses are to maximise the preservation. With less, of course, it can be consumed, too - I would advise cooking first.

Like bacon, for instance, you can dry it out after cold smoking and it has lost at least 15%. As I said, you cook it anyway.

Meat	Weight Loss (Generalising)
Cured and Cold Smoked Bacon	25%+ (personal preference)
Cured and Cold Smoked Fish	15%-20%
Cold Smoked Dry Cured Salami	30% Minimum - up to 45% (a little smoking, a lot of drying)
Cured & Cold Smoked Salmon	15%-25% (for preservation more weight loss)

WOOD

I've heard of corn cob smoked bacon used by early settlers in America (but yet to try), will be on the next blog.

For certain equipment which I will talk about later, like a pellet tube it's best to stick to the type of wood it's designed for. Many maze smokers require sawdust or pellets.

But here are some principles that apply to harvesting your own or acquiring your own smoking wood.

Wet or Dry

Firstly if you are chopping 'green' / fresh wood, you need to let it dry a year to start with unless it's thin like grapevines, 6 months will be enough drying.

I've read so many different opinions on whether it is best to use wet or dry smoking wood.

When you are cold smoking or cooking and smoking at the same time it is known as hot smoking or low and slow barbecue smoking.

The main aspect is that people presume soaked wood chunks or chips generally will burn/smoke longer.

It doesn't smoke longer.

It's not creating any more smoke vapor for achieving the purpose of what you're using it for. It basically creates steam before combustion starts.

So you are steaming rather than smoking.

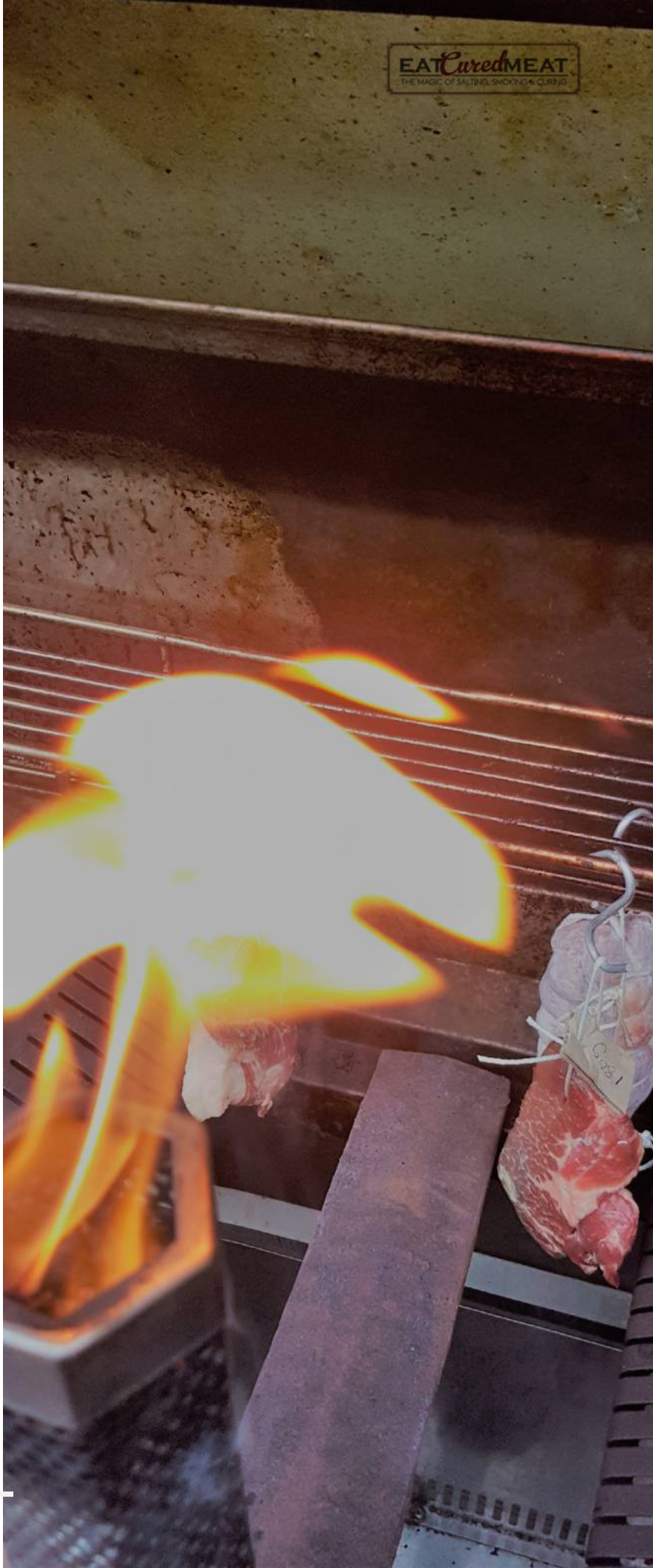
There is one application that can work which is cooking a whole pig on a spit or spit roasting a whole animal. This is not preserving or cold smoking this is just cooking fresh meat on a rotisserie spit. If this is done on an open fire it may provide a little moisture over the meat - it's a theory.

The bottom line is, for cold smoking cured meat or any non-meat foods you might as well just use dry wood!

Bark

I've come across some cultures where the bark of certain types of trees that are low in resin are used for smoking, like oak.

But generally speaking, bark can create a bitter flavor and you are best to avoid using bark if you're harvesting trees yourself or buying chunks or blocks.



Varieties of Wood

The general rule is woods with resin or sap are not good for smoking food.

Of course, if you buy the wood commercially and it's labeled for smoking food or meat then it's of course a safer option.

Apple or Oak are all-rounders. I'm still not sure if the intricacies of different woods can really be tasted.

There are light, medium, and strong types of wood, in my opinion.

Fruit wood is generally seen on the lighter side of the scale than heavy/ strong woods like hickory or mesquite on the other end.

Lighter and medium woods are probably more preferable for cold smoking since you'll be smoking things for many hours, days, or even weeks.

Choosing the Wood

To mix lighter and stronger woods is an option as well. I like to use an 80:20 ratio of light to stronger woods sometimes.

Here are some common smoking woods.

- Apple (Bacon yum)
- Cherry
- Apricot
- Pear
- Beech
- Maple
- Hickory (Bacon yum)
- Grape Vine
- Pecan
- Alder
- Maple
- Oak
- Manuka (lots of resin after smoking)

Some people like to break down the wood into a light flavor to strong flavor range. It is very hard for anyone to guess the type of wood. There are SO many varieties that can be used. This list is far from exhaustive.

The way I see it is:

Light/subtle:	Apple (medium also), fruitwoods (many are medium also), pohutukawa
Medium:	Beech, alder, pecan, maple, oak, apricot, manuka,
Heavy:	Hickory, walnut, mesquite (better to mix)

These below can give off bitter flavors and extra toxins:

- **Elm**
- **Cedar (red cedar ok)**
- **Cypress**
- **Pine**
- **Fir**
- **Redwood**
- **Spruce**
- **Sycamore**
- **Eucalyptus**

Size/Cut of Smoking Wood

Certain types of cold smoking equipment are suited to certain sizes of wood.

I am often using commercially bought wood pellets because they are universal and provide consistency whether I'm using it in a smoke generator or pellet tube/maze type cold smoker.

If you're looking at building a smokehouse this isn't so relevant, because you normally have a smoking combustion area and then you are piping smoke into a hanging cold smoking chamber (see Appendix A - Smokehouses).

Therefore it has a smoldering fire and whether you're using sawdust, wood chips, wood chunks, or even grape vine, it's all good.

Sticking to store-bought smoking wood of course is the obvious choice. I've had many wonderful years of smoking (cold and hot) using pruned wood from organically spray-free apple trees or grapevines (you won't taste it, but you probably want to use spray free trees ideally).

ENVIRONMENT & CONDITIONS FOR COLD SMOKING

The conditions for cold smoking inside or outside are similar, but I shall talk about the manipulations that can be made for favorable conditions inside the cold smoker.

Using a humidity and temperature probe, weather station or hydrostat meter inside your cold smoker will give you the data for testing and keep track of it as well.

Below - My Cold Smoked Dry Cured Bacon

Ideally, we are looking for:

1. Humidity -70%-80% range for cured meats and hours or days of cold smoking
2. Temperature - 68°F / 20°C - (for cream or dairy under 50°F/10°C I prefer)
3. "Some" Airflow

HUMIDITY

Adding Moisture If Needed (70%+)

This is much more relevant for cold smoking meat that's been cured. It's not so applicable when you're trying to flavor fruit, vegetables, dairy, or anything else you have decided to cold smoke.

It's about not drying out the outside of the meat too much, very similar to dry curing the meat in a traditional dry cure - over 65 or 70% humidity preferably. As the moisture inside of the meat works its way to the surface for cold smoking or dry curing you want to keep that moisture high.

If it does seem to be a little bit dry, add a pan of water or ice to boost the humidity inside the cold smoker - simple.

As mentioned before at nighttime there is more moisture in the air depending on your location.

TEMPERATURE

Ideally, you've got external environmental conditions suitable to keep the inside of the smoker cold.

I've enjoyed using Smokai's smoke generator because it can be attached to whatever smoked area I want to use ie. bbq gas grill (bottle removed), kettle bbq, smoke cabinet or smokehouse - it pumps in cold smoke and therefore doesn't increase temperature.

It is obvious! But if you've got a pellet tube or maze smoker it does give off some heat while it is smoldering.

Because of this, you do not want the pellet tube in a small area close to the cured meats.

For instance, using a kettle grill and having the smoke inside is not a good idea.

This is also why 2 chamber cold smokers are used (like common smokehouse designs, which I will mention later.

Ice in a tray can give you a little drop in temperature if you need it as well.

As mentioned before higher moisture happens usually at night being not too windy and not too dry.

TIME OF YEAR / TIME OF DAY

As mentioned, for most temperate places around the world, night time will present lower temperatures and higher humidity suited for cured and cold smoked meats.

The easiest hack is adding a bowl of water in the smoking area to increase humidity.

Generally, if there are bodies of water, like around Parma, Italy - then the humidity is often higher.

When the temperature is higher, humidity is lower. And vice versa basically. (Unless it's the tropics!)

In Mexico, the humidity is very often 15-20%, so a large bowl of water would be needed for cold smoking and hopefully the temperature would drop low enough also at night.

EQUIPMENT & TYPES OF COLD SMOKERS

The apparatus/equipment that you use for cold smoking can be incredibly simple. But there are a few ways of doing it.

At the end of the day you want a little bit of clean-burning smoke passing through and around the meat or food that you're smoking - consistently. (Tending to open fire in a traditional smokehouse can be hands-on, but enjoyable if you dedicate the time!)

Factors for Equipment

1. Smoldering Reliable Amount of Smoke
2. Airflow or air exchange in Smoking Chamber
3. Hanging Area or Racks can work too
4. Optional - Vent/Damper for open or close for more or less smoke
5. Optional - Insulation can be beneficial to keep more consistent temperatures

In a cold smoker box, wine barrel, old fridge, cabinet, or smokehouse there are heaps of options available. Attaching a smoker generator (link to my blog & options) to any of these is a simple process or using the pellet/maze smokers.

Here is a Smokai Generator on a wine barrel - epic & controlled cold smoke

I did talk to the owner of one commercial smokehouse - it took 5 years before the smokehouse had the right smoke coating on the walls inside the smoker.

They produce some outstanding fish pates and other small goods and have collected some awards, maybe, because of the smoking coating/aging on the smokehouse! I have no science to back this up, but it makes a nice marketing angle!

I will show example/links to smokehouse designs at the end in appendix A

COLD SMOKE GENERATORS

If you want to invest in a cold smoker (or it hot smokes / low & slows too) that has maximum control of the amount of smoke and a consistent clean burn - this is it.

Smokai invented smoke generators.

As you see in the pictures here, the cold smoker is a tube that is gravity feeding/burning smoking wood inside. There is a separate air pump that blows through the vertical tube.

The airflow going through a pipe - draws or pulls the smoke and also keeps the combustion going in the main vertical tube - venturi effect.

Quite an ingenious invention, the one big advantage with this type of cold smoker is the pump has a variable control, therefore you can make adjustments - on the go.

I found that depending on the wood type a different amount of airflow was necessary to keep a consistent level of smoke pumping into my smoking chamber.

The way these are normally designed is that you have a bolt-on system: You drill a hole through and tighten it on so that you have a smoker attached to whatever you're using as a smoking chamber.

An option like a smokehouse, wine barrel, old fridge, beehive box (looking for one), kettle, bbq, or any other wooden 'area'.

You will need to have electricity to run the air pump, I'm sure you could do it off the car battery but I haven't needed to resort to that strategy.

The time you can get out of the 1L+ smoke generator surpasses a pellet tube to a certain degree like maybe 1-3 hours more depending on the wood type.

I've had my smoke generator pumping out smoke for 6 or 7 hours, which is a very long smoking session, remember, you should always have breaks and let the meat rest in a fridge or fridge curing chamber. Then continue with more smoking sessions when you are doing things like dry-cured cold-smoked bacon.

Smoke Daddy is a US brand, but it seems to burn through wood very quickly, it's also got some design issues that I'm concerned about in terms of unclean combustion.

Here is a page on the blog with recommended smoker generators

PELLET TUBE SMOKERS

I think practically every cold smoker is straightforward.

It's doing a little bit of smoldering and not too much combustion (In this pic, I didn't fill up the tube because I only needed 2 hours of cold smoke).

Pellet tube smokers are something I have used for many years, this type of cold smoker, simple operation and set up. It is portable so I can also do some meaty smoked projects at friends' places as well.

I've used pellet tube smokers with different types of wood shapes like sawdust, smoking wood pellets, or random chipped chunks of grape wood. It's less consistent when you don't use pellets. But I have had success mixing sawdust, wood pellets, and grapevine - when experimenting.

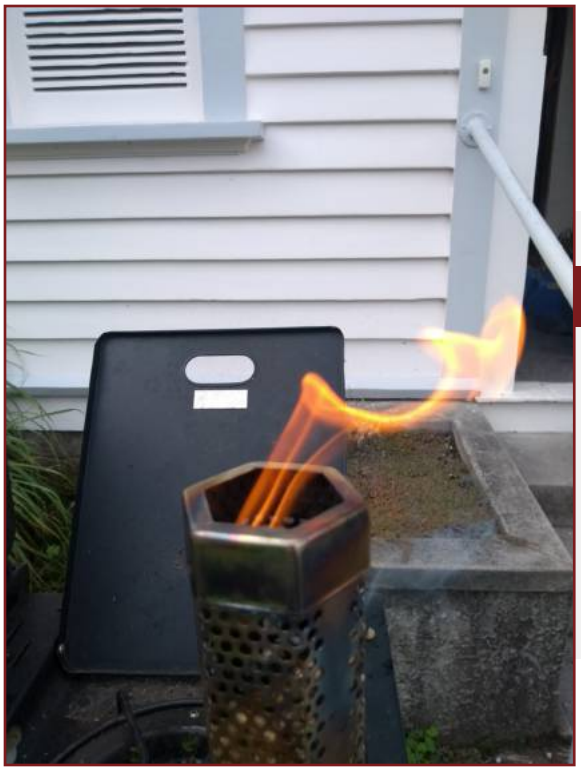
You generally get 6 or 12" pellet tubes. The 12" tube I find will get around 5 hours of smoke.

I have heard of people using motorcycle baffles from exhaust pipes and I even tried to source something similar locally.

After talking to motorbike and car mechanics the weight and spaces between the holes of the baffle meant I would probably have to modify and drill a few hundred extra holes which I wasn't keen on doing. I found a picture of what I want, but only really car baffles not bike types like these.

Definitely get a shape that has a flat side, this means that it won't roll around too much. My favorite is the oval-shaped one.

Depending on what type of torch or butane burner you use it may take 30 seconds to get the pellets going or 6 or 7 minutes to let it burn with a flame which you blow out.



Example

Option 1
This may take a few minutes to get a flame burning out the top. Using a 'brulee' type gas torch

Then you sit and wait for the flame to get 4-5 inches long out the top.

Example

Option 2
Use a commercial propane torch, this will take a few seconds to get ½ dozen pellets glowing red! So it won't need to burn for 6-7 mins.

When you fill the pellet tube up with the pellets, you want to leave about half an inch from the top. You'll be placing the pellet tube on its size, if it's full, the pellets will fall out at the start.get 4-5 inches long out the top.

MAZE SMOKER

Some are designed to have a little tea candle placed underneath to get the sawdust or pellets going at one end of the maze. There are other types of Maze smokers where you need to use a butane torch or Brulée torch to get the wood sawdust chips going from one end.

Some are for pellets and some for sawdust.

Both these smoking tools are working on a very similar principle but there are a few variations.
All in all, often producing less smoke (remembering though it's the vapor, so often you can't see the smoke flavor!

CHARCOAL / WOOD - BASIC

I came up with this in a pinch, when my equipment was in storage. I was in between moving houses and I wanted to cold smoke some bacon. So I got a piece of charcoal going with a camping gas stove - once the piece of charcoal was half white I just sprinkled some smoking sawdust.

And it was smoldering away, using a very old kettle bbq that was outside, the smoke came up through the middle of the bottom vent.

I could have used a cardboard box instead although cardboard does combust, so I opted for something a little less 'combustible'.

Every hour or so I would just drop another half a handful of wood on to the charcoal. A lump or 2 of charcoal lasted about 60-90 mins.

Cold Smoking devices are available for existing BBQ smokers, will talk about the equipment later on.

For instance, the accessory 'Low and Slow Smoker from Masterbuilt' switches on, and an electrical element burns a little wood, 6 hours is what you can get out of this.

With ash removal, it is a tidy system, one of the more techy options out there.

The other key to cured and cold smoked meat is to give the smoked meat time to rest. Seal it up or wrap it up, it will permeate in the smoke flavors and become more flavorful the next day.

SMOKEHOUSE/CABINET

I have had a lot of success with vertical commercial cabinet smokers which I use for cold smoking and hot smoking - it can run everything from charcoal, wood or LPG gas.

It's a big metal insulated box with a vent on top and a chamber area at the bottom, where we place the pellet tube.

When you get to a certain size, which would be about 7 or 8 feet long by at least a foot wide, it's quite a lot harder for the smoke to heat up inside depending on installation.

When you have a larger area you need that little whisper of smoldering smoke happening.

I knew a Dutch butcher who had a massive smoke-cabinet. He would use the leftover sawdust from a furniture-making company that would be suitable for smoking. (Non-resin types)

He would have a pile of mahogany sawdust that is lit with a butane blow torch and let that smolder away overnight to make deep dark rich smoked Dutch delicacies. Through experience, he knew how long to light it for and how much sawdust.

The point here is if you're using a large amount of space and using a pellet tube/maze smoker or smoke generator it doesn't matter, you end up pumping smoke into the large smoking area.

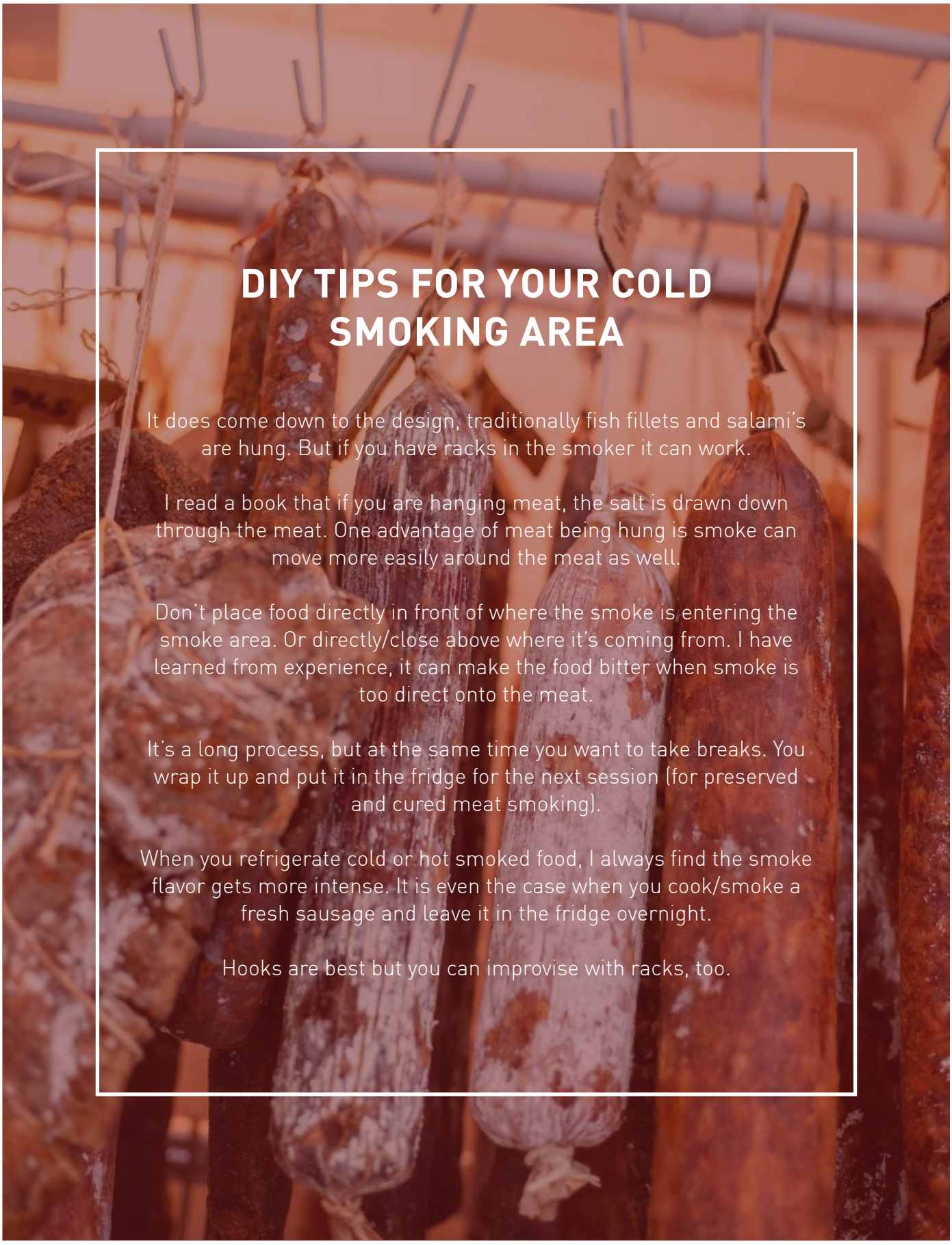
Though, having a smoke generator allows you to adjust the smoke with the variable pump.

Another traditional way is having two separate areas: one area for smoldering of wood and then piping smoke with ducting over into the second area.

It's quite common in Eastern Europe to have an underground system where smoke can curl through the ducting /piping into the smoking area.

All you need to do then is build a small fire and by the time this smoke and the heat goes out the other end into the smoking area, it's well under 30°C, especially since most of the cold smoking is done in winter. Of course, you need a little real estate for this.

For portability cabinets or gas grills with smoke generators or pellet tubes are the way to go.



DIY TIPS FOR YOUR COLD SMOKING AREA

It does come down to the design, traditionally fish fillets and salami's are hung. But if you have racks in the smoker it can work.

I read a book that if you are hanging meat, the salt is drawn down through the meat. One advantage of meat being hung is smoke can move more easily around the meat as well.

Don't place food directly in front of where the smoke is entering the smoke area. Or directly/close above where it's coming from. I have learned from experience, it can make the food bitter when smoke is too direct onto the meat.

It's a long process, but at the same time you want to take breaks. You wrap it up and put it in the fridge for the next session (for preserved and cured meat smoking).

When you refrigerate cold or hot smoked food, I always find the smoke flavor gets more intense. It is even the case when you cook/smoke a fresh sausage and leave it in the fridge overnight.

Hooks are best but you can improvise with racks, too.

MEAT COLD SMOKING FOR FLAVOR & PRESERVATION

The most important aspect in my opinion is fully & properly curing the meat. When this is done right, a large chunk of the risks are mitigated. This is why equilibrium curing is ideal - choosing the saltiness flavor whilst providing the scientific minimum amount for preserving and cold smoking.

If you aren't smoking meat, then it's a straightforward process. I love to smoke cheese and nuts. You will find this a great way to start cold smoking.

Most of the time I use cold smoking for glorious bacon or fish. You can do this over multiple sessions and refrigerate overnight.

I have used frozen pork belly for bacon which did turn out great. The quality and the traceability I knew well.

Frozen meat is fine.

SALT BRINING VS DRY CURING

For large muscles of meat like pork legs/ham wet brining with an injection of a salty brine is logically the best option.

It's also useful for a large amount of fish and due to volume, commercially cold-smoked fish was put into an incredibly maxed out wet brine (80 degree equivalent to 21% equilibrium cure). I've done it before and it took 45 minutes to stir and dilute the salt, but 11 minutes to brine the fish fillets!

I haven't had a bucket load of experience with saltimeters and powerful brines, I tend to use equilibrium brining for efficiency. I want more accuracy in the brine.

I've got the equilibrium brining calculator here; You need a snug container for brining.

3 days per 2 inches is a good guide when your equilibrium brine in the kitchen fridge @ 35-38°F/2-4°C temperatures.

For most cold smoking meat curing projects at home dry curing/equilibrium curing makes more sense, see below.

SATURATION METHOD VS EQUILIBRIUM DRY CURING

The old method of saltbox or saturation is to cover the meat completely with salt - it uses a lot of salt with this method.

I still use this method for large meat muscles or salt pork. Things like salt beef, salt fish & salt pork fall into this category.

I think that the saturation methods of salt curing makes a lot of sense if your goal is full preservation for multiple 20lb slabs of pork belly for bacon, for instance – I'm talking huge volume again.

Every 1 kilogram of meat = 1 day in the saturation cure / excess salt /saltbox method

Or 2 pounds of meat = 1 day

Now you can use equilibrium curing to achieve full preservation for salt pork, salt beef type products. You just need to use 12%+ salt to the weight.

Then to cold smoke, this strong cure created in moderate or cool temperatures will last months or possibly even over a year, some experiments I'm doing now actually.

Outcomes can vary greatly, hence why most of the time equilibrium curing is the favourable option.

Equilibrium Dry Curing (or Wet)

When it comes down to curing and cold smoking meat, equilibrium dry curing is generally my go to. For less salty balanced tastes, around 2% to the weight of the meat, for more saltiness 2.75-3%.

This is all about equalising the outside of the meat with the inside of the meat. With a tight bag around the meat equilibrium curing 'equalises' the saltiness uniformly.

With equilibrium brining you are 'equalising' the liquid salt content outside the meat the same as inside the meat.

For me, the minimum I like to use for dry curing whole muscle cold smoking would be 2% salt.

This often includes the 0.25% of pink curing salt 1 or 2 – for dry curing.

2.25% to 2.75% is the sweet spot for my preference, so this means 2.25% salt weight to the weight of the meat before applying the cure.

Now before getting all mathy, here is a link to the equilibrium curing calculator on my blog (it is at the top of every page as "meat curing calculator".

https://eatcuredmeat.com/meat-curing-calculator-tool-equilibrium-curing-brining/

Pink Curing salt

(I've written about this stuff 50 times, here is an excerpt from the blog....)

Personally, I use it for salami products. I do not use it for whole muscle cured meats or things I will cook at high temp like pancetta or bacon. I'm phasing out the stuff for my salami too.

Why to Use Pink Curing Salt?

When curing meat, canning, brining it's protection from unwanted bacteria using pink curing salt in the correct ratio can avoid bacteria such as botulism.
Taste and colour are also factors, a grey looking ham doesn't have the same appeal!

HOW TO USE PINK CURING SALT?

Most of the pink curing salt packages that I've seen have indicated a commercial quantity and ratio of use.

Pink curing salt is generally written as: **4 ounces should be used for 100 pounds of meat.** The way I work out my meat curing is to decide on the amount of saltiness using the modern equilibrium curing, so let's say 3% salt for making bresaola.

I use 2.75% salt + 0.25% pink curing salt #2 equals total 3% salt

The majority of pink curing salt is 'salt' with the nitrate/nitrites .

Example, 1000 grams of meat

= 27.5 grams of salt

= 2.5 grams of pink curing salt #2

Here is a table to highlight the different amounts, whether it is No.1 or No.2 the amounts is the same:

Amount of Meat	Weight Loss (Generalising)	Pink Curing Salt Amount (grams)
100 pounds	4 (0.25%)	113.4 grams (0.25%)
5 pounds	0.2 (0.25%)	5.66 grams (0.25%)

For Equilibrium Curing at home, 0.25% of the meat weight means accurate scales are very important in measurement –

here is a page of scales I can recommend.

Effects of Nitrates and Nitrites

From the textbook "Meat Production of Quality Meats and Sausages" (Marianksi &Marianski): adding nitrates to meat will improve flavor, prevent food poisoning, tenderize the meat,and develop the pink color widely known and associated with smoked meats.

Different Names for Pink Curing Salt

Here is a list of pink curing salt that has the same ratio of salt, nitrates & nitrites.

Under 30 Days Pink Curing Salt	Over 30 Days Pink Curing Salt
Pink Curing Salt #1	Pink Curing Salt #2
Prague Powder #1	Prague Powder #2
Quick Cure #1	Quick Cure #2
Instacure #1	Instacure #2
Tinted Curing Mix (TCM) #1	Tinted Curing Mix (TCM) #2

Here are curing salts with different ratios of nitrates/nitrites – this is due to European Meat Curing standards (many of these have 0.6% of nitrite in the salt vs. 6.25% for curing salt #1) – therefore my calculator is not applicable.

Colorazo	Sel Nitrite	Peklosol	Nitrited Salt
Sweden	France	Poland	England

There are other brands like Tender Quick, I have not used.

Tender Quick – These all have different amounts of sugar, nitrites and nitrates depending on the product. They have similarities to pink curing salt but it is best to just follow what instructions are on the packaging. These products are popular in Canada.

"Salumi" a meat curing book by Ruhlman and Paulson summarizes curing salts like this.

"Nitrates and nitrites are naturally occurring chemicals that our bodies rely on. Green vegetables such as spinach and celery are loaded with them. As much as 95% of the nitrates in our bodies comes from vegetables. Our bodies naturally convert nitrates into nitrites which work as a powerful antibacterial agent, particularly in an acidic environment (such as our stomachs).

Nitrates and nitrites provide the same antibacterial function for a sausage being cured. Lactobacillus bacteria feeding on sugars in the sausage produces acid (that is the tanginess we associate with salami) and the nitrates keep harmful microbes from growing – most importantly the bacterium that generates the deadly botulism."

Here is a scientific paper about the health benefits of nitrates/nitrites from fruit and veg:

Food sources of nitrates and nitrites: the physiologic context for potential health benefits

Pink curing salt is used at very minimal levels when I am doing a few pounds of dry-cured meats. A very small percentage of 1 teaspoon is used as part of the ingredients.

Pink curing salts are something that should be double or even triple checked to make sure you have the right amount.

In contrast pink curing salts when used properly and with the right ratios add a level of protection to the curing project – this is why I use them.

In the textbook "Home Production of Quality Meats and Sausages" it states:

Carcinogens can only be formed when products are heated above 266°F or 130°C. This can only happen when cured bacon is fried or cured salamis is grilled. The majority of cured meats never reach such high temperatures.

COLD SMOKING - CURING & PRESERVING PROCESS

I feel the 'theory' I've written about above is important before doing the process.

I will try for each of the points to give you details about how I do this.

This preserving/cold smoking doesn't have to have the full weight loss, but this is for the balance of preservation and flavor to consume dried without cooking, so it needs to hit a 30% weight loss for red or pork meat.

So here is my cold smoking dry cured meat process:

01

Weigh the Meat

Accurate scales that go to at least 1 decimal place is always a key for equilibrium curing to work successfully - here are some recommended scales on the blog.

You will be recording this starting weight and the final weight depending on what you are making.

02

Use Accurate Scales to Measure all Ingredients

- Calculate the salt (and nitrates if applicable)
- Calculate the water for the brine (if applicable)

Having a good spreadsheet is useful here, I am looking at a tool which will auto-populate this, based on meat weight put in and chosen recipe.

For equilibrium curing, a finer curing mix is preferred, so using a spice grinder/coffee grinder is a good idea here too - here is a link back to blog to visualise.

03 Use Bowl or Container to Massage and Rub Cure Mix

You want to make sure all the cure has been massaged and rubbed onto the meat, takes a couple of minutes to do this.

For reference, here is the blog I wrote about equilibrium curing.

Pay attention to the crevices and gaps that are around the meat.

Using only whole muscle meats without cuts means there shouldn't be unwanted bacteria harboring inside the meat. This is why whole muscle meat curing and cold smoking should be mastered before dry curing salami which has lots of exposed meat to the environment.

04 Place Meat in a Bag and Remove Air/Oxygen

Either a plastic bag, ziploc, reusable manual pump or very tight perfect fit tupperware

05 Place in the fridge or in a similar temperature for an allotted time depending on weight/size

1 inch thick / 1 week - equilibrium curing
1 inch thick / 3 days - equilibrium brining

06 Pellicle Formation

The pellicle is a naturally occurring aspect of meat, the proteins on the surface bind together.

After meat is salt cured, the easiest way is - leaving it uncovered in the regular kitchen fridge for a certain amount of time depending what meat it is.

For fish I normally allow 1 to 2 hours to suffice.

For pork and red meat, give it a good 3 to 5 hours to dry out. I leave it a little bit longer. The other option is to just leave it overnight in your kitchen fridge.

To form a pellicle on the surface of the cured meat, will mean the smoke vapor from the cold smoker will adhere to the meat better.

The pellicle feels kind of 'tacky' when you touch it and has a slight gloss to it, in certain light.

COLD SMOKING MEAT SAFETY

Not sure if certain regulatory officials have got their heads around cold smoking. If you have been to European food markets, you will find a massive range of cold smoked meats and foods.

The most important aspect, in my opinion, is it fully & properly cured the meat - as mentioned.

This USDA site often talks about the 'danger zone' of meat temperature. This does not take into account salt curing effects on the meat and how they help remove bacteria and spoilage.

https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/danger-zone-40-f-140-f/CT_Index

In certain categorisations of 'processed meats they are seen as all the same, but Parma Prosciutto Ham is rather different to a Hog Dog (not in the eyes of WHO).

There are chemicals in smoke that possess antibacterial and antimicrobial properties, which are reasons why the smoke has some preservative function. This is why it began being used in the Bronze age of mankind accidentally maybe.

European regulators are much more advanced since cold smoked goods are part of many cultures & countries. It has developed and been refined over hundreds and thousands of years.

I've heard 60% of sausages are smoked in Germany (random 2nd hand information).

Importance of Weight Loss

For Cold Smoked Bacon I aim for 20% weight loss - 10-20% is a guide generally. . Recently I have been only doing 10% weight loss, then slicing and freezing in individual slices on baking paper. When frozen in a pack, it means I just pull a hand full out and fry up when needed.

Less drying means less saltiness also, even at 2% equilibrium dry curing.

The meat becomes quite firm due to the moisture loss during the curing & smoking if going for 20% weight loss.

COLD SMOKING NON-MEAT OR MEAT FOR FLAVOR (NOT CURED)

So that is 'cured' cold smoking above for preserving and flavor, now we are on to no-cure- and no-salt types of cold smoking for flavor.

That might be a bit confusing, but you can form a pellicle and cold smoke a steak or other meat prior to sizzling it on the grill or roasting it. Giving it a 'resting' stage, will always help bring out the smoke flavour.

COLD SMOKING MEAT FOR FLAVOR

The idea here is to keep the meat under 10°C of 50°F when cold smoking it, uncover it overnight in the fridge first to get it drier and form a pellicle beforehand.

An imperative rest of a minimum of four hours or overnight.

Then perform your cooking to give your steak a different flavor profile. Rest then cook later on.

You really can apply this method to any meat with some forward thinking.

Good things take time as they say!

NON-MEAT SMOKING

Salt curing is only applicable for meat, it is not needed for dairy products like cheese. I have used it for eggplant or aubergine - ie/ sprinkled with salt to draw out some moisture prior to cold smoking can be an advantage.

Under smoking is much more enjoyable than over smoking, it's better than ruining something from over-smoking.

You have to be especially careful when it comes to vegetables and fungi where over an hour seems to be enough for smoke flavor. I've learned through experience what another 30-60

minutes can do and haven't enjoyed that longer smoking time. Though it will depend on how much smoke and how much airflow you have.

My advice here is to start with non-cured foods and then - once you know the cold smoking process you can add the curing and experience with some meats.

Cheese is a no brainer, you can stick cheese straight in a cold smoker to give it some flavor. Nuts are also very easy to cold smoke and can provide a whole new angle to your taste buds. When I have friends that want to try cold smoking this is where I point them to.

30-60 Mins depending on preference. I find 45mins to be spot on for lots of cheeses. I've shocked people by cold smoking cheap basic colby cheese for 45 mins! (Keep in container for 8 hours or overnight to permeate).

DAIRY

The idea here is to keep the meat under 10°C of 50°F when cold smoking it, uncover it overnight in the fridge first to get it drier and form a pellicle beforehand.

An imperative rest of a minimum of four hours or overnight.

Then perform your cooking to give your steak a different flavor profile. Rest then cook later on.

You really can apply this method to any meat with some forward thinking.

Good things take time as they say!

EGGS

In New Zealand, there was a franchise that had quite a rich history behind it of protecting its patent of cold-smoked egg sandwiches!

It is a simple egg sandwich, but the difference was the raw egg was cold smoked beforehand.

What many people don't know is that the eggshell is permeable to the point where the smoke flavor gets in.

I'm still experimenting with this, but as you know this is just a cold-smoked egg, I'm generally doing this at under 50°F/10°C.

So at least 8 hours, for a hint of smoke flavor, I've put some eggs in whilst cold smoking my bacon. 12-20 hours to start getting a smokey flavored egg.

VEGETABLES

There are endless levels of smoking vegetables you could create.

My mum hasn't had success with carrots - be warned! But maybe someone out there would enjoy it! Or go light on the smoker!

The most success I have had is cold smoking **field mushrooms, tomatoes, eggplants and aubergine - 45 minutes**

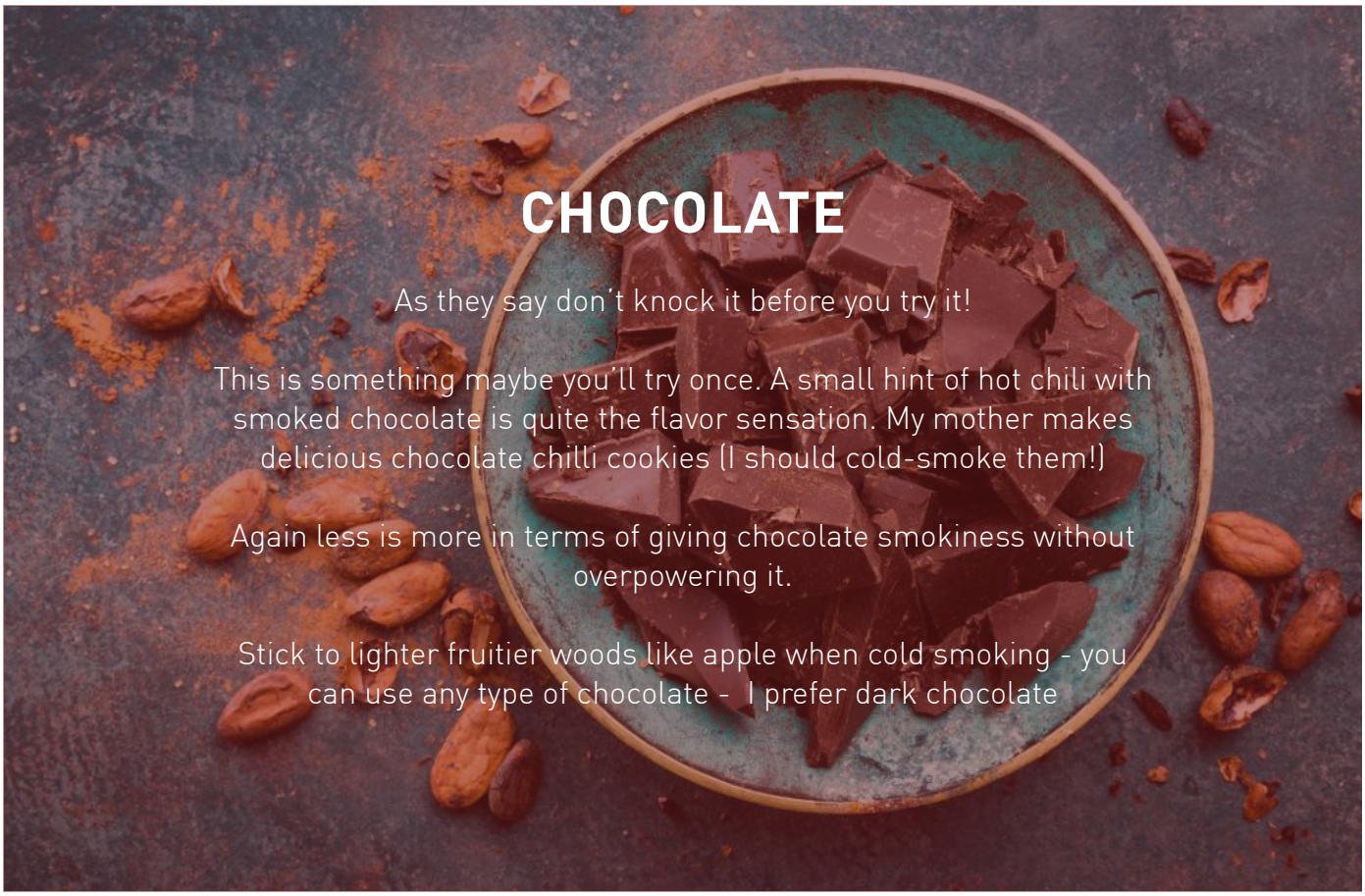
Eggplant is the only vegetable where I have used sprinkled salt to draw out excess moisture before smoking, it helps.

30 to 60 minutes I have found is most successful with cold smoking vegetables or any non-meat foods apart from eggs.

NUTS

Roasting before cold-smoking or not, it's up to you. Or you can hot smoke and roast them at the same time.

Smoked pecans or cashews have such a different complexity and flavor. 30 minutes 60 minutes is fine and rest at least for a day which enhances flavor further.



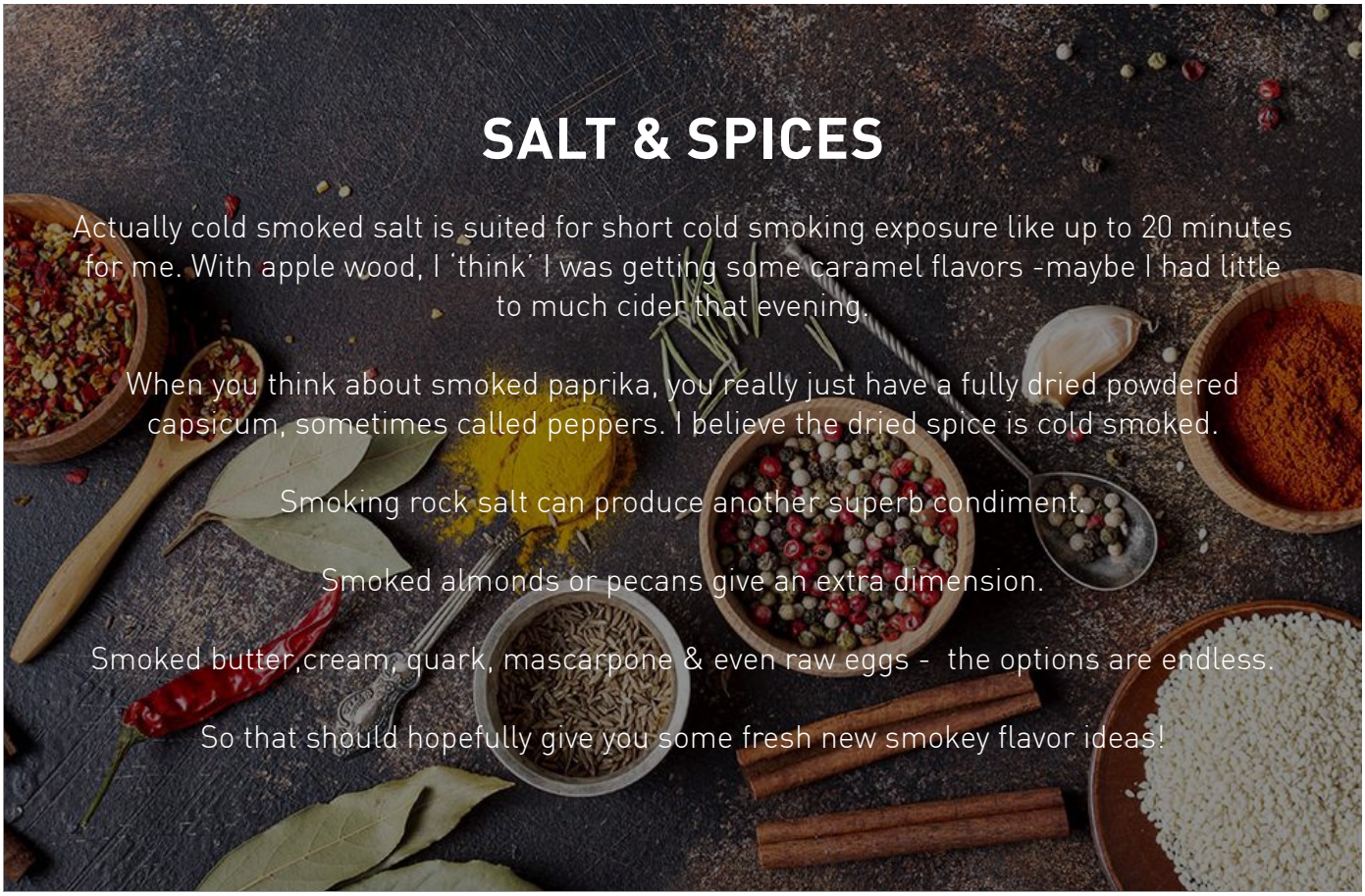
CHOCOLATE

As they say don't knock it before you try it!

This is something maybe you'll try once. A small hint of hot chili with smoked chocolate is quite the flavor sensation. My mother makes delicious chocolate chilli cookies (I should cold-smoke them!)

Again less is more in terms of giving chocolate smokiness without overpowering it.

Stick to lighter fruitier woods like apple when cold smoking - you can use any type of chocolate - I prefer dark chocolate



SALT & SPICES

Actually cold smoked salt is suited for short cold smoking exposure like up to 20 minutes for me. With apple wood, I 'think' I was getting some caramel flavors -maybe I had little to much cider that evening.

When you think about smoked paprika, you really just have a fully dried powdered capsicum, sometimes called peppers. I believe the dried spice is cold smoked.

Smoking rock salt can produce another superb condiment.

Smoked almonds or pecans give an extra dimension.

Smoked butter,cream, quark, mascarpone & even raw eggs - the options are endless.

So that should hopefully give you some fresh new smokey flavor ideas!

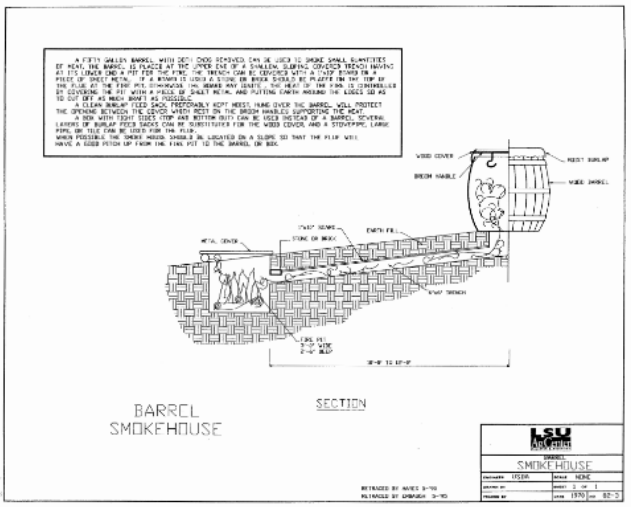
APPENDIX- A - SMOKEHOUSES

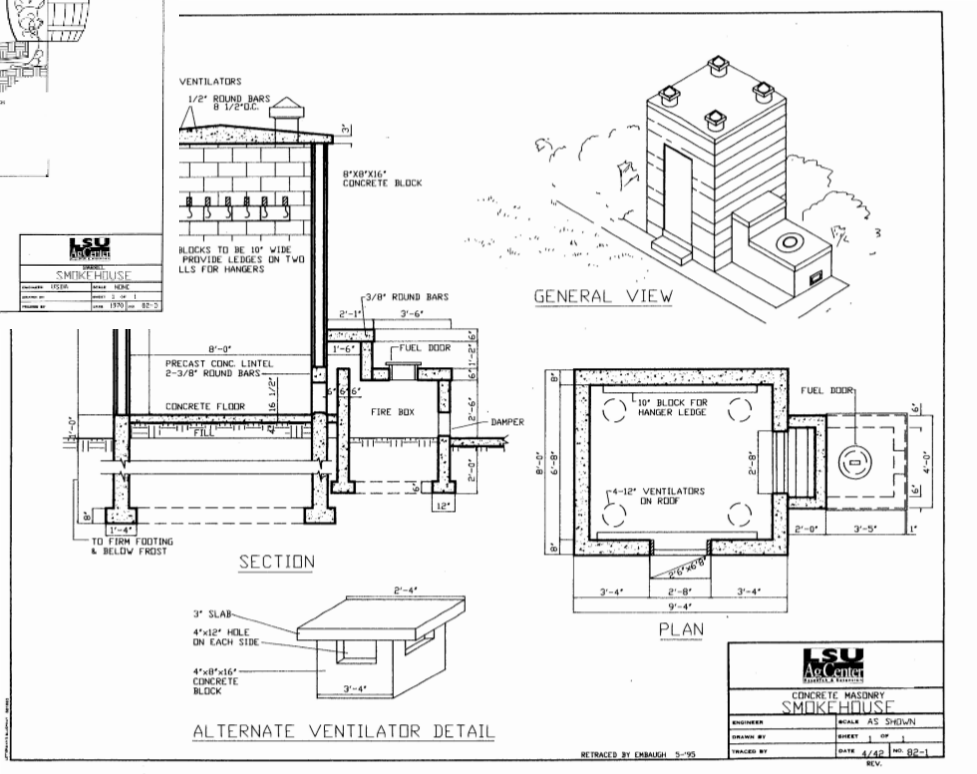
Masonry, Brick, Wood, 40 Gal Drums, Concrete, Steel - you really can come up with any material on hand to create a smokehouse.

The most basic models are with one 'burning' combustion area and an area to hang the meat.

LSU College of Agriculture (link) - has many of these designs and measurements if you want a plan to base your smokehouse on.

Here are some samples from the site, I don't think it needs too much explaining, apart from some form of control on airflow in and airflow out.





Happy Cold Smoking - Tom