

Preserving Meat without Refrigeration

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Preserving Techniques

Salt Curing

Salt curing meat to preserve it is probably one of the oldest preservation techniques known to man. This method of curing meat was known to the Romans, as well as smoking. There exists a story that salt meat was important enough to the Romans that the senate once debated whether man could exist without it. Salt curing preserved both raw and cooked meats, as well as poultry, game and fish. Several receipts for salt curing exist from the Roman occupation to the end of period. These receipts call for a variety of preparations of the meat, and a variety of curing mixtures. One of the receipts from the 15th century even calls for the addition of 'great salt of Peter', or sodium nitrate, which is still used in modern food processing operations.

Brine curing is the process that consists of soaking the raw or cooked meat in strong salt solution. If multiple pieces of meat are brined in the same container, the meat is usually rearranged every couple of days to ensure consistent coverage. Often the brine would contain spices other than salt to add flavor or to attempt to disguise the sometimes-heavy salt flavor of the meat. After several days in the brine solution, also called a pickle, the meat is hanged until completely dry on the surface. It can then be stored. The shelf life of the finished product depends on many factors among which are the amount of meat to be processed, the strength of the pickle, and length of the brining process. In many instances brine curing becomes a pre-process to another preservation method.

Dry curing is the process of rubbing the raw or cooked meat with a dry salt mixture, and allowing the meat to stand for several days. Often the salt rub is reapplied after a few days. This may be repeated more than once. The product is normally cured in a container that will drain, laid on a bed of the salt cure mixture. The curing rub was often more than just salt. Saltpeter was added as early as 400CE. Many spices or sweeteners were used in the curing mixture, often in an attempt to cover the salty flavor of many of the foods preserved in this manner.

A combination of brining and dry curing was also used. Both of these methods were used with both raw and cooked meat, fish and poultry, whether domestic or game. Both of the processes should be performed between the temperatures of 35°F and 50°F. This means that unless some kind of refrigeration is employed this must be done at a time of the year when the nighttime low dips no lower than 32°F, and the daytime high is no greater the 53°F. If the temperature drops below 32°F the process is suspended. If the temperature rises above 50°F there is an increased chance of spoilage during the curing process. This 50°F high temperature becomes less important as the meat cures longer. In many cases that is the end of the process; the preserved meat is then stored. Often this was only the first step in a process that involved one or more of the other preservation techniques.

The chemistry and biology (note I'm telling you what's coming so you can skip this part if you want) of this is that most harmful bacteria, including the bacteria that cause

botulism, cannot exist after the salt content gets so high, or when the water content of the meat gets so low. Soaking the meat in a salt solution, or rubbing it with salt both causes the meat to assume the salt, and leaches moisture out of the meat. Even meat cured in a pickle loses water weight during the curing process. If the meat starts the curing process raw, it will still be raw when completed. The curing process will not kill trichinosis or salmonella. If the meat should be fully cooked before eating fresh, it should still be fully cooked after curing!

Smoking

Smoke as a preservative has probably been around as long as man has been eating meat. A widely believed theory is that smoking was seen to improve both the flavor and the keeping qualities of meat as a side effect of it's being hung above the fire to keep insects off. As with many beneficial discoveries this was probably completely accidental, but would probably have been noticed because even our most primitive ancestors would have had an interest in preserving their food supply. Although I have seen no period documentation of the processes used, there is evidence of smoked meat from the Roman occupation through the end of the 16th century. This primarily appears in descriptions of Roman foods and orders and invoices for armies and in preparation for lengthy voyages where fresh supplies may be in short supply.

Cold smoking is a process involving saturating the meat in smoke at a temperature of 75°F to 120°F. Meat to be cold smoked is almost always at least partially cured before smoking. In most cases it is fully cured before smoking. The meat is usually hung or placed on racks, and smoked for days instead of hours. Sometimes the process took place in special buildings for that particular purpose, sometimes strips of meat were hung around a fire, and sometimes meat was placed near the hearth or hung in the hearth or chimney where smoke from the cooking fire would pass. The resulting product was either completely raw or only partially cooked. When combined with salt curing this can result in a product that will remain edible and tasty for a year or longer without refrigeration, even under the worst conditions. Cold smoking can be used for all meats, poultry, fish and game.

Hot smoking is essentially the same process with temperatures in the range of 140°F to 200°F. In many cases meat to be hot smoked is not cured, or is only slightly brined for the salty flavor, or to inhibit bacterial growth during the smoking process. The meat is then hot smoked for several hours, cooking in the process. These hot smoked products are usually intended for immediate (relatively) consumption, and will not keep like the fully cured, cold smoked variety. In some cases the hot smoking process was also used to further dry the product in addition to flavoring and adding the smoke based preservatives, as with the famous double smoked red herring. These meats are usually fully cured before smoking.

In both processes the meat is usually completely dried on the surface before it is smoked. In some cases cold smoking is followed by a period of hot smoking. The smoking process, either cold or hot, flavors the meat, improves the shelf life and prevents attack by

many insects that will infest meat that is only salt cured or not cured at all. Virtually all manner of meat, fish, poultry, and game was smoked. Many of today's local specialty smoked food products, and smoked food names survive from the middle ages or earlier.

Now we move to the science. Smoking meat deposits the resins from the burning wood into the meat. Many of these resins contain aldehydes. These chemical compounds force the moisture out of the meat. (Remember how your fingers dried out in biology class.) This has a twofold effect; first, the aldehyde compounds themselves inhibit bacterial growth, and the lowering of the moisture content further slows bacterial growth.

Drying

Drying meat and fish as a preservation technique has been practiced for hundreds of years; possibly thousands in more arid areas. In many communities along the Mediterranean coast meat and fish were suspended in nets above the roofs to dry in the sun. Many early fishermen would clean and salt the daily catch, and hang it in the rigging until it was 'hard as oak planks'. In the Middle East and Africa dried meat very similar to modern jerky was produced. Drying was most often done in the sun, but in regions where this was impractical special drying sheds were built to dry the meat with mild heat.

Except in arid environments, meat to be dried was usually partially cured before drying. In extreme dry areas the meat would dry before bacterial action could start. In more humid climates partial curing was necessary to retard spoilage long enough to dry the meat enough that bacterial action could be inhibited. To effectively dry meat and fish more processing of the raw meat is required. Large pieces of raw flesh do not dry well unless hung for extended periods of time, which usually rendered the meat inedible. So meats to be dried are cut or pulled into smaller pieces. Often the size and shape of the prepared meat depended on its intended use. If properly stored, dried meat and fish will keep indefinitely.

Red meat and fish are the usual candidates for drying. There is some evidence that the Chinese were smoking and drying duck before 500 BCE. Dried meat products are excellent foodstuffs for travelers. They are light in weight, and a small amount of the meat provides a large amount of protein, so less is consumed at each meal. Small cubes and thick strips of dried meat can be reconstituted for use in soups and stews or noodle dishes. Thin strips are usually spiced in some manner when dried, with the intent that they be consumed in the dried state.

Ok, here's more of the scientific stuff. As mentioned before, most harmful bacteria cannot exist when the moisture content of their environment gets too low. Drying relies on this principle heavily. The salting process prior to drying is usually only sufficient to protect the product during the drying process, and may be safely omitted if the meat is cut so that it will dry quickly, or spiced in some other manner to prevent bacterial growth. After the process is complete, the lack of moisture is usually sufficient to normally inhibit bacterial growth indefinitely.

Pickling

Pickling is usually applied to preserving food by soaking in either heavy vinegar or sugar solutions. The Egyptians have practiced this type of preservation for thousands of years. Foods and bodies have been found preserved in honey in many Egyptian tombs. Evidence of pickled meats can be found from pre-period Roman documents. This technique was also widely applied to fresh fruits and vegetables.

Vinegar pickling is accomplished by immersing the food in a strong vinegar solution. The Romans pickled lamb and many pork by-products. Many of these are still available today. One medieval pickling receipt adds a strong spice mixture, and claims that the process will work for meat, poultry, or game. Most meat intended for pickling is cooked before the pickling process begins. This keeps the vinegar pickle from assuming too much water from the meat, and as a result going rancid because of the lower acid content of the pickling solution. Vinegar pickling was often used in areas where salt was unavailable or at a premium. If stored properly foods pickled in vinegar will last for years, and in many cases will retain their natural color and texture. Foods preserved in vinegar solutions have a very tart or acid flavor. If spices are included in the pickling solution the food will readily pick up the additional flavors.

Preserving in sugar, or honey, has been practiced in northern Africa, the Middle East, and the Orient for hundreds or thousands of years. Although this method is used primarily for fruits, vegetables, and flowers, there is evidence that meat can also be preserved in strong sugar solutions. There is a Roman recipe for preserving meat in honey.

Behind the scenes, these processes do essentially the same thing as salting. This is one of the reasons that they are grouped together. Both of these processes leach the moisture from the food and replace it with components of the pickle, in this case vinegar, sugar, or spice. Not only is the moisture content of the food decreased, it is also impregnated with a substance that resists bacterial growth.

Combination Processes

In many cases a combination of preserving techniques are used together on the same product. Much of the time this is standard operating procedure, as in the case of most smoked meats and sausages. Meat and fish are usually prepared for drying by first brining or salting the food. In some cases these foods were also smoked before or during drying. The same process would be applied repeatedly to certain products. This is the case in the well-known red herring that traveled well through Europe through the 13th and 14th centuries. This product was heavily salted, then hot smoked twice, until it was very dry. This product was often still edible after more than two years, but reportedly tasted like 'dried wood' after that length of time.

Storage Methods

Dry Hanging / Storage

Dry storage refers to the storage of a product at room temperature in a dry (relatively) environment. This is the preferred storage method for many salt-cured, smoked, or dried meat and fish products and many sausages. No, the processed meat was not just thrown on the shelf. The meat was usually wrapped or stitched into a close fitting cloth sack. Often this was not the only preparation to storage. Many preserved products specifically target this storage method. Fully cured hams can be wrapped in butcher's paper and hung in a close fitting linen or muslin bag. These hams will remain edible and tasty for two years or longer. Dried meat and fish can survive for years if kept dry. There are still many storage related problems. Several enhancements to dry storage have been made throughout the years.

Sealing is the act of preventing air contact with the preserved food product. Waxing food to be dry-stored enhances shelf life by sealing out air, and sealing in moisture. This had the dual effect of inhibiting mold growth, and keeping the stored product moist and edible, both of which are problems with this type of storage. This was usually done with cheeses, and later in the Middle Ages with fruit preserves. Modern housewives still pour a layer of paraffin on top of each jar of homemade jelly and jam to inhibit mold growth. The method would probably work with dry cured or smoked meats, but there is no evidence that this was ever tried. Dry hung meats were sealed using other substances also. Often salted and smoked meats were closely stitched into linen sacks, and painted with a lime wash. The wash dried to a very thin cement-like coating, effectively sealing it from the air. Potted meats were sealed with a layer of butter or lard in milder climates.

Larding and oiling perform a function similar to waxing. Applying a thin coating of oil or other grease that will not go rancid seals the product from the air and greatly reduces the risk of mold growth. Oiling is not as effective against drying because the oil tends to dry which then allows air exposure. This method was used primarily for smoked and salted meats. The meat was larded before sacking, and usually required treatment again during extended storage. Larding is a reasonably effective deterrent to mold but might attract insects.

Spicing or salting the meat before hanging is also done as a deterrent to insects and mold. Strong spices, such as pepper and mustard seed, are generally used, because of their repellent qualities. These spices also perform better at inhibiting mold growth. The meat is usually dredged in the cracked or very coarsely ground spice or spice mixture, then sacked and hung as usual. The usual candidates for spicing are smoked and salted meats. On occasion dried meats are spiced *before* drying to keep insects off during the drying process. Spicing also adds flavor to the meat, especially after it has aged well. Salt packing is the storage of salted meat or fish in crocks or barrels between layers of salt. This storage method is generally used with salted fish and fatty pork products. This is quite effective at preventing both insect attack and mold growth, and it will prevent the fats from going rancid for quite a long while. It is also quite effective at rendering the

meat inedible, especially after extended storage. Salt packing can extend the shelf life of salt cured meats by years.

Wet Storage

Wet storage refers to the storage of preserved food in a liquid medium at room temperature. This storage method is used for a very wide variety of preserved foods, including several preserved meats and fish. Both salted and smoked meats were stored in liquids.

Brine storage is immersing the preserved food in a strong salt solution. The product must be fully immersed. Storage in brine was usually reserved for brined or salted meats. Foods stored in brine could last for several years, and would not dry out as much as those packed in salt. These foods would still suffer from too much salt content after extended storage, rendering them as inedible as those packed in salt dry. Storing meat in brine requires some maintenance. Because the container is not sealed the brine might turn rancid after a time. To prevent this, and to redistribute the meat within the solution, the meat is unpacked, the brine boiled and strained, and replenished if necessary, and the meat is repacked in the brine. This is also done at any sign of mold or off odor.

Oiling and larding are processes that seal the preserved food from contact with the air. Smaller pieces of salted or smoked seafood or meat were immersed in a variety of oils or covered with melted lard or butter. The oil or lard should completely cover the preserved food, leaving *no* air pockets. This would allow trapped microorganisms to multiply and start spoilage. Jars and crocks of oil stored foods were often also sealed with a piece of leather or waxed cloth tied close about the opening, or the opening was plugged with a piece of cork. Later bottles and jars were available with a close fitting lid or stopper. Smoked and salted foods stored in oil often lasted for years, and were usually still quite edible after lengthy storage. This is very similar in concept to sealing as previously discussed.

Preserved foods stored in a pickle are usually stored in a strong vinegar solution. When completely immersed these foods are also sealed from contact with the air. Foods to be stored in this manner are usually pickled first, and then simply left in the pickling solution for storage. Often the container was sealed for storage. Preserved foods stored in a pickling solution will often remain in good eating condition for years.

How Do I Do This

OK, here goes. If you try this, and someone gets sick or worse, I am not responsible. The author will assume no liability for any failure when using any of the food preservation, or storage techniques outlined. All responsibility falls to the person performing the preservation and storage.

Salting

Most red meat, pork, fowl, game and fish can be successfully salt cured. Red meat and pork can be either dry salted or brined. Fowl is usually brined, and fish is usually dry salted. Salt curing meat and fish must be done during cool temperatures or under refrigeration. If the temperature gets too high there is a great risk of spoilage, and if the temperature gets too low the curing process is suspended. The optimal temperature for curing with salt is between 35° F and 45° F. Temperatures lower than 32° F or higher than 50° F should be avoided.

A basic curing salt can be made with 1 pound of pickling or kosher salt and a teaspoon of saltpeter. Do not use table salt, iodized or otherwise. The smaller granules tend to impede the flow of moisture out of the meat, and the ability of the meat to assume salt. The saltpeter can be omitted but shelf life and product color may suffer. This cure may be directly applied to the meat or mixed into a quart of water to make brine. Sugar cures can be made by replacing up to ¼ of the salt with about twice as much amount of sugar, or brown sugar in dry cures. Liquid sweeteners, such as honey, molasses, or maple syrup can be used to make sweet cure brines. Be careful not to replace too much salt. This can lead to improper curing and spoilage. Many herbs and spices can be added to cures and brines. These additions can add considerable flavor to the preserved meat, but have little effect on the quality of the cure.

Although the cure itself remains mostly unchanged, the process and curing time vary greatly depending on the food being cured and the size of the pieces. As a general rule, fish, less fatty fowl, and game will cure in shorter periods of time; fowl containing more fat will finish next; less fatty meats like beef and lamb will take somewhat longer; and fatty meats like pork take longest to cure. There is very little difference in the curing time required for dry curing versus brining.

To dry cure fish, scale but do not skin the fish and split or fillet the fish. If the fish is split remove the backbone except enough near the tail to provide some rigidity. Lay the fish skin side down on a bed of salt about ½” deep. Cover this layer of fish with ½” of salt. Place the next layer of fish skin side up on top of the first. Cover this layer of fish with ½” of salt. This is continued until all of the fish have been added to the stack. Fillets ½ inch thick will cure in 6 to 10 days. Thicker fillets will take longer; about 1-2 days per ½ inch. Fillets greater than 1½ inches should not be dry cured due to the greater risk of spoilage. Dry cured fish is normally packed in salt or dried for storage.

Brining fish takes a little more attention. Make the brine using the basic salt cure. Prepare the fish as for dry curing. Put the fish in the brine, leaving plenty of space. If the fish floats to the surface, place sufficient weight on the fish to force it under the curing brine. Curing times are about the same as dry curing. The brine should be agitated daily to ensure that all of the fish is properly exposed to the brine. Brine cured fish can be stored as dry cured fish. It is not advised to store the fish in brine, but brined fish can be stored in oil after the surface has dried completely. It will become mushy in time. Most brine-cured fish will eventually be smoked.

Dry salt curing pork, beef, or other red meats works best for larger cuts of meat such as pork hams or shoulders, lamb leg, or ¼ round beef roast, but can be used for smaller cuts also. Avoid trying to cure pieces too large because they may spoil before curing is complete. Dry curing meat requires about a cup to a cup and a half of curing salt per pound of meat. Rub each piece with about ½ of the salt required for that piece of meat. Place the meat in a cool dry place well protected from insects and animals for 4-5 days, and not touching the walls of the container or other pieces of meat. After this time rub the meat with the remaining cure mixture and replace. If the pieces are very large, greater than 7" at the smallest part, rub with an additional ½ pound of cure after 5 days. If boneless the meat should cure for 5 days per inch of breadth at the narrowest part, or 7 days per inch if the meat contains a bone. Rinse off the excess salt with fresh water, allow to air dry and store.

To cure these meats in brine, make basic brine from your curing mixture, and immerse the meat in the brine. Make sure that the meat is fully immersed in the brine. The meat should remain in the brine for 48 hours per pound, if boneless. If the meat contains bone it should be cured for an additional 12 hours per pound. If multiple pieces are cured in the same container the meat should be removed from the brine and repacked every couple of days to ensure equal coverage by the brine. Curing should be extended by 12 hours per pound in this case also. If the brine should start to turn rancid, remove the meat and rinse in fresh water. Boil the brine to kill the contaminant, replace water lost while boiling, and replenish the brine, if necessary. After the brine has cooled repack the meat in the brine and continue curing. After curing is complete the meat should be rinsed in fresh water and hung to air dry, unless it will be stored in the brine.

The preferred method for salt curing fowl is brining, though dry curing is possible. To brine fowl immerse the bird in sufficient brine to cover completely. Make sure that the body cavity is filled with solution, and that the bird is weighted to keep it under the brine. The bird should remain in the brine for 30-48 hours per pound, depending on the fat on the bird, the strength of the brine solution and whether the meat is to be processed further. Fowl with higher fat content, like duck and goose, will take longer to properly cure because the fat doesn't absorb the curing solution as readily as meat. If fat poultry is improperly cured the fat will soon turn rancid, and the meat will quickly follow. After curing is complete the bird should be rinsed in fresh water and hung to air dry, unless it will be stored in the brine.

Dry salting whole fowl is nearly impossible because of the shape and cavities. If the bird is split or cut up this presents less of a problem. Small birds are better candidates for dry salting. The bird should be rubbed well with curing mix, and laid on a bed of the same mixture. Cure the fowl for about 4 days per inch of meat thickness. Rinse off the excess cure with fresh water, allow to air dry and store. I do not suggest doing this. It is only presented for completeness. If the cure is not well distributed over the entire surface of the meat, it may not cure properly. Because of the unusual shape of cleaned poultry this is usually the case.

Smoking

Meat, fowl, fish, and game to be smoked must be salted sufficiently to at least resist bacterial growth during the smoking process. This is particularly important during cold smoking, which is performed at optimal temperatures for bacterial growth. Often smoked meats are fully cured before smoking. The length of the curing process is determined by the anticipated storage time and often by personal preference and taste. The cure used on the meat will often contain sweeteners, spices and other flavoring agents. The length of smoking time is also a matter of personal preference in many cases. When smoking to cure taste is less of a consideration; the food *must* be smoked sufficiently to deposit the curing agents supplied by the smoke. Smoke cured meats are smoked much more heavily than those produced today for the smoke flavor alone.

Smoke curing is done at low temperatures, 75°F to 120°F. If the temperature gets too high the meat will start to cook and caseharden. This cooks and seals the surface of the meat, and as a result decreases the amount of smoke preserving agents that can be absorbed by the food product. While fully or partially cooking the product while smoking may be the eventual aim, the food must be cured at low temperatures, only after curing is complete should the temperature get high enough to actually cook the food product.

Pork, red meats, and game meats other than fowl should be cold smoked for at least 6 to 24 hours per inch of breadth at the narrowest point. The time per inch in the smoker is dependant upon the density of the smoke and to a degree on personal preference. If the smoke is very dense (meat is nearly obscured by only a six inch curtain of smoke) exposure for 6 hours per inch of meat should be sufficient. However light smoke (the meat is obscured at 2-3 feet) would require 24 hours or more per inch. Animal skin or a thick layer of fat covering most of the meat surface will retard the absorption of the curing agents. Smoking times should be doubled for these meats. A whole, skin covered ham, about 10" across might be in the smokehouse as long as 3 weeks. For normal smoking the surface of the meat should be air dried before smoking is begun. The meat will either be hung in the smoke chamber or laid on a rack, depending on the configuration of the smoking equipment and the cut of meat.

Poultry and game fowl should be cold smoked for 12 to 24 hours per inch of thigh or breast depth, whichever is greater. Fatty birds such as duck and goose should be well cured before smoking because the fat in the meat resists penetration of the curing agents carried in the smoke. Ideally fowl should hang by the wings when smoking. This allows smoke to pass freely through the body cavity, and it allows moisture to drain during smoking. If necessary, fowl can be smoked on a rack lying on their back. If this is the case make sure that the body cavity remains open to allow smoke passage through the cavity, and hang the bird to drain well before storage.

Very little fish is cold smoked; salmon and herring are processed this way. Cold smoked fish is processed between 75°F and 100°F for 4 to 12 hours. The fish must be sufficiently cured to resist spoilage during the smoking process. If the temperature rises above

100°F, the fish will start to cook, and may caseharden. This will retard the smoking process. Unless fully cured cold smoked fish will only keep for several days unless refrigerated. Under refrigeration smoked fish will often keep for 3 weeks or more.

Some fish can be hot smoked at temperatures ranging from 140°F to 180°F. This is usually done with salted herring or a similar fish, or small (under 5") whole fish like anchovy and shiner sardines. This process cooks the fish while smoking. Smoking times and smoke density vary greatly depending on the intended product, but will usually range from 2 hours to 2-3 days. Fish destined for the hot smoker should be fully cured unless it is to be eaten immediately or stored under refrigeration. Most hot smoked fish is intended to be dry stored, sometimes in oil.

A third process for smoking fish, called kippering, involves cold smoking the fish for several hours, then hot smoking for sufficient time to cook, or partially cook, the fish. This is usually done with fatter or oilier fish such as herring, trout, and salmon. Depending on the desired end product and fish being used the fish may be only lightly salted or fully cured. The lightly salted varieties should be eaten immediately, or stored under refrigeration. Fully cured kippers can be dry stored or packed in oil.

Drying

The process of drying for preservation is primarily used for red meats, game meats, sausages, and fish. Some oriental cultures will dry smoked duck and other waterfowl. Unless previously processed meat or fish that will be dried should be cured sufficiently to resist spoilage during the drying process. Because much of the meat to be dried is sliced quite thin curing times are often significantly reduced, often to only hours. Often meats that will be dried are smoked first. Some recipes even call for the product to be cooked before drying.

Meats that will be dried should be cut into strips no more than ½" thick, or cubes about 1" square. The prepared meat should be cured sufficiently to inhibit spoilage during the drying process. Usually 6 to 12 hours is enough. A variety of spices may be added to the cure, depending on the intended use of the dried meat. After curing the meat may be rubbed with additional spice, or smoked, or both before it is dried. Fish should be fully cured before drying.

In dry climates the product can be sun dried. This is not the case for most of us. Alternative methods include oven or commercial food driers, drying in a smoker at low temperatures, and drying near an open flame. Drying times will vary depending on the size of the pieces, and on the drying method chosen.

Sun drying is recommended only for thin slices of meat and fish fillets. Meat should be laid on a rack and placed in the sun. It should remain there until nearly all of the moisture has been removed from the meat. The time will vary according to the relative humidity. If the product must be dried for more than one day take care to protect it from dewfall. When it is done it will be leathery and crack when bent or folded. Fish fillets

should be hung in the sun to dry. Again the time will vary with relative humidity. Fish should be dried *completely*. It will resemble wood when done. In less arid climates oven or smoke drying is the preferred method. Heat the oven or smoker to 100°F to 120°F; place the meat into the oven or smoker on racks, and dry until done as above. Make sure that the oven door is left slightly open or that there is good flow through the smoker to evacuate the moist air. This should take between 12 and 24 hours, depending on whether the meat is sliced or cubed.

Pickling

Pickling is accomplished by soaking the meat in a strong vinegar, honey, or sugar solution. Both acid and sugar have the property of inhibiting bacterial growth. Red meat, fowl, and fish can be successfully pickled. To pickle, the meat should be cut into smaller pieces or sliced, and immersed in the pickling solution. The meat must remain in the solution until it is permeated with either sugars or acids, and should be kept at lower temperatures (35°F to 45°F) until pickling is complete to avoid bacterial contamination. The time required depends on the size of the pieces or thickness of the slices. It may be either raw or cooked, however most pickling receipts call for the meat to be cooked first. Normally, pickled meats are stored in the pickle until used.

When pickling in vinegar, the vinegar should have at least 6% acid content. This is stronger than standard white or cider vinegar. Check the specialty vinegars, or vinegars sold at gourmet shops. Sugar pickles should contain at least 50% sugar by weight. Honey pickles should be 100% honey, with only seasoning agents added. Sugar and honey pickles are not very popular for meats because the flavor of the end product can be somewhat alien to the modern palate.

Using the Preserved Product

Consume As Is

Eat the preserved product without further preparation. This is usually done with dried red meats safe to consume raw, or kippered meat or fish. Most preserved meats used in this manner are intended for such consumption.

Cook As Is

The salted, smoked, or pickled meat can be taken directly from storage into the cooking pot. This will often result in a dish that tastes strongly of salt, smoke or vinegar. Carefully selecting receipts for the use of these meats will help with this problem by providing ingredients that either compliment or hide the flavor left by the preserving process. This also allows for the option of leaving out the ingredients supplied by the preserved meats. (Use pickled meat in a receipt that calls for vinegar or verjuice, and leave out the vinegar.)

Freshen and Cook

This is probably the most common method of using the preserved meat. This involves soaking the meat in fresh water to reconstitute it and to remove some of the salt, vinegar, or smoke resins. The meat should be soaked for 24 to 36 hours, sometimes longer. In some cases the soak is changed several times to keep the water as fresh as possible. This is not for fear that the water would turn, but to attempt to remove as much of the preserving agent as possible. The meat is then used as fresh meat, adjusting the spice as required due to the flavor of remaining preservative. Many dried meats and fish treated in this manner are hard to distinguish from fresh.

What Can Go Wrong

Spoilage / No Guarantee

Remember, **there is no guarantee!** Although these are proven methods, there is no guarantee that any preserved food product will not spoil. Learn to detect spoiled preserved food. In many cases this is difficult due to the odors of the preserving agents. Insufficient treatment and improper storage can both lead to food spoilage. Learn to detect rancid or sour storage brines. Often the meat can still be salvaged. Rinse the meat in fresh water and if it smells good after that, repack it in brine. Boil the brine to kill the infection, and replenish if necessary. Many types of raw meat also carry disease. If the meat was not cooked during the preserving process it is still raw! If cooking is required it should be cooked.

Mold

Many molds will grow on hanging meats. Most are harmless. Mold is usually a result of improper storage, which often cannot be avoided. If hanging salted or smoked meat is found to have molded, the mold can be scrubbed off using a stiff brush and a strong vinegar solution. The meat can then be safely used. I have found this solution to molded, cured meat in both period and modern references. Oiling and larding can retard or prevent mold growth.

Health Risks

In addition to the other problems there can be other risks involved in using preserved meat and fish, depending on the method of preservation. The most obvious risk is the high salt content of salt cure meat. This can be a considerable risk to those with heart disease, arteriosclerosis, or high blood pressure. There is often a high salt content in smoked and dried meat and fish. Many cures include saltpeter or sodium nitrate. This substance is suspect as a carcinogen. Many of the preserving agents in wood smoke, the aldehydes, are suspected as carcinogens also. One of these preserving agents is formaldehyde. Today we can weigh these risks and decide; our ancestors had no choice.

Insects

There are a few insects that will infest or attack preserved meats. Most are deterred by the salt or smoke. Among those that will attack cured meats are the cheese skipper, mites, ham beetle, and larder beetle. The skipper larva bores into meat and cheese leaving slime and rot in the infested area. These are a yellowish color, and are about 1/3" long when fully grown. The two-winged adult fly is about 1/8" long. Mites feed on the surface, giving it a powdery appearance. Since these do not fly, they are usually carried by other insects. Both the adult ham beetle and its larvae bore through cured meat causing rot. The larva is a purple color and about 1/3' long. The adult beetle is a bright green-blue color with red legs and is about 1/4' long. Larder beetle larvae are a fuzzy brown color, and are about 1/3' long when full grown. They feed on the surface or just below, and do not cause the meat to rot. The adult beetle is about 1/3' long and is dark brown with a yellowish band across its back.

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