



FACT SHEET

Department of Animal Science, University of Connecticut

HOME SAUSAGE MAKING

SECOND EDITION

By

I. J. Ehr, T. L. Tronsky
D.R. Rice, D. M. Kinsman
C. Faustman

Department of Animal Science
University of Connecticut

Storrs, Connecticut 06268

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Introduction

From antiquity to the present, man has searched for methods of preserving and extending his food supply. The oldest method of preservation is salting. In 830 B.C., Homer wrote about smoking and salting meats in *The Odyssey*. Different types of sausage were created all over the world, and each region developed their own distinctive style of sausage influenced by the availability of local ingredients, spices, and casings. Climate was another important factor for the development of region-specific fresh and dry sausages.

Regions with distinct seasons used different techniques to preserve meat. In the cold seasons, fresh sausage was able to keep for short periods of time without refrigeration. The smoking process was developed to preserve sausages during the warmer seasons. Dry sausage, which does not require any refrigeration, was created in warmer regions. Some sausages became associated with their country or city of origin. A good example is Bologna, which originated in the town of Bologna in Northern Italy (All About Sausage, 2004). Almost every culture has created its own characteristic type of sausage. Even the Native Americans created sausages made from a wide variety of meats and berries (Basic Sausage-Making, 2004). Any meat which has been changed from its original form (e.g. minced) and seasoned is considered sausage.

Of all the various processed meats, sausage is the most appetizing and widely utilized. The word “sausage” is derived from the Latin word *salsus*, which means salted. A sausage is any salted, ground meat, and there are many different types of sausages produced in the United States. There are six basic categories of sausage:

1) Fresh Sausages - made from ground meats which are seasoned and stuffed into casings, or left in bulk form. Fresh sausage is not cured or smoked; it must be fully cooked before eating. Examples: pork breakfast sausage; Italian; bulk pork sausage.

2) Cooked Sausages - made from meats which are ground, seasoned, often cured, stuffed into casings, and cooked. No smoke is used. Cooked sausages are often served cold. Examples: braunschweiger; liverwurst; liver cheese.

3) Cooked, Smoked Sausages - made from meats which are ground, seasoned, stuffed into casings, smoked and cooked. These can be eaten cold or reheated. Examples: bologna; berliner; cotto-salami; frankfurters.

4) Uncooked, Smoked Sausages - made from meats which are ground, seasoned, stuffed into casings, and smoked. These must be fully cooked before eating. Examples: some kielbasas, mettwurst; teawurst; smoked country-style pork sausage.

5) Dry and Semi-dry Sausages - made from meats which are ground, seasoned, cured, stuffed into casings, fermented, often smoked, and carefully air-dried; true dry sausages are not cooked. These sausages have a distinctive tangy flavor due to the presence of lactic acid that is produced by fermentation. The meat is stuffed into casings and allowed to “ferment,” the process by which bacteria metabolize sugars and produce acids and other compounds as by-products. In meat fermentation, bacteria which produce lactic acid are utilized to produce the tangy flavor of dry sausages. They are sometimes referred to as “summer sausages” and eaten cold. Examples: pepperoni; German salami, Lebanon bologna, Genoa salami; thuringer; cervelat.

6) Specialty Sausages - this is a diverse category that may contain cured, uncured, smoked, and non-smoked meats that do not readily “fit” into the other categories. They are seasoned and often formed into loaves. Examples: olive loaf; head cheese; jellied corned beef; scrapple; souse.

This booklet is a second edition of a publication originally authored under the same title by D. R. Rice and D. M. Kinsman. It includes sections on equipment, sanitation, ingredients, casings, game meat, and recipes that should be helpful during your adventure in home sausage making.

Equipment

Sausage can be made in your own home with only a few items of equipment. The three most important pieces of equipment are a thermometer, scale, and a meat grinder. A smokehouse and a food chopper are needed to make emulsion type cooked sausages, such as frankfurters.

An accurate thermometer is necessary for ensuring that raw meat ingredients do not exceed 40° F, and for making cooked sausages. Cooking should be sufficient to “pasteurize” the product which means raising the internal product temperature to a point where pathogens are killed. This allows the meat to be eaten safely. As sausage diameters may vary, sausage cooking must be regulated by temperature and not by time. Most sausages are considered fully cooked when they reach an internal temperature of 160° F.

A properly calibrated scale is the second most important item in sausage making. The scale should be calibrated in ounces or grams. There are 28 grams in one ounce, and 454 grams in one pound. The proper ratio of beef to pork, or of lean meat to fat, is specific to certain types of sausage. To assure a consistent blend, keep records of what you like and dislike about each recipe.

A meat grinder is used to reduce the particle size of the meat. It consists of a screw auger, a four- or five- bladed knife, and a plate containing numerous holes (see Fig. 1 and Fig. 3). Plates with larger or smaller holes can be used to vary the final texture of the sausage. A plate with a 1/4, 3/8 or 1/2-inch holes produces a coarse grind, while 1/8 or 3/16-inch holes produce a fine grind. Use only sharp knives with plates. Dull equipment produces excessive heat, which can “render” or melt the fat and produce a “smearly” product. Some grinders can be fitted with a “stuffing horn,” and thus also function as a sausage stuffer (see Fig. 3).

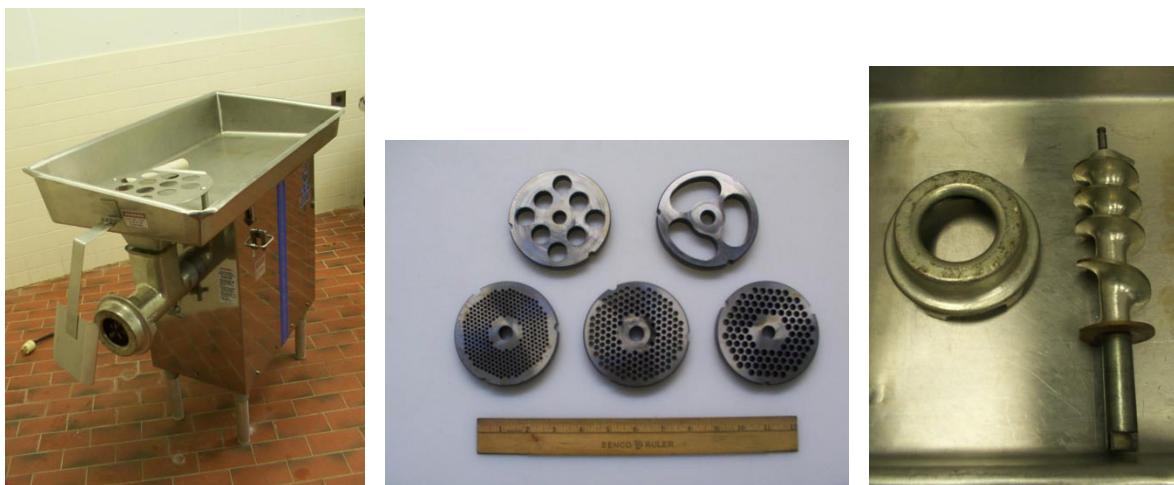


Figure 1. From left to right: meat grinder, grinding plates, and screw auger with cap.

A food chopper or "silent cutter" is used to produce finely-ground, emulsified sausages, such as frankfurters, bologna, and some loaf products. It can also be used as a grinder to produce coarser sausages by minimizing the length of time that the meat is chopped. A chopper cuts meat by utilizing high-speed rotating blades and a bowl which also rotates (see Fig.2). The high-speed blades cut the meat with less friction and heat production than a conventional meat grinder. The chopper can emulsify meat by continuing to chop until the product reaches batter-like consistency. Temperature control is important during emulsifying. The batter must warm (through friction) enough to allow microscopic fat particles to be encapsulated by the meat proteins. The temperature should be

monitored while emulsifying batters to achieve an optimum ending temperature of approximately 63° F. Table-top bowl choppers are available for home use, but can be expensive.



Figure 2. A bowl chopper that holds approximately 26 lbs. of meat.

If you plan on encasing sausages, you can consider buying a sausage stuffer. Many small meat grinders are capable of supporting a small stuffing horn (see Fig. 3). The most common home sausage stuffer is the piston type. Piston stuffers (see Fig. 5) will stuff fast with fewer air pockets than hand-operated, screw-type stuffers. Stuffers are convenient and versatile, but not essential in making home sausages. If you do not have a stuffer, you can make cooked sausages in loaf pans, or form the meat into patties.



Figure 3. From left to right: home sausage grinder/stuffer (electric mixer with grinder/stuffing horn attachments), a natural intestine casing being stuffed, and links being tied off.



Figure 4. From left to right: front of hand crank stuffer, profile of hand crank stuffer, and stuffing horns.



Figure 5. From left to right: front of automatic stuffer, profile of automatic stuffer, and automatic stuffer with its table.

Smoking sausages adds flavor, helps to protect against off-flavor development from oxidation, and aids in preservation of the meat (Kramlich et al., 1973). Smoking is accomplished by the slow burning of sawdust or woodchips. Color and flavor of smoked sausages are influenced by wood type and ventilation. Only hardwoods such as hickory, apple and alder should be used. The sawdust can be slightly moistened to prevent flare-ups which wastes wood and can cause ash to be blown onto the sausage. The smoke density is controlled by the dampness of the sawdust and by controlling the outlet or exhaust damper. Temperature control is important so as to avoid under- or over-heating; in general, each product has its own optimum temperature processing schedule.

Sanitation

Strict sanitation and proper handling of meat are very important in sausage making. The main danger in handling raw meat is bacterial contamination and food borne illness (Basic Sausage-Making, 2004). To prevent the spread of pathogenic bacteria, the preparation area must be cleaned before and after processing sausages. Wash all surfaces that are going to be used with antibacterial soap and dilute chlorine bleach (10:1; water:chlorine bleach). Applying pressure with vigorous scrubbing greatly improves the removal of grease and other unwanted contaminants from a preparation surface. Keep surface areas clear of foreign objects so that they do not get accidentally mixed into the meat (Curing and Smoking, 1982). Utensils and hands should be washed thoroughly using antibacterial soap. Any rings and other jewelry should be removed prior to sausage-making (Basic Sausage-Making 2004). Once your preparation area is clean and sanitary you can begin making sausages.

USDA Inspected and Passed Meat, or meat from your own home-slaughtered animals are good sources of raw material. The meat should have a typical bright color with no off-odors or “slime.” “Life begins at 40!” so keep all meat, raw and finished product, refrigerated below 40° F. The “**3-Cs**” is a helpful way of remembering the rules of sanitation. Keep it **clean** (disinfect surfaces), **cold** (below 40° F.), and **covered** (prevent exposure to foreign materials)!

Bacteria grow best between 40°F to 140° F. When cooking or cooling meat (for cooked sausages), make sure the product temperature passes through this range quickly. During meat processing, cooked sausages should have a final internal temperature of 160° F as this effectively kills pathogenic bacteria. Pans of water can be placed near the sausages to provide humidity and prevent over drying (Meat Science and Meat Sense, 2004). Once cooked, the sausages must be cooled quickly or pathogenic bacteria that “land” on the product during subsequent handling will have the opportunity to grow.

Once a sausage is finished, its shelf-life is limited. It should be stored under refrigerated or frozen conditions to minimize bacterial growth. When refrigerated, fresh and uncooked sausages can be kept for a few days. Hard/dry and summer sausages can be kept up to three weeks. Cooked sausages can be kept for approximately one week (Safe Handling of Sausage and Hot Dogs, 1999). Due to the high perishability of sausages, never consume sausage that has a putrid smell, or is slimy. As the old saying goes “when in doubt, throw it out.”

Ingredients, Additives, and Spices

An ingredient is a component of a recipe that is added in a specific quantity. Most ingredients may be purchased at local supermarkets or meat markets. Unless it comes from your own livestock or game, only USDA inspected meat should be used in your sausage products. Homegrown or custom meat should come from healthy, disease-free livestock. Certain cuts of meat, generally of lower economic value, are suggested for sausage making and these are specified in the recipes section.

Non-meat ingredients are used to impart flavor, slow bacterial growth and increase the yield of the sausage. These include water, salt, sugar, nonfat dry milk, extenders and binders, and spices.

Water and ice are added to provide moisture and keep the sausage cold. Cold temperature delays microbial growth and also ensures a better final product texture. Ice and water can also be added to increase the yield of sausage, but there are upper limits for wholesale or retail marketing. Water also aids in dissolving salt to facilitate its distribution within the meat. Texture and tenderness of the finished sausages are markedly affected by added water content (Pearson and Gillet, 1996).

Salt is an ingredient that is always used in sausage products. Technically, it is the only non-meat substance required for a product to be considered a sausage. Salt serves three functions in the meat. It lowers the amount of available water (which allows for preservation or shelf-life extension), extracts the meat myofibrillar proteins needed to make the product bind and to emulsify fat, and for flavor enhancement (Meat Board, 1991). In general, salt is added at a concentration of 1% to 2% (w/w) of the total sausage batter weight.

Sugar is used for flavor and to counter the slight bitter taste of salt. It is also added as a medium (food) for the microbial fermentation process used to reduce the pH of dry and semi-dry sausages (e.g. pepperoni). The lactic acid produced by fermentation of the sugar (usually dextrose) reduces the meat pH and gives these sausages their characteristic tangy flavor (Meat Board, 1991).

Additives can be included in sausage products but under strict conditions and legal limits. They are used to impact the color, minimize rancidity or to inhibit microbial growth. Examples of these are sodium nitrite, phosphates, sodium ascorbate, and sodium erythorbate.

Sodium nitrite is used for curing meat. It inhibits the growth of a number of pathogenic and spoilage microorganisms, most importantly *Clostridium botulinum*. It is also used to retard the development of rancidity, stabilize color of lean meat and to contribute to the flavor of cured meat (Meat Board, 1991). It is usually manufactured as a pink colored salt (to distinguish it from normal sodium chloride salt) that can be purchased from ingredient suppliers as “Quick Cure” or “Rapid Cure.” It is highly undesirable to add too little or too much nitrite to sausage. Closely follow the manufacturer’s directions when using nitrites.

Ascorbates and erythorbates are chemicals used interchangeably in cured sausages to which nitrite has been added. They are active reducing agents that react with nitrite to accelerate the curing process. Ascorbate is derived from ascorbic acid (i.e. vitamin C).

Milk-protein derived extenders are used widely in processed meat products. These include nonfat dry milk, dried whey, and buttermilk solids and are added to improve binding qualities, flavor,

cooking yields and slicing characteristics. They also help to stabilize meat emulsion products such as bologna and frankfurters.

Spices and seasonings are added for flavor. They may be added as whole seeds, coarsely ground, powdered, or in the form of oleoresin. Oleoresins are derived by solvent extraction of spices (Kramilch et.al, 1973). They contain volatile and nonvolatile fractions of the spices and therefore are considered more complete than essential oils. Several companies produce spice blends that can be added to a batch of meat for the production of specific sausages. This makes home sausage making easier because large numbers of individual spices do not need to be purchased. Health food stores and food co-ops are excellent places to purchase individual spices at reasonable prices.

Table 1. Spices Used in Processed Meats

Common Name	Form	Teaspoons/ Ounce	Usage
Allspice	Whole, Ground	14	Bologna, pickled pigs feet, head cheese
Anise	Seed	14.5	Dry Sausages, mortdella, pepperoni
Basil	Leaves	35 leaves	Pickled and jellied meats
Bay	Leaves	136 leaves	Pickle for pigs feet, lamb tongue
Caraway	Seed	9.5	Semi-dry sausages, meat loaves, luncheon meat
Cardamom	Seed-whole Ground	14.5	Frankfurters, liver sausage, head cheese, semi-dry sausages
Cassia	N/A	N/A	Bologna, blood sausage
Celery	Seeds, flakes, salt	14	Pork Sausage, Frankfurters, bologna, meat loaves, lunch meats
Cinnamon	Stick, Ground	17.5	Bologna, head cheese
Cloves	Whole, Ground	14.5	Bologna, liver sausage, head cheese
Coriander	Seed, Ground	14	Frankfurters, bologna, polish sausage, luncheon specialties
Cumin	Seed, Ground	14	Curry Powder
Fennel	Seed	14	Italian sausage
Garlic	Powder, Salt, Minced	N/A	Polish sausage, many smoked sausage types
Ginger	Whole, ground	14	Pork Sausage, Frankfurters, corned beef
Mace	Ground	14	Veal Sausage, Liver sausage, frankfurters

Common Name	Form	Teaspoons/ Ounce	Usage
Marjoram	Leaves	19.5	Liver sausage, polish sausage, head cheese
Mustard	Seed, powdered	14.5	Good in almost any sausage
Nutmeg	Whole ground	12.75	Veal sausage, bologna, frankfurters, liver sausage, head cheese
Onion	Chopped, Powdered, Salt, flakes, granulated	N/A	Liver sausage, head cheese, baked loaves
Oregano	Leaves, ground	26	Frankfurters, bologna, meat loaves, luncheon
Paprika	Ground	13.5	Frankfurters, Mexican sausage, dry sausage
Pepper (black, white)	Whole, ground (fine, coarse)	15.25, 13.25	Most Sausage Products
Pimento	N/A	N/A	Baked loaves
Rosemary	Leaves	35	Liver sausage
Sage	Leaves, rubbed, ground	22	Pork sausage, baked loaves
Savory	Leaves, ground	18.75	Good in almost any sausage
Thyme	Leaves, Ground	20.25	Good in almost any sausage
Turmeric	Ground	12	Good in almost any sausage

Salt: 2 tablespoons per oz.

Sugar: 2.5 Tablespoons per oz.

General Conversions:

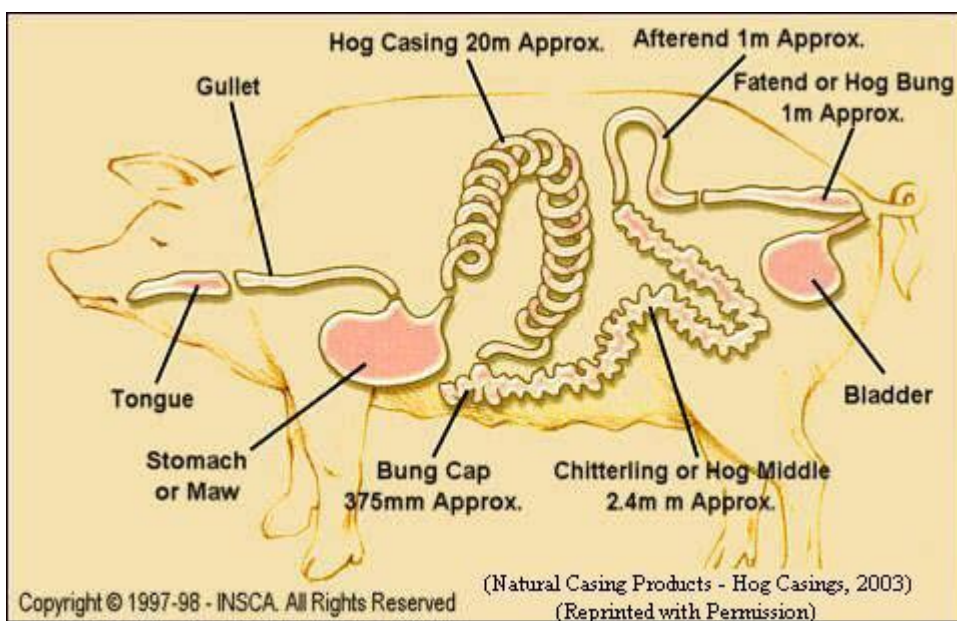
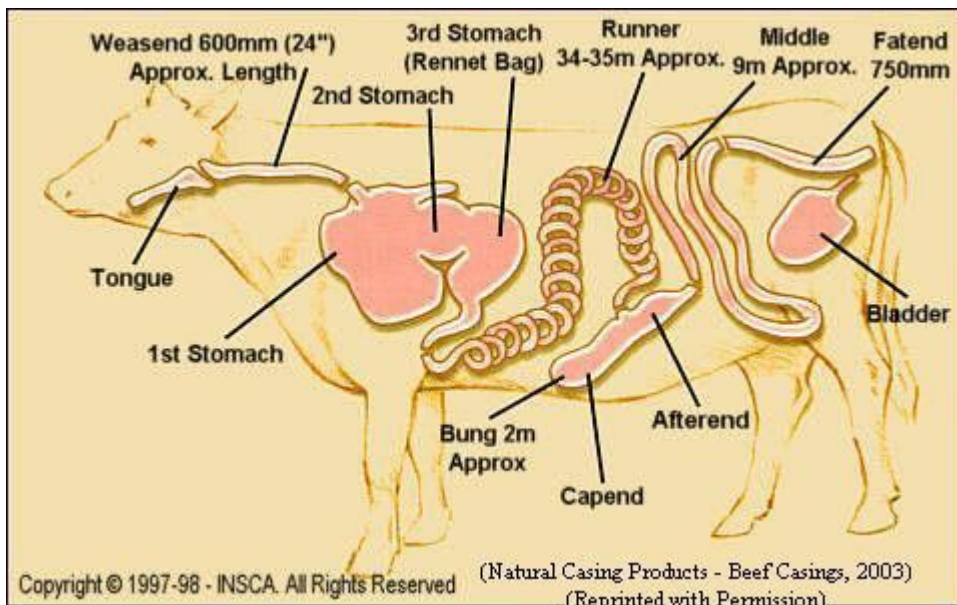
28 grams per 1 ounce

454 grams per 1 pound

16 ounces per pound

Casings

After the meat has been chopped or ground, it is formed into patties or placed into a container. The containers, such as pans for loaves and casings for links, will hold their shape during cooking. Traditional sausage casings are made from parts of the alimentary canal of various animals. These natural casings are largely made up of collagen which has the unique characteristic of variable permeability. Moisture and heat make casings more porous and tend to soften them. Natural casings readily permit smoke penetration and do not contribute any undesirable flavors. Sausage made from natural casings have a “snap” when bitten into that is considered a desirable sensory characteristic (A Brief History of Natural Casings, 2003). When stuffed, natural casing sausages have a characteristic curved shape. Natural casings are readily purchased from local meat markets.



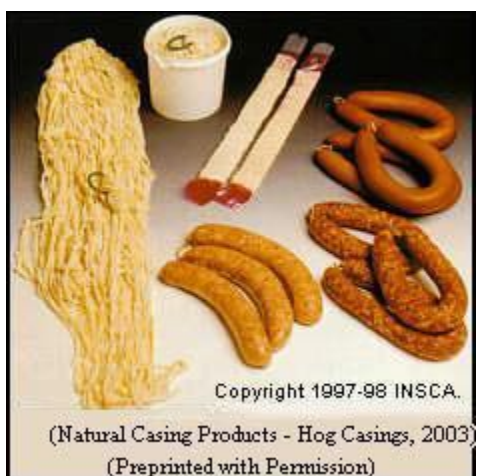
Natural casings are usually obtained from hogs, beef cattle and sheep. There are five classifications of hog casings: bungs, middles, smalls, stomachs, bladders. Bungs and middles are generally used for liver sausage. Middles are used for dry sausage. Small casings are used for fresh sausage, bockwurst, Polish sausage, frankfurters, and chorizos. Head cheese is generally stuffed into stomachs. Bladders are used for minced luncheon meats. Small hog casings (i.e. from the small intestine) are probably the most widely used and easiest to find at a local meat shop.

Similar to the hog, almost the entire beef gastrointestinal tract can be used. Beef rounds are the most common of all beef casings. Rounds are

used for ring bologna, holsteiner, and mettwurst. Commercial sausage makers often use “sewed-casings.” Sewed casings are obtained from two natural casings that are slit, matched up, and stitched together. This increases the uniformity and strength of the casings. The intestines of sheep are used mainly for frankfurters and pork breakfast sausage.

Each type of casing can be stored for a reasonable length of time if salted in a controlled, refrigerated environment. All natural casings need to be prepared before use. The casings should be rinsed thoroughly in lukewarm water to remove salt before using. Dried middles, bladders and similar casings should be softened by soaking in warm water.

The alternatives to natural casings are synthetic casings made from edible or inedible materials. The three most common types of synthetic casings are collagen, cellulose, and artificial casings. Collagen casings are made from the gelatinous substance found in the connective tissue, bones and cartilage of all mammals. The substance is harvested from the animals and



reconstructed in the form of a paper-like edible casing. Cellulose casings are made from solubilized cotton linters, the short fibers that adhere to cottonseed (All About Sausage, 2004). The interior surface of the cellulose casings can contain a water soluble dye which colors the sausage surface during heat processing (Small-Scale Sausage Production, 1985). Briefly (e.g. 30 minutes) submerging cellulose casings in room temperature water can facilitate the stuffing process. They are uniform, very strong, and generally used for slicing-sausages such as salami. Skinless hotdogs are made with this form of inedible casing; the casing is removed after smoke processing and before consumption. Artificial, inedible casings are made from plastics and do not require refrigeration. Artificial casings are used by commercial producers and can be made in different colors. For example some manufacturers use red casings for bologna, clear casings for some salami and white casings for liverwurst (All About Sausage, 2004). Artificial casings' strength and uniformity are similar to cellulose.

Synthetic casings are more consistent in diameter throughout their length, have a higher tensile strength than natural casings, and are cost effective for large manufacturers. They can be stored for longer periods of time and require less preparation prior to use.

There are four steps to prepare natural casings so that they can be stuffed (A Brief History of Natural Casings, 2003):

- 1) 1) Remove casings from their bag. Leave them tied together and carefully rinse with fresh water, being careful not to tangle them.
- 2) 2) Lay the casings on a table or in a clean sink and stretch them out to avoid tangling.
- 3) 3) Separate the casings one by one, being careful not to knot them. After a casing is separated, take an open end and slide it on the end of a sink faucet (like a water balloon). Gently run some water into the casing and turn off the faucet. Wind the casing on your hand as the water works its way to the open end. Repeat this step so the casing is flushed twice.
- 4) 4) Place flushed casings in a container of fresh water until you are ready to use them; avoid letting them dry out. This water should be warmer to render a little of the natural fat in the casing. This will help to allow the casing to slide on the stuffing horn more readily.

Mail order sources for casings and sausage equipment (All About Sausages, 2004):

- • Stuffers Supply Company (Will ship to USA)
22958 Fraser Highway
Langley, British Columbia, V2Z 2T9 Canada
Tel: 604-534-7374
Fax: 604-534-3089
Email: bleathem@telus.net
Web-site: <http://www.stuffers.com>
- • Eldon's Jerky and Sausage Supply
022 Main Street box 422
Kooskia, Idaho 83539 USA
Order Toll Free 24 Hours: 1-800-352-9453
Customer Service: 1-208-926-4949
Fax: 1-208-926-4383
Email: eldonsausage@cybrquest.com
Web-site: <http://www.eldonsausage.com>
- • Syracuse Casing Co. INC.

528 Erie Blvd. W.
Syracuse, NY 13204 USA
Phone (315)475-0309
Fax (315)475-8536
Email: makincasin@aol.com
Web-site: <http://www.northamericanhogcasing.emerchantpro.com>

- • The Sausage Maker, Inc.
1500 Clinton St, Bldg 123
Buffalo, NY 14206-3099 USA
Order Toll Free 24 Hours: (888)490-8525
Customer Service: (716)824-5814
Fax: (716)824-6465
Email: customerservice@sausagemaker.com
Web-site: <http://www.sausagemaker.com>

Game Meat

Sausages can be made with almost any kind of meat. The majority of sausage recipes use pork and beef. Game meats can be substituted for pork or beef in any sausage recipe to create a unique and original flavor. For example, meat from deer, wild boar, wild fowl, and bear can be used to make sausage. It is very important that the meat is handled properly after the animal is killed. The animal should be dressed as soon as possible and the meat kept cold (under 40° F). Quick, proper dressing and refrigeration will limit bacterial growth and reduce the chance of getting a food borne illness (Cutter, 2000).

Normally, game meat is aged after it is dressed to increase tenderness, but this is not necessary for sausage making. The meat will be processed in a grinder and it will be tenderized and broken down mechanically (Cutter, 2000). Sausage making is a great way of using less tender cuts and trim pieces.

Game meat is processed the same way as pork or beef, except for the fat. All external fat should be removed prior to grinding. The majority of “gamey” flavor comes from fat, not the meat. However, a sausage made without any fat will be dry and unpalatable. Thus, pork/pork fat (not salted pork fat) is often added with game meat when grinding. It is common to use pork shoulder butt as a source of fat for game sausages. The sausage should have 15 to 20 percent fat content to achieve a desirable texture and flavor. Different blends of meats and fat percentages will affect the final product and you will need to experiment with these over time to find what you like best. Sausage made from game meat offers an interesting and unique experience for home sausage makers.

Recipes

Fresh Pork Breakfast Sausage: this is a fresh pork product that is mildly seasoned.

Pork Trim	25 lbs
Salt	196 g (7 oz)
White Pepper	40 g (1.4 oz)
Sage	15 g (0.5 oz)
Nutmeg	8 g (0.28 oz)
Mace	8 g (0.28 oz)

With a meat grinder, grind the trimmings through a 1/2 inch coarse plate. Thoroughly mix the meat with seasoning. Grind it again through a 3/8 inch fine plate. The sausage can then be made into patties or stuffed into an 18-22mm sheep casing or hog middle. Refrigerate or freeze the sausage until used.

Fresh Italian Sausage: this is a fresh pork product that is highly seasoned and cooked thoroughly.

Pork	25 lbs
Salt	224 g (8 oz)
Black Pepper-Coarse	28 g (1 oz)
Fennel seed-whole	42 g (1.5 oz)
*Paprika	14 g (0.5 oz)
*Crushed Red Pepper	42 g (1.5 oz)
*Garlic Powder	28 g (1 oz)
*For Sweet Italian sausage, do not add red pepper, paprika or garlic.	

It is recommended to use fresh pork shoulder butts for this sausage. If shoulder butts are not available, then lean pork trim can be used.

Coarse grind the pork. Add the appropriate amount of seasoning based on meat weight. Mix extremely well. Your hands should become uncomfortably cold while hand mixing. The very cold feeling is an indicator that the meat is at the proper mixing temperature. Fine grind the meat after it has been mixed. Stuff the meat into natural (30-32mm hog intestine) or artificial casings.

Bratwurst: This German sausage is of a pork, or pork and veal mixture, mildly seasoned, and typically made into links of hot dog length.

Pork	25 lbs
Salt	227 g (8.1 oz)
Sugar	56 g (2 oz)
Ice	500 g (17.8 oz)
Nonfat Dry Milk	227 g (8.1 oz)
Fresh onion	227 g (8.1 oz)
Black Pepper	42 g (1.5 oz)
Lemon Juice	15 ml
Allspice	2 g (0.07 oz)
Celery Seed	20 g (0.7 oz)

Coarse grind the pork. Add the appropriate amount of seasoning based on meat weight. Mix extremely well. Your hands should become uncomfortably cold while hand mixing. The very cold feeling is an indicator that the meat is at the proper mixing temperature. Fine grind the meat after it has been mixed. Stuff the meat into natural (30-32mm hog intestine) or artificial casings.

Polish Sausage: This sausage is made with coarse ground lean pork with beef. It is highly seasoned with garlic, and is frequently referred to as Kielbasa, which is a polish word for sausage.

75% pork, 25% beef	Total of 25 lbs
Salt	250 g (8.9 oz)
Sugar	112 g (4 oz)
Ice	600 g (21.4 oz)
Pepper	35 g (1.25 oz)
Mustard Seed	21 g (0.75 oz)
Marjoram	14 g (0.5 oz)
Garlic Powder	21 g (0.75 oz)
Nutmeg	14 g (0.5 oz)
Nonfat Dry Milk	300 g (10.7 oz)
Curing salt	28 g (1 oz)
Sodium erythorbate	8 g (0.29 oz)

Coarse grind and mix the pork and beef well. Add and mix salt, seasoning, and curing salt. Then fine grind the meat. Stuff the sausage into natural or artificial casings. Process in a smokehouse until the internal temperature is 180 ° F.

Frankfurters: This sausage originated in Frankfurt, Germany, and can be a combination of beef and pork, all pork, or all beef. They are cured, smoked and normally served hot. Frankfurters are also called “wieners” or “hot dogs.” Their size ranges from large dinner frankfurters to tiny cocktail franks. They may be skinless or with natural casings.

60 % beef, 40% pork	Total of 25 lbs
Salt	227 g (8.1 oz)
Sugar	49 g (1.75 oz)
Ice	1800 g (64.2 oz, 4 lbs)
Ground White Pepper	35 g (1.25 oz)
Ground Mustard	7 g (0.25 oz)
Ground Coriander	21 g (0.75 oz)
Ground Nutmeg	14 g (0.5 oz)
Curing salt	28 g (1 oz)
Sodium Erythorbate	6 g (0.21 oz)

Coarse grind and mix the pork and beef well. Add and mix salt, seasoning, and curing salt. Then fine grind the meat; if possible, use a bowl chopper. Stuff the sausage into natural or artificial casings. Process in a smokehouse until the internal temperature is 180 ° F.

Bologna: This sausage originated in Bologna, Italy. It is made of finely ground beef and pork. It contains seasoning similar to frankfurters and is stuffed into natural or artificial casings of varying diameters.

Pork Trim	30 lbs
Beef trim	20 lbs
Ice	12.5 lbs
Dry Skim Milk	2 lbs
Salt	1 lb, 168 g(6 oz)
Sugar	0.5 lb
White Pepper	28 g (1 oz)
Coriander	14 g (0.5 oz)
Mace	14 g (0.5 oz)
Curing Salt	56 g (2 oz)
<i>Sodium Erythorbate</i>	12 g (0.43 oz)

Coarse grind and mix the pork and beef well. Add and mix salt, seasoning, and curing salt. Then fine grind the meat. Stuff, and smoke-cook to an internal temperature of 160°F.

Snack Sticks: These are a highly seasoned product often prepared in narrow diameter casings.

Fatty Pork Trim	12.5 lbs
Lean Beef Trim	12.5 lbs
Cold water or ice	2 lbs
Salt	290 g (10.3 oz)
Dextrose	142 g (5.07 oz)
Ground Red Pepper	35 g (1.25 oz)
Anise Seed	21 g (0.75 oz)
Garlic Powder	9.5 g (0.35 oz)
Nutmeg	4 g (0.14 oz)
Curing salt	28 g (1 oz)
Sodium erythorbate	6 g (0.21 oz))
Starter Culture	Follow directions on the culture for 25 lbs of meat

Grind the meat through a coarse plate. Mix the ingredients and meat in a mixer. Grind the meat and ingredients through a fine plate. Then stuff the meat into 19 mm or 21 mm edible collagen casings. Smoke and cook.

Chicago Bear Sausage: This is a fresh sausage using bear meat. It is heavily seasoned with garlic and is mixed with pork for flavor (Wild Game Sausage Recipes 2004).

Bear Meat	20 lbs
Pork Butt	8 lbs
Thick Slab Bacon	2 lbs
Red Pepper	4 tsp
Garlic Salt	10 tsp
Black Pepper	5 tsp

Coarse grind the meat and mix well. Add the spices and grind the mixture again. Make sure the all of the ingredients are mixed thoroughly before stuffing into casings.

Caribou Sausage: This fresh sausage uses caribou meat which is flavored with a variety of spices (Wild Game Sausage Recipes 2004).

Caribou	15 lbs
Fresh Pork Butt	5 lbs
Ice	3 oz
Black Pepper	1 oz
Ground Ginger	¾ oz
Nutmeg	1 ¼ oz
Allspice	½ oz
Coriander	½ oz
Paprika	2 oz
Garlic Powder	2 tsp
Salt	10 oz

Grind the two meats and mix them thoroughly. Once the two meats are mixed, add the ice, spices, and mix thoroughly. Stuff the mix into casings and form links approximately six to eight inches in length.

Venison Sausage: Venison is a very popular meat source for game sausage. The following recipe uses venison meat specifically, but venison can be substituted (be sure to add some pork or beef for fat) for the meat source of almost any recipe (Venison Sausage Recipes 1998).

Venison	10 lbs
Beef	5 lbs
Pork	5 lbs
Coarse Ground Pepper	10 tsp
Ice	5.2 lbs
Garlic Powder	5 tsp
Marjoram	5 tsp
Mustard Seed	10 tbs

Coarse grind the meat and mix well. Add the spices, ice, and grind the mixture again. Make sure that all of the ingredients are mixed thoroughly before stuffing into casings.

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