

Build a cold smoker

Add delicious flavours and create unique dishes



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Ben Everard is the editor of HackSpace magazine and a maker whose projects always seem to lead to food, including an irrigation system that waters his vegetables and a 1947 radio (converted to a Bluetooth speaker) that keeps the music flowing in his kitchen.

YOU'LL NEED

- ◆ Kettle BBQ with lid
- ◆ Heat-proof ducting
- ◆ Hardboard (4 × 610 mm × 550 mm and 2 × 610 mm × 610 mm)
- ◆ Thermometer
- ◆ Galvanised fencing wire
- ◆ 200 mm × 300 mm sheet of 1 mm stainless steel mesh
- ◆ Aluminium foil tape
- ◆ 2.5 mm × 20 mm screws
- ◆ 18 mm × 38 mm × 1200 mm planed pine
- ◆ 8 × M6 50 mm bolts with nuts

T here are few things that you can turn your hacking skills to that can give you as much enjoyment as food.

Most people eat around a thousand meals a year, so that's a thousand chances to use your knowledge and skill to increase your happiness. To us, that sounds like a great area to focus on. We'll start with a brilliant way of adding flavour to a wide range of foods such as meat, cheese, and fish: cold smoking.

The three main things you need your smoker to do are produce smoke, cool the smoke, and apply the smoke to the food. None of these things is especially difficult, and the hardest thing for many DIY smokers is just getting them all into a limited amount of space. In most cases, this is done best by splitting the three tasks up into three separate physical parts.

The rough layout of our design is widely used for small-scale smokers. You have a firebox, which

contains some smouldering wood that's used to generate the smoke; there's then some ducting that the smoke travels along, cooling as it goes. This duct deposits the smoke into a smoke chamber that holds whatever it is you want to smoke.

First, let's take a look at the firebox. This obviously needs to be fireproof, it needs to be fairly well sealed (so the smoke doesn't leak out everywhere), and it needs to connect to the ducting; but other than that, it can be almost anything that's large enough.

Below ◆ Our finished smoker. Smoke likes to rise, so it's best to place your smoke chamber above your firebox





Above ♦ The joints holding the smoke chamber together. The bolt through the long side makes it easy to take apart for easy storage

We've used a barbecue (because last year's miserable summer in the UK led to lots of discounts at garden centres). Garden incinerator bins are a popular alternative, and almost anything metal that you can attach a duct to will work.

The trick with producing smoke is to control the burn properly. If the wood burns too well then you'll get flames but not much smoke and you'll burn through your wood quickly. If it burns too slowly, it'll go out. There are maze smoke generators commercially available that are just tracks that allow wood to burn, but, unlike hacked-together options, these don't allow you to adjust the width of the burning sawdust, so it's hard to control the amount of smoke.

There are a few options for building your own smoke generator, but the easiest is to create a long, thin pile of sawdust that you light at one end and it slowly burns along. How long this pile should be is defined by the length of time for which you want to generate smoke, and how thin it is depends on how much smoke you want. There aren't any formulae for calculating this, as it also depends on the airflow of the smoker, the moisture content of the wood, and a myriad other factors. Essentially, getting the right size comes down to trial and error.

We've created our pack of sawdust using 1 mm wire mesh. You can buy this in sheets and it's easy to work with. Fold it into an M shape by hand and pile the wood dust in the middle groove. We found that 1 mm mesh was fine enough to hold commercial cold-smoking wood dust, but we wouldn't recommend anything with larger holes than this. Our 30 cm-long sheet of mesh burned for about four hours. If you need a longer burn time, you can either refill it or get a longer mesh.

We found that we needed a pile of wood dust about an inch and a half (38 mm) deep and about the same width to sustain a smouldering fire, and two inches (51 mm) deep provided a thicker smoke.

To get smoke, just set fire to one end of this dust trail. A blowtorch is the easiest option, but a candle underneath also works (just remember to remove →



TOOLS

- ♦ Drill
- ♦ Jigsaw
- ♦ Wood saw
- ♦ Metal saw


HOT SMOKING

There are two types of smoking possible: hot and cold. In most of this article, we've looked at cold smoking, where the smoke is chilled and applied to the food without it cooking. The alternative is hot smoking, where the smoke is applied to the food as it cooks. This is as simple as chucking some damp wood on the burning coals of a BBQ, then using some form of lid to stop too much steam escaping.

You smoke the food as it cooks, which means that the smoking time is more limited, as is the range of foods you can smoke.

Left □ We bent the corners of our M-shaped smoke generator to make it fit closer to the ducting taking the smoke out of the firebox



Above  The lit smoke generator will provide several hours of smoke from a single trace

SELECTING WOOD

There are a few different types of wood you can buy for smoking. Larger chunks (often around a centimetre cubed) are for hot smokers as they won't smoulder in the right way for cold smokers. There are also various types of pellets and pucks that are designed for specific commercial smokers. For a home-built cold smoker, you want to get wood dust or fine wood chips designed for cold smoking. There are a few different sources available, but make sure you get some that are for food.

There are loads of different tree species available and some people will make you think that it's essential that everything gets smoked in exactly the right species. Different woods do have different flavours, but the density of the smoke in the chamber and the length of time it's smoked for has a far bigger effect. We'd recommend starting with a fruit wood like apple or cherry. These are a bit milder than some woods such as oak, which means it's a little more forgiving of oversmoking so you're less likely to end up with something that tastes like an ashtray.

If you create your own wood for smoking, remember that it has to be uncontaminated with oil. This means no chainsaws or other mechanical devices that use oil. Cold smokers don't get hot enough to cleanly burn this oil, so you'll just end up with an oily taste in your food.

the candle before smoking the food). A cigarette lighter can work, but you're likely to burn your fingers once or twice.

We were able to hacksaw a square hole in the metal lid of the BBQ and attach the duct (see below) to the firebox using heat-resistant tape. It wasn't the neatest join, but we found that this was a situation where a neat finish would have taken much more time for very little gain. It does, however, need to be fairly smoke-proof, so you might need to pile on the tape. If anyone asks, tell them you were aiming for the rustic look. The bigger the hole you create, the better the smoke will flow through into the duct (provided you haven't made it bigger than the duct, of course).

DUCT TALES

You'll be glad to know that the firebox is the most complex part of the build. Now we've dealt with that, everything gets easier. The duct just needs to be long enough for the smoke to cool down sufficiently. There aren't any hard-and-fast rules on this as it depends on your firebox design, the amount of heat produced by the smouldering wood, and the ambient temperature in the smoke chamber. The end result we're looking for is a chamber under 26°C (79°F). As a general rule

of thumb, we'd say around 1 to 1.5 metres should be fine, but we'll use a thermometer to ensure that the smoke chamber is at the correct temperature when smoking.

Provided that you control the burn in your smoke box well, the duct shouldn't get too hot, but it's always best to err on the side of caution and make sure that it's heat-proof. There are a few options here. Solid metal pipe can work provided it has a large enough diameter to let the smoke flow freely, but it can be a little awkward to work with. Perhaps the easiest option is a flexible chimney liner. There are also other flexible high-temperature ducts available. Remember that plastics can give off toxic chemicals even if they're not burning, so we'd highly recommend staying away from anything non-metallic. We used metallic ducting designed for channelling smoke in oven hoods.

CHAMBER MADE

The final part of the build, the smoke chamber, can be as simple or as complex as you like. It just has to be reasonably (though not completely) airtight and be connected to the duct. Many people reuse something they have spare. We've come across folks using tea chests, wardrobes, cider barrels, fridges, and filing cabinets (do be careful that there aren't any toxic paints or other substances, though).

We opted to build our own because we want it to be collapsible for easy storage. The design is about as simple as it's possible to be. We used four sides of 61 cm × 55 cm hardboard with the top and bottom made of 61 cm × 61 cm hardboard (the sizes were determined by the stock available at our local hardware store).

The four sides were joined with sections of 18 mm × 38 mm planed pine cut into roughly 150 mm lengths. The 18 mm wide edge was screwed into one of the box sides, leaving a slight lip where the hardboard poked out beyond the wood by about 1 mm. We joined the adjacent hardboard side to this by drilling a 7 mm hole through both the hardboard and pine and bolting it in place. Two of these joints in each corner held the box together. With this style of joint, you can simply unbolt the sides and the box comes apart. The small lip on the side pulls the sides together and minimises any gaps, though if you do find a little leakage, you can always tape the sides shut. It's worth numbering the corners and writing this on both sides so you can reassemble it easily.

You'll need some venting on the top of the smoke chamber to allow the smoke to escape, because if it can't escape, then it won't pull through from the firebox. We found that three 7 mm holes were

WHAT TO SMOKE

Now you've got your smoker, the next question is what to put in it. Unlike a hot smoker (which is hot enough to kill bacteria), a cold smoker carries some risks. Essentially, you'll be holding the food at around room temperature for a few hours, which can allow bacteria to grow, so you need to make sure that what you smoke isn't going to harbour nasties that can cause problems.

Cheese is a great option to start with, and the flavours of different types of cheese with different types of smoke can be fantastic. It tastes best a few days after it's smoked, as this gives the flavour time to mellow. Most vegetables can be smoked, and smoked garlic, onions or peppers give a great depth of flavour to cooked dishes.

Meat can be safely smoked if it's been properly salted first. This salting slows

down the bacteria enough for it to be smoked without becoming contaminated. In principle, properly made bacon is safe to smoke, but we would stay away from commercial bacon as it's hard to know what preservatives have been used. A good butcher will be able to tell you if their products are safe to cold-smoke. Alternatively, you can make your own. The process takes a little time (up to two weeks), but the results are delicious. Our favourite recipe comes from River Cottage: hsmag.cc/cGAz0N. Just be sure to cure it for around four to five days before smoking.

There's nothing to stop you smoking many different things at a time, provided they all fit into your smoker of course. The best way of finding out what smoked things you like is to try lots of different things out!

sufficient to ensure a good airflow. Unfortunately, we discovered this after we'd drilled six 7 mm holes. If, like us, you find yourself over-ventilated, a little tape will solve the problem.

Beyond the bare box, the only things you need in your smoker are the thermometer, somewhere to put the things you're smoking, and the end of the smoke duct. We pushed our thermometer through a 3 mm hole drilled into the side of the chamber to allow us to read it without opening the chamber (which lets a lot of smoke out). We made a rudimentary rack using galvanised fencing wire threaded through holes in the chamber, and placed an oven rack on this. Finally, we used a jigsaw to cut a circular hole for the duct. We made this larger than the duct, pushed the duct through and taped it on the inside. This was neater and more secure than taping to the outside, as we had to do with the firebox.

That was all there was to it. It took a little experimentation to get the right amount of wood dust and airflow holes, but within an hour of finishing the build, we were cold-smoking our first batch of food. □

Below ♦
Meat thermometers are simple and cheap, but you could hook up a digital sensor and collect the data

