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# HOMEMADE MEAT, POULTRY, AND GAME SAUSAGES

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**F**or thousands of years, people have prepared meat products similar to today's sausage. Homer spoke glowingly of sausage in the *Odyssey*, saying it was a favorite food of the Greeks. Roman festive occasions were considered incomplete without it. Marco Polo's spice quest (1271–1275) and Christopher Columbus's voyage (1492) in search of a shorter route to the East Indies for spices used in sausage also indicate its popularity.

Some early sausage makers became so adept in spicing and processing sausages of distinctive types that the fame of their products spread throughout Europe. Many of today's sausages bear the name of the city of origin. From Italy comes Milano, Romano, Genoa, Bologna, and Salami. From Frankfurt, Germany, came the frankfurters and from Vienna, Austria, weinerwurst.

Sausage continues to grow in popularity. Sausage can be made by grinding or emulsifying meat, poultry, or game, mixing in salt and other seasonings, and then stuffing into a container or casing. Many meat processors and local custom locker plants make excellent sausages. However, you can make homemade sausages. They are particularly popular among hunters who find that properly handled game, when made into sausage, is palatable and highly nutritious. Making sausages spiced to meet your own preferences is a further incentive to prepare them at home.

## **Types of Sausage**

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There are four broad categories of sausages: fresh sausages, cooked sausages, semi-dry or dry sausages, and specialty meats (luncheon meats).

**Uncooked fresh sausages** are made from fresh ground meat and spices. These are not cooked during manufacture and usually are not cured, which means they do not contain nitrite.

You can store fresh sausages in the refrigerator for up to 3 days, but you must freeze them for longer storage. Examples of fresh sausages are fresh pork sausage, Italian sausage, and some types of bratwurst and bockwurst. You must cook fresh sausages before eating them.

**Cooked sausages** are usually cured with nitrite, heated to an internal temperature of 150°–155°F during processing, and frequently smoked. Cooked sausages require refrigeration. They will keep for at least 2 weeks in unopened vacuum-sealed packages and for 1 week in non-vacuum packages or after you open vacuum-sealed packages. Freeze for longer storage. These sausages can be eaten without heating, but many are heated before serving to enhance their flavor. Examples of cooked sausages include hotdogs and luncheon meats such as bologna, cotto salami, polish sausage, and braunschweiger.

**Semi-dry and dry sausages** are cured and may or may not be smoked. The distinguishing feature of their production is a carefully controlled bacterial fermentation which results in a lower (more acidic) pH and a characteristic tangy flavor. Some of these sausages also undergo a carefully controlled dehydration procedure. Lactic acid-producing bacteria and sugar (dextrose) are added to the meat to assure proper fermentation. Lactic acid formed during the fermentation results in the decreased pH. Dry sausages require drying periods usually ranging from 3 weeks to 3 months

in which both the temperature and humidity are carefully controlled. Therefore, they are quite costly and difficult to make. Many semi-dry sausages, on the other hand, are simply fermented and cooked in a smokehouse. The low pH, low water content and nitrite in dry and semi-dry sausages contribute to their long shelf life. Dry and semi-dry sausages can be stored for several weeks in the refrigerator, but freeze them for long-term storage. Some dry sausages can be stored at room temperature. Check the label on purchased sausages. Examples of semi-dry and dry sausages include summer sausage, Italian salami, pepperoni, Lebanon bologna, cervelat, and some thuringers.

To make dry sausages, both the fermentation and dehydration steps need to be carefully controlled. Proper equipment and knowledge of sausage making are essential to produce these products safely since *Staphylococcus aureus* toxin can be produced if fermentation conditions are not rigidly controlled. Therefore, **home production of dry sausages is not recommended.** Semi-dry sausages can be safely prepared within 24 hours if you use very fresh ingredients, properly handled lactic acid starter culture, and careful temperature control.

Tangy semi-dry sausages can also be produced without fermentation by adding encapsulated lactic acid or citric acid directly to the sausage mixture. Sausages made with encapsulated acids are easier to make, but they may have a slightly different flavor than fermented sausages. Encapsulated acids are recommended for homemade dry or semi-dry sausage.

**Specialty meats** are cured, fully cooked, and occasionally smoked. They are usually cooked in loaf pans or casings. Commercially they are sometimes water-cooked in stainless steel molds. Examples of specialty meats include pickle and pimiento, olive, ham and cheese, and honey loaves, as well as head cheese. These sausages are ready to eat and require refrigeration. Their storage life is similar to that of cooked sausages (7 days when not vacuum packed).

## Using Sausage Making Equipment and Supplies

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You can buy most equipment and supplies required for sausage manufacture from sausage makers' equipment and supply companies, farm and home centers, certain kitchen appliance stores, and mail order outlets. The following items are used for preparing homemade sausage:

### Thermometers

You need an accurate meat thermometer that can measure the coldness of your raw materials and the final internal temperature of cooked sausages. This is essential to produce safe, high quality products. A temperature range of 30°–200°F is required. You also need an oven thermometer to check the smokehouse or oven temperature.

### Meat Grinder

Hand operated and electric powered models are available. The size of grinder plate holes determine the coarseness of the ground product. The most widely used plates for sausage manufacture have 1/2", 3/8", 3/16", or 1/8" holes. The meat grinder should come equipped with attachable stuffing horns. Grinder knives must be kept very sharp and the meat kept very cold (32°F) to prevent product smearing. Meat is usually ground through a 3/8" or 1/2" plate, mixed with salt and other ingredients, and then reground through a 3/16" or 1/8" plate.

## Mixer

You can use a commercial mixer or a home mixer equipped with a flat beater or dough hook. For small batches, clean, sanitized hands can also be used. For good product uniformity, mix sausage products thoroughly (2 to 5 minutes), but overmixing can cause a rubbery finished product.

## Food Processor

You can prepare finely ground or emulsified sausages, such as frankfurters and luncheon meats, with a food processor. The food processor should be equipped with overload protection to prevent the motor from overheating.

## Casings

Casings are used to form the product. The two major kinds of casings are artificial and natural. Artificial casings are used commercially for most types of sausages. Natural casings are not as uniform or as easy to use, so commercially they are used primarily for gourmet sausages. You can buy natural casings, pickled or preserved in dry salt, from a local butcher who makes sausage or from sausage maker supply companies. Artificial casings also are sometimes available from places where sausages are made.

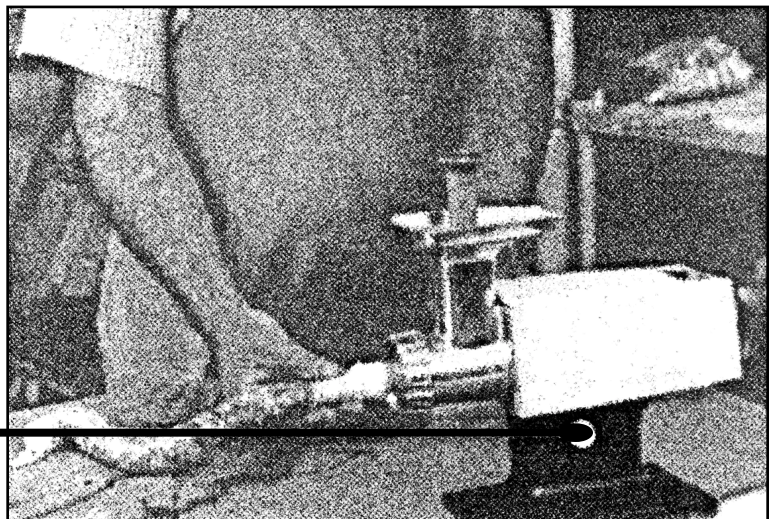
Natural casings preserved in dry salt must first be soaked in lukewarm water before use. Flush each casing by putting the end of the casing over the cold water tap and running cold water through the casing. Unused casings can be drained, covered again with fine salt, and frozen. Soak natural casings which come in a brine, in cold water before use.

Some artificial casings should be soaked in warm tap water (100°F) at least 30 minutes, but not over 4 hours before use. Puncture with a knife point before sausage is stuffed unless the casings are pre-stuck. These holes eliminate air and fat pockets in the finished product.

Most specialty meats are transferred without stuffing to molds or bread pans and cooked as meat loaf. Most cooked sausages and semi-dry sausages can also be cooked in loaf pans, but natural smoking is not very effective in pans.

## Stuffer

You can use a stuffing horn mounted on the grinder head or a piston-type stuffer (i.e., cider press). Or, tightly pack a plastic or stainless steel pipe (2 to 2½" inner diameter) with sausage batter. Use a clean plunger that just fits inside the pipe to force the meat into a casing placed over the opposite end of the pipe.



This small electric grinder is also equipped with a plastic stuffing horn that can be used with hog casings.

## Oven and Smokehouse

If you have a smokehouse, smoke the sausage items with low heat first and then cook to the final temperature in the smokehouse or oven. Several types of smokehouses and smokers can be constructed or purchased for smoking meat.

You can also use a household oven. Place a pan of water in the bottom of the oven to catch drippings and increase humidity. Hand-formed loaves of sausage or sausage stuffed into casings can be placed on oven grates. The oven must be able to maintain a temperature of 185°F.

## Sausage Ingredients

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### Meat

Sausages are most frequently made from pork and beef. However, lamb, veal, goat, chicken, turkey, rabbit, venison, and other game are suitable. Species affects sausage color. Beef and venison sausage are dark red. Sausages that contain veal, chicken, or rabbit are light colored. Sausage flavor is more affected by spices than by the kind of meat used. All fat is often removed from game meat, and pork fat added for proper texture and juiciness. Always use meats that are as microbiologically fresh as possible. Before grinding, the meat should be as close to freezing as possible (30°–32°F) to prevent fat smearing.



Meat for sausage should come from carcasses that have been chilled to an internal temperature below 40°F within 24 hours after death. It should also be free from dirt, hair, and bloodshot. Sausage quality is often directly related to the freshness of the meat used. Therefore, sausage trimmings should be removed from the carcass (one day post-mortem is best), chilled to 32°F, and made into sausage or frozen as soon as possible. Properly frozen meat works well for sausage. After thawing under refrigeration or in a plastic bag placed in cold water, make it into sausage as quickly as possible.

Freezing meat before it is made into sausage is usually effective in killing parasites sometimes found in meat. However, trichinae in bear meat may not be destroyed by freezing,

so fully cook bear meat. Meat (particularly pork) that will be made into products that will not be fully cooked should be frozen for the length of time listed below to destroy trichinae:

Temperature of Freezer	For Pieces of Meat 6" Thick or Less	For Pieces of Meat Between 6" and 27"
F	Days	Days
5°	20	30
-10°	10	20
-20°	6	12

Use lean meat from any part of the carcass. However, meat from the back and hind legs of large animal carcasses is generally saved for roasts and steaks. Boneless, fat-free lean from the remainder of the carcass is ideal for sausage. Do not age meat to be used in sausage; remove it from the carcass prior to aging. Sausage is often made from poultry legs, thighs, and wings, but breast meat also works well.

### Water

Water may be added to a sausage formulation to rehydrate nonfat dry milk and other extenders and to replace anticipated moisture loss during cooking and smoking. Water helps make the product juicier and in emulsion products, works with the salt to solubilize proteins for binding fat. Approximately 10% water may be added to cooked sausages and 3% to uncooked fresh sausages. For low-fat sausages, you can add up to 20% water, if .3% phosphate is also added.

### Salt

Salt adds flavor to sausages and helps inhibit spoilage. Salt also helps solubilize the proteins at the surface of meat particles. These soluble proteins can entrap fat, bind water, and on cooking, bind the meat particles together. This stabilizes the sausage so fat does not form large pockets called fat caps, and also gives the sausage its proper "bite." Most sausages contain 2–3% salt, but you can lower this level to 1<sup>1</sup>/<sub>2</sub>–2% salt if phosphate is used.

### Sugars

Several types of sugar are used in sausage production, primarily to provide flavor and to counteract the harshness of the salt. Glucose (dextrose) is required for fermented sausages because some fermentation bacteria require simple sugars to produce lactic acid.

### Phosphates

Phosphates are often added to sausage to increase water binding capacity and juiciness of the meat, to solubilize proteins, and to inhibit oxidative rancidity. About 1/3 pound of phosphates are added to 100 pounds of sausage. You sometimes can purchase phosphates from small commercial sausage makers.

## Spices

You can buy commercial premixed spices to season most sausages. Local meat processors or butcher supply houses normally sell commercial premixed spices for various sausage items. You can also buy spices individually. Buy fresh spices in quantities that you will use in one year. The color and flavor of herbs and spices deteriorate over time. If spices are over one year old, use 30 to 50% more spice than is called for in the recipe.

## Nitrite (*cure*)

Nitrite produces the characteristic color, flavor, and storage stability of cured meats. Nitrite provides protection against food poisoning and also inhibits rancidity in cured meats. Fresh sausages which do not contain nitrites are much more perishable than cured meats. Sausages which do not contain nitrite will be brown, not red or pink after processing. Nitrite is used in very small quantities in cured meats, and overdoses can be harmful. Since it is difficult to accurately weigh the small quantities needed, it is necessary to use a preblended commercial curing mix.

The cure mentioned in several of the following recipes is a *commercial* cure containing 6.25% sodium nitrite. Sometimes you can buy commercial cures, such as Modern Cure™ or Prague Powder™ from small commercial sausage makers.

You can buy *complete* cures, such as Morton's Tender Quick Curing Salt™, at some grocery stores or locker plants. Follow the instructions on the container if you use *complete* cures. They are added at much higher levels than commercial cures (containing 6.25% nitrite) because they often contain only .5% nitrite. *Complete* cures also often replace most of the salt and sugar called for in sausage recipes.

## Reducing Agents

Sodium erythorbate or ascorbic acid (vitamin C) enhance proper color development and stability and help inhibit rancidity.

## Binders and Extenders

Sausages may contain additional ingredients such as binders to retain natural juices and extenders to reduce the cost of the formulation. Nonfat dry milk, cereal flours, and soy protein are the most frequently used binders and extenders.

## Lactic Acid-Producing Bacteria and Encapsulated Acids

Lactic acid starter cultures are available commercially in either frozen or freeze-dried forms. Both forms produce acceptable results, but need to be stored properly and used according to manufacturer directions. Small quantities of cultures for home use may be available from a local sausage maker. You can make "tangy" imitation fermented products by substituting encapsulated lactic acid or citric acid for the starter culture. Use these according to manufacturer directions. It is important to add these encapsulated acids after the final grinding step. Mix the acids in at the end of the mixing period and then stuff and cook the sausage immediately. If the encapsulated acids are ground or the meat mixture gets too warm before stuffing, the acid will escape into the meat too soon and make the sausage mushy and mealy. For safety and convenience reasons, encapsulated acids are recommended for home production of semi-dry sausages.



## Making Sausage

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Read the desired sausage recipes well in advance to be certain you have all needed ingredients and equipment. Home sausage makers have successfully prepared the sausages described in the following recipes. Recipes give brief descriptions of procedures. For more detailed descriptions about equipment use and ingredients, read the equipment and ingredient sections. The recipes can be used for lean meat, poultry, or game which has been trimmed of fat. If the meat contains visible fat, you may need to reduce the amount of fat in the recipes.

The seasoning used in these sausages can be altered to suit individual tastes. Many consumers think, for example, 14 g monosodium glutamate (MSG) per 25-pound batch improves the flavor of these products.

### Sausage Recipes

The following abbreviations are used in the recipes:

<b>c</b>	= cup(s) oz
<b>g</b>	= gram(s) (there are 28 g in an oz)
<b>h</b>	= hour(s)
<b>lb</b>	= pound(s)
<b>min</b>	= minute(s)
<b>oz</b>	= ounce(s)
<b>pt</b>	= pint(s)
<b>qt</b>	= quart(s)
<b>tbsp</b>	= tablespoon(s)
<b>tsp</b>	= teaspoon(s)

### *Fresh Sausage*

18 lb	lean meat
7 lb	pork or beef fat*
3/4 c (8 oz or 227 g)	salt
6 tbsp (42 g)	ground black pepper
5 tbsp (14 g)	rubbed sage

\*Pork fat is preferred in this and in subsequent recipes, but beef fat is usually easier to purchase.

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Season by sprinkling the ingredients over the meat and mixing thoroughly.
- Grind through a 3/16-inch plate.
- Sausage can be frozen in packages, made into patties, or stuffed into hog casings.

This recipe produces a mild sausage. For a more highly seasoned sausage, increase the amount of pepper and add additional seasoning (example: 1 tbsp nutmeg, 1 tbsp ginger, 1 tbsp mace).

If you want a leaner sausage, replace some of the pork or beef fat with an equal amount of lean meat. Adding up to 1<sup>1</sup>/<sub>2</sub> c of water will improve the tenderness and eating quality of leaner sausages.

## ***Fresh Thuringer***

20 lb	lean meat
5 lb	pork or beef fat
4 tbsp (56 g)	sugar
1 qt (2 lb)	cold water
3/4 c (8 oz or 227 g)	salt
3/4 c (79 g)	ground white pepper
5 tsp (7 g)	powdered mustard
2 tbsp (31 g)	commercial cure (6.25% nitrite)
1.5 tsp (6 g)	sodium erythorbate or ascorbate

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Sprinkle ingredients over meat and mix.
- Grind through a 1/4-inch plate while adding water and then re grind through a 3/16-inch plate.
- Mix 6 minutes, stuff into hog casings and link.
- Cook thuringer in 170°F water or in a 185°F smokehouse until internal sausage temperature is 152°F.
- Chill to an internal temperature of 100°F in cold water.
- Hang at room temperature until surface is dry (about 1/2 hour) and then refrigerate or freeze.

Thuringer can also be served hot right out of the 170°F water or smokehouse. Liquid smoke (1 to 2 oz diluted with a pint of water) is sometimes added to replace the application of natural smoke. Add the diluted liquid smoke at the end of the 6-minute mixing period.

## ***Liver Sausage***

12.5 lb	liver
7 lb	lean meat
2.5 lb	pork or beef fat
3 lb	bacon end pieces
1.5 lb	fresh onions
2 1/4 c (13 oz or 370 g)	nonfat dry milk
7/8 c (9 oz or 255 g)	salt
6 tbsp (42 g)	ground white pepper
2 tbsp (31 g)	commercial cure (6.25% nitrite)
1.5 tsp (6 g)	sodium erythorbate or ascorbate

- Fry liver until it is about half-cooked.
- Grind liver, lean, and fat through a coarse (1/2-inch) plate.
- Chop onions and season by sprinkling ingredients over the meat and mixing.
- Grind through a 1/8-inch plate.
- Mix 6 minutes and stuff into natural casings or artificial casings 2 to 3 inches in diameter.
- Cook in water at 170°F or in a 185°F smokehouse until internal temperature of sausage reaches 152°F.
- Immediately place sausage in cold water until internal temperature of sausage is 100°F.
- Rinse briefly in hot water to remove grease.
- Hang at room temperature until surface is dry (about 1/2 hour).
- Move to refrigerator.

## ***Cotto (Cooked) Salami***

19 lb	lean meat
6 lb	pork or beef fat
1 c (10.5 oz or 298 g)	salt
1/2 c (110 g)	sugar
1 qt (2 lb)	cold water
2 <sup>1</sup> / <sub>3</sub> c (14 oz or 397 g)	nonfat dried milk
5 tbsp (35 g)	ground black pepper*
3 tbsp (13 g)	garlic powder
3 tbsp (14 g)	coriander seed
4 tsp (7 g)	ground mace
4 tsp (7 g)	ground cardamon
2 tbsp (31 g)	commercial cure (6.25% nitrite)
1.5 tsp (6 g)	sodium erythorbate or ascorbate

\*Whole pepper, if added in place of ground pepper, must be mixed in after the meat has been ground for the last time.

- Cut meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Sprinkle ingredients over meat and mix.
- Grind through a 3/16-inch plate.
- Mix 6 minutes and stuff into natural or artificial casings 2 to 3 inches in diameter.
- Place in a smokehouse and heat at 185°F until internal sausage temperature reaches 152°F.
- Move to a cold water bath until internal temperature reaches 100°F.
- Rinse briefly with hot water to remove grease and hang sausage at room temperature until surface is dry (about 1/2 hour) before refrigeration.
- Cool salami overnight in a refrigerator before cutting.

Salami can be roasted in casings in a 185°F oven if you do not have a smokehouse. For flavor, you can add 1 to 2 oz of liquid smoke diluted in 1 pint of water per 25 lb of product at the end of the 6-minute mixing period. Follow the above chilling procedures.

Another alternative is to roast salami without casings. Mix the above ingredients 6 minutes and form rolls 2 to 3 inches in diameter and 10 inches long. If you wish, sprinkle diluted liquid smoke (1 part to 5 parts water) over the roasts. Place rolls on a broiler rack with 1/2 inch water in the pan underneath and bake in a 185°F oven until internal temperature reaches 152°F. Cool in cold water until internal temperature reaches 100°F and refrigerate overnight before slicing.

## **Polish Sausage**

19 lb	lean meat
6 lb	pork or beef fat
2 c (12 oz or 340 g)	nonfat dry milk
1 c (10.5 oz or 298 g)	salt
1/2 c (110 g)	sugar
2 qts (4 lb)	cold water
5 tbsp (35 g)	ground black pepper
3 tbsp (14 g)	coriander
3 tbsp (13 g)	garlic powder
4 tsp (7 g)	onion powder
2 tbsp (31 g)	commercial cure (6.25% nitrite)
1.5 tsp (6 g)	sodium erythorbate or ascorbate

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Sprinkle ingredients over the meat and mix.
- Grind through a 1/4-inch plate while adding water and then regrind through a 3/16-inch plate.
- Mix 6 minutes and stuff into hog casings.
- Place in a smokehouse and heat at 185°F until sausage has a smoked color and internal temperature reaches 152°F.
- Immediately place sausage in cold water until internal temperature is 100°F.
- Rinse briefly with hot water to remove grease.
- Hang at room temperature until the surface is dry (about 1/2 hour).
- Move to refrigerator.

## **Bockwurst**

19 lb lean meat (poultry breast, veal, rabbit, or pork will give the characteristic pale color)	
6 lb	pork or beef fat
2 c (12 oz or 340 g)	nonfat dry milk
3/4 c (8 oz or 227 g)	salt
2 qts (4 lb)	water
3	eggs
2 tbsp (28 g)	sugar
5 tbsp (28 g)	onion powder
4 tbsp (26.4 g)	ground white pepper
1 tbsp (5.4 g)	ground mace
1 tbsp (4.8 g)	ground ginger

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Sprinkle ingredients over meat and mix.
- Grind through a 3/16-inch plate.
- Mix 6 minutes and stuff into hog casings.
- Cook in water at 170°F or at 185°F in smokehouse until internal temperature of the sausage reaches 152°F.
- Immediately place sausage in cold water until internal temperature is 100°F.
- Rinse briefly with hot water to remove grease.
- Hang at room temperature until surface is dry (about 1/2 hour).
- Move to refrigerator.

**Note:** If desired, this product may be cooked from the fresh state without first heating in 170°F water.

### **Country Style Bologna\***

21 lb	lean meat
4 lb	pork fat
2.5 pt (2.5 lb)	cold water
1 c (10 oz or 298 g)	salt
2 1/3 c (14 oz or 397 g)	nonfat dried milk
3 tbsp (42 g)	sugar
10 tsp (15 g)	ground coriander
6 tbsp (42 g)	ground white pepper
1 tbsp (7 g)	onion powder
2 tsp (4 g)	ground allspice
2 tbsp (31 g)	commercial cure (6.25% nitrite) dissolved in 1 pt (1 lb) of additional cold water
1.5 tsp (6 g)	sodium erythorbate or ascorbate

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Sprinkle ingredients over meat, mix, and regrind through a 3/16-inch plate.
- Mix 6 minutes and stuff into large diameter artificial or natural casings.
- Hang sausage in a 185°F smokehouse until internal temperature reaches 152°F.
- Remove sausage from smokehouse and immediately place in cold water until the internal temperature is 100°F.
- Hang sausage at room temperature until surface is dry (about 1/2 hour) and then refrigerate.

\*You can make frankfurters using this recipe. The only difference is that frankfurters are stuffed into small casings.

### **Summer Sausage**

21 lb	lean meat
4 lb	pork or beef fat
3 lb	water
.9 c (9.5 oz or 270 g)	salt
1/2 c (4 oz or 112 g)	sugar
5 tbsp (35 g)	pepper
4 tbsp (28 g)	mustard seed
2 tbsp (14 g)	nutmeg
2 tbsp (31 g)	commercial cure (6.25% nitrite)
1.5 tsp (6 g)	sodium erythorbate or ascorbate

Encapsulated lactic acid or citric acid as specified by manufacturer.

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate.
- Mix in all ingredients except the encapsulated acid and regrind through a 3/16-inch plate.
- Mix for 4 minutes and add encapsulated acid.
- Mix 2 more minutes and stuff into artificial or natural casings.
- Immediately smoke and cook sausage in a 170°F smokehouse until internal temperature reaches 150°F.
- Remove sausage from smokehouse and immediately place in cold water until internal temperature is 100°F.
- Hang sausage at room temperature until surface is dry (about 1/2 hour) and then refrigerate.

## **Pepperoni**

22 lb	lean meat
3 lb	pork fat
1 1/3 c (14 oz or 397 g)	salt
6 tbsp (3 oz or 84 g)	sugar
3/4 c (75 g)	ground red pepper
3/4 c (64 g)	ground allspice
1 tbsp (5 g)	garlic powder
3 tbsp (17 g)	fennel seed
2 tbsp (11 g)	anise seed
4 tbsp (20 g)	ground paprika
2 tbsp (31 g)	commercial cure (6.25% nitrite)
1.5 tsp (6 g)	sodium erythorbate or ascorbate

Encapsulated lactic acid or citric acid as specified by manufacturer.

- Cut lean meat and fat into 1-inch squares or grind through a coarse (1/2-inch) plate, and mix in all ingredients except the encapsulated acid.
- Regrind through a 3/16-inch plate.
- Mix for 4 minutes and add encapsulated acid.
- Mix 2 more minutes and stuff into artificial or natural casings.
- Immediately smoke and cook sausage in a 170°F smokehouse until internal temperature reaches 150°F.
- Remove sausage from smokehouse and immediately place it in cold water until the internal temperature is 100°F.
- Hang sausage at room temperature until surface is dry (about 1/2 hour) and then refrigerate.

This semi-dry pepperoni will work well on homemade pizza.

## Storage

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You should have excellent products when you remove your sausage from the smokehouse, water cooker, or oven, but improper chilling or storage can ruin both the flavor and safety of your masterpiece. As with all cured meats, place sausages in a container that will minimize exposure to air because cured meats are susceptible to rancidity.

All recipes described in this bulletin yield sausages that require refrigeration at 40°F or below. Some commercial dry fermented sausages can be stored at room temperature (read the label), but the eating quality of these dry sausages will also be better maintained with colder storage temperatures. The maximum recommended refrigerator storage times are:

- 3 days for fresh sausages
- 1 week for non-vacuum packaged cooked sausages and specialty meats
- 2 weeks for vacuum packaged cooked sausages and specialty meats
- 3–4 weeks for properly fermented dry and semi-dry sausages

Freeze properly packaged, cured, and smoked sausage at 0°F for storage up to 6 months. A moisture vapor proof bag is essential for maintaining quality during long-term frozen storage.

## Safety Tips

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1. Keep your equipment, hands, and working surfaces clean and properly sanitized. Use a solution of 1 tablespoon chlorine bleach to 1 gallon of cool water as a sanitizer. It is especially important to clean equipment, hands, and work surfaces that have been in contact with raw meat before you use them for cooked sausages.
2. Use meats and non-meat ingredients that are very fresh and have been properly handled.
3. All recipes in this bulletin call for final internal temperatures that will destroy trichinae. We do not recommend preparing homemade sausages that are not fully cooked. If you do prepare them, be sure the meat, especially pork, has been properly frozen to destroy trichinae and other parasites. Do not eat bear meat that has not been thoroughly cooked, because the trichinae in bear meat may survive the freezing process.
4. Use a meat thermometer to help insure meat is kept cold before cooking and sausage is properly cooked.
5. Cool the sausage quickly after cooking and keep in the refrigerator for short-term storage or freezer for long-term storage.

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