

CHAPTER 18 : SAUSAGE

Sausage is any meat that has been comminuted and seasoned. Comminuted means diced, ground, chopped, emulsified or otherwise reduced to minute particles by mechanical means.

A simple definition of sausage would be *'the coarse or finely comminuted meat product prepared from one or more kind of meat or meat by-products, containing various amounts of water, usually seasoned and frequently cured.'* In simplest terms, sausage is ground meat that has been salted for preservation and seasoned to taste. Sausage is one of the oldest forms of charcuterie, and is made almost all over the world in some form or the other. Many sausage recipes and concepts have brought fame to cities and their people. Frankfurters from Frankfurt in Germany, Weiner from Vienna in Austria and Bologna from the town of Bologna in Italy. are all very famous. There are over 1200 varieties world wide

Sausage consists of two parts:

- the casing
- the filling

THE CASING

Casings are of vital importance in sausage making. Their primary function is that of a holder for the meat mixture. They also have a major effect on the mouth feel (if edible) and appearance. The variety of casings available is broad.

These include: **natural, collagen, fibrous cellulose and protein lined fibrous cellulose.** Some casings are edible and are meant to be eaten with the sausage. Other casings are non edible and are peeled away before eating.

NATURAL CASINGS:

These are made from the intestines of animals such as hogs, pigs, wild boar, cattle and sheep. The intestine is a very long organ and is ideal for a casing of the sausage. The intestines are flushed clean, especially from the inside and soaked in a solution of KMNO₄ for a period of 2 hours at 10°C. Sinews, blood vessels and fat clinging to the insides of the casing must be removed. Natural casings should not be over handled as they may puncture. They should be refrigerated at all times. Natural casings are available in Australia, New Zealand, and South America where cattle are reared on a very large scale. Casings are a by-product of the meat industry that is what these countries specialize in.

Use of natural casings is considered by many professional sausage makers to have many advantages:

- They are semi porous and permit deeper smoke penetration.
- Natural casings absorb flavors and release fats better
- Generally, they hold their shape better and do not burst during cooking.
- Natural casings are edible and need not be peeled before eating.
- They have a natural color and have a better appearance.

Hogs casings are the most commonly used. Sheep casings are the highest quality available. Beef casings are also popular. Almost all casings are salted before they are packed. Natural casings need to be protected from extreme variations in temperature. The ideal storage temperature is 40-45°F

COLLAGEN CASINGS:

These are edible and are not synthetic casings. They are made from the hide of cattle. Collagen is obtained from the *corium layer* that is situated just under the skin of the animal. The fat, flesh and hair are removed from the hide and it is split into two layers by special equipment. The hair side of the hide is used in the leather industry. The flesh side (corium) is used to make collagen casings. The material is first ground, and then swelled in an acidic medium. It is then sieved, filtered and finally extruded into casings.

The advantages of collagen casings are that they can be manufactured in the sizes that you require, both diameter and length. Their consistent diameter means that they are uniform and aid portion control. They are also stronger and

are preferred while using machines in the commercial manufacture of sausages. They are ideal for smoking of sausages and require no special pre preparation and storage. Moreover, they are clean and sanitary.

FIBROUS CELLULOSE CASINGS

These are by - products of the food processing industry. Cellulose and fiber is extracted from the husk, skin, peels, pips and seeds of the fruit and vegetables during the processing stage. These are processed further to make casings. These types of casings are also referred to as *peel-able cellulose*. The fiber adds to the strength of the casing and enables them to handle high temperatures.

PROTEIN LINED FIBROUS CELLULOSE CASINGS

A protein lining is often added to the inside of the above type of casing. These casings are ideal for the dried sausages. The protein lining causes the casing to shrink as the meat is cooked or dried so that it retains the shape of the sausage. Used mainly for dry or semi-dry sausages, they come in a red color (salami) or clear. They need to be soaked in water before stuffing, as the protein tends to stiffen during storage. Sometimes, the casing needs to be soaked in vinegar or even liquid smoke. This makes it easier to peel off the casing when the finished product is sliced.

Besides these, there are some other types of casings that are also used in the sausage making industry. *Plastic casings* have recently become popular. They are cheaper, stronger and uniform in size. However, they need to be removed before the product is served. *Caul fat*, a membrane like lining of the stomach, is also used as a casing to make the flat sausages, *crepinette*. The membrane is networked like a spider web, with streaks of fat. Caul fat is ideal to wrap items of uneven sizes like the *loukanika* (patty like Greek sausage) and the crepinette.

THE FILLING

The filling of the sausage is made up of two parts:

- The meat component
- the non meat component

Meat Component:

A variety of meats are used in the sausage making industry. Each type provides a particular flavor, texture and color in the product.

Lean meats make up the largest proportion of the meat component providing the dominant character of the product. The color, flavor, texture and appearance of the product are determined by these meats. Pork is by far the most common and popular meat used in sausage making. Beef is also becoming popular of late, because of its excellent binding properties as well as its deep red color. Veal, lamb and poultry are also being used in certain products of late.

Pork fat adds to the taste, flavor and the texture of the forcemeat. Jowl fat is the most commonly used product in charcuterie. It is obtained from the cheek of the animal. Normally, not more than 30% of the forcemeat is fat.

Variety meats are the offal of the carcass and can be added into the forcemeat in the production of sausage. Variety meats used include heart, kidney, tripe, liver and tongue. These meats have a low binding power and if a lot of them are added into the forcemeat, you would require additional binders in the mixture.

NON MEAT COMPONENT:

Non meat ingredients are food item, which are added to the filling before stuffing. They enhance the flavor and the color, slow or prevent bacteria growth, act as a preservative and increase the volume and bulk of the mixture. There are

six types of these additives: water, curing agents, curing accelerators, sensory enhancers, stability enhancers, and extenders and binders.

WATER is usually added to the sausage mixture during the blending stage. It improved the mixing and helps to extract the proteins from the meat. It is used in all sausage mixtures.

CURING AGENTS are necessary to inhibit the growth of bacteria (especially *clostridium botulinum* - an anaerobic bacteria which can cause death) and improve the shelf life. They also help to improve, fix and retain the color of the forcemeat. The two common curing agents are sodium nitrate and nitrite. Nitrite is used in cured, cooked or smoked products. Nitrate is used in dried sausages.

CURING ACCELERATORS such as ascorbic acid, sodium erythorbate and citric acid are used in cured, cooked and fermented products. As their name suggests, they speed up the curing process.

SENSORY ENHANCERS are a variety of items that are used to enhance the flavor, smell, color, feel and mouthfeel.

Salt is used in all sausage products for the enhancement of flavor and as an aid in the extraction of protein from the meats.

Sweeteners (both nutritive and non-nutritive) are often added to the forcemeat. Non nutritive sweeteners such as saccharin and sorbitol add sweetness and aid in peeling. Nutritive sweeteners such as cane or beet sugar, dextrose and corn syrup are also used.

Flavorings for sausage include spices, plant, vegetable and milk protein, yeast extract and even mustard flour. These add flavor, taste, increase the volume and act as binders. Colorings for sausage meat can be natural as well as artificial. Artificial colors are used a lot in sausage production. Chefs do not recommend these. Natural colors can be obtained from red peppers, saffron, turmeric and caramel. These will add not only color but also flavor. The use of natural colors is recommended wherever possible.

Smoke, both natural and liquid smoke contribute to the taste and flavor of the product. Use of too much liquid smoke will tend to make the product bitter. Liquid smoke also tends to fade on storage.

Flavor enhancers are products, which bring out the flavor of the other ingredients, yet have no flavor of their own. The one most commonly used in the kitchen is *MSG*, mono sodium glutamate. This is a natural product but must be used sparingly. *MSG* and nucleotides and other flavor enhancers are often used in mass production of sausage but are not widely used or common.

Other sensory enhancers include bacterial cultures, enzymes, phosphates and acidulants. They serve a variety of purposes including flavoring, softening of the tissues, juice retention and are used only in the mass commercial production of sausages and not in the hotel kitchens.

STABILITY ENHANCERS are used in sausage making to protect the flavor of the product, to slow down mold growth and to extend and bind the product.

EXTENDERS AND BINDERS are usually either animal based, fermentation based and cereal grain based. Gelatin, stock and non - fat dry milk are the animal based ones used most often in the kitchen. Fermentation based extenders and binders involve the introduction of specified types of microorganisms into the forcemeat. As these grow, they create favorable changes in the sausage. Cereal grain based ones include oats, wheat, barley, corn and rye. These products are also used to extend the volume - this is often termed as the filler. These items are far more popular in the commercial mass production of sausage rather than in specialized kitchen preparations.

TYPES OF FILLINGS USED FOR SAUSAGES

There are primarily four types of fillings that are used in the production of sausages.

1. Coarse minced forcemeat - This forcemeat contains tender and lean meat as well as fat in the mixture. The ratio is normally 3 parts of meat to one part of fat. The mixture is coarsely ground and the proportion gives optimum quality. Only good grade of meat and fat is used, as the mixture is easily identifiable. Salami is a good example of this type of a filling.
2. Cutter pulverized forcemeat - All types of sausage containing finely ground forcemeat including frankfurters and cocktail sausages come under this group. 5 parts of meat and 3 parts of fat are the normal ratio. Second grades of meat can be utilized, as they are not identifiable, being ground into a fine mixture. Meats from older carcasses can also be used.
3. Combination forcemeats - are a mixture of the above two types. One part of coarse forcemeat and two parts of cutter pulverized forcemeat are normally use. Pepperoni and chippolatas are examples of sausages that use this type of a forcemeat. Both good and inferior quality of meat can be used. This makes it more commercially viable as well.
4. Chunky forcemeat - In this type of a filling, the meat and fat are left in chunks. Three parts of meat to 1 part of fat are used. This type of a filling is used for the spicy South American sausages like the chorizo, which have predominant Portuguese and Spanish influence. The meat and the fat are dried before the are filled into the casing.

Once the forcemeat is prepared, it is ready for filling into the casing. It may be done manually or, a sausage filler may be used. A sausage filler is a machine something like a mincing machine, which has a nozzle with changeable diameters. The rolled up casing is fitted onto the nozzle and the machine is started. The casing then un - rolls as it fills up. A stapling machine cum stapler then separates the sausages into links and seals the ends. Heat treatment is used in the sealing process.

Besides meat, which is the traditional filling, nowadays a host of other ingredients are also used. Poultry seafood, vegetables, lentils and soybean are being introduced.

There are five varieties of sausages that are available in the commercial market.

- Fresh sausage (e.g.: Brokwurst)
- Cooked sausage (Mortadella)
- Cooked-smoked sausage (Bologna, Frankfurters, Berliners)
- Uncooked-smoked sausage (Kielbasa - the Polish sausage, Mettwurst)
- Dry/semi dry sausage (Salami)

SOME FAMOUS SAUSAGES:

1. ANDOUILLETTE French sausage made of pork, tripe and calf mesentery.
2. BERLINER from Berlin, made of pork and beef, flavored with salt and Sugar
3. BIERSCHENKEN a German sausage containing ham or ham fat + peppercorns and pistachio
4. BIERWURST a German beef and pork sausage flecked with fat and smoked.
5. BLACKPUDDING/BLOOD SAUSAGE there are many versions of this sausage or pudding, made out of pigs blood. The British one has oatmeal. The German version is called *Blutwurst* and the French one is known as *Boudin Noir*. The Spanish call it *Morcilla*, the Irish *Drisheen* and the Italians, *Birardo*. They are usually sliced and sold.
6. BOCKWURST a delicately flavored, highly perishable German white sausage consisting of fresh pork and veal, chopped chives parsley, egg and milk.
7. BOLOGNA There are a number of versions of this popular Italian sausage. It usually has a mixture of smoked pork and beef. The English version is called *Polony*.
8. BOUDIN BLANC unlike *boudin noir*, this is a fresh sausage, made of pork, eggs, cream and seasoning
9. BRATWURST a German sausage made of minced pork / veal and spiced.
10. BUTIFARA a Spanish pork sausage flavored with garlic and spices - comes from the Catalanian region of Spain.

11. **Cambridge** an English sausage made from pork and flavored with herbs and spices.
12. **CERVELAT** the name originated from the Latin word for brains. Nowadays it contains pork and is seasoned with garlic
13. **CHORIZO** is a Spanish and South American spicy sausage made of pork and uses small casings. Some Chorizos are fresh but others are dried or smoked. *Longaniza* is a Portuguese version.
14. **CREPINETTE** a general term for a small minced meat sausage - some contain lamb; others pork. They are coated with breadcrumbs and fried.
15. **CUMBERLAND SAUSAGE** an English sausage made of coarsely minced pork with pepper.
16. **EXTRAWURST** a lightly smoked beef/pork sausage from Germany.
17. **FRANKFURTER** an ancestor of the ubiquitous hot dog, it is made of lean pork and is very finely ground. Vienna sausage is a small cocktail frankfurter
18. **HAGGIS** is a Scottish sausage served on festive occasions. It is made from the offal of sheep and oats. It is stuffed into the inner lining of the stomach - the thymus and needs prolonged slow cooking.
19. **KABANOS** is a Polish sausage made out of minced pork.
20. **KALBWURST** a German veal sausage, flavored with pistachio nuts.
21. **KATENRAUSCHWURST** German sausage made of smoked pork, dark skinned and firm.
22. **KNOBLAUCHWURST** a German garlic sausage.
23. **KOLBASA/KIELBASA** the first the Russian version and the second, the Polish. Both words mean sausage. Made with beef and pork.

24. LAP CHEONG a Chinese sausage of chopped pork, soy, cereal and paprika.
25. LIVERWURST/LEBERWURST a German liver sausage of which there are many kinds. Made of pork and pork or veal liver and may even contain truffle.
26. MERGUEZ a spiced sausage from North Africa made from goat or mutton flavored with chili and cumin.
27. METTWURST a German spreading sausage of pork or beef.
28. MORTADELLA a bland Italian sausage from Bologna, made of pork and flavored with pepper, pistachio or coriander. Ready to eat, it is served sliced
29. OXFORD SAUSAGE an English sausage containing veal, pork, beef suet, herbs and spices.
30. PEPPERONI an Italian sausage made of pork and beef.
31. SALAMI there is a vast range of salami sausage available. These include: *Birnenformige, Edel, Land and Netz* from Germany *Alesandre, Calabrese, Cotto, Felinetti, Genoa, Napoli, Milano, Easter Nola, and Toscana* from Italy *Arles* from France. There are varieties from America, Holland, Denmark and Hungary as well. All are made of uncooked meat, which may be pork, beef or a mixture of the two and variously flavored. Salami may be air dried or smoked or both. It is ready to eat, thinly sliced and eaten cold. However, chopped and sliced salami finds its way into many Italian dishes. *Salamini* are smaller versions of the usually large Salami. *Kosher salami* is made out of only beef and flavored with garlic, mustard, juniper and coriander.
32. SALSICCIE is an Italian sausage very often home made and flavored with garlic and peppercorn.

33. SAUCISSON are large French sausage, air dried or smoked. Some are coated with dried herbs.
34. STRASSBURGER a liver and veal sausage containing pistachio nuts.
35. TEEWURST is like mettwurst- a spreading sausage. Made of pork or pork and beef. Spiced and lightly smoked.
36. TOULOUSE SAUSAGE from Toulouse in France made of pork and pork fat flavored with pepper and sugar. It is an essential ingredient of several French recipes especially the cassoulet of Toulouse
37. WIESSWURST a mildly spiced German sausage made of pork and veal.
38. WHITE PUDDING or Boudin Blanc - it is made of white meats and will include pork, cream, eggs and spices. Eaten hot.
39. ZAMPONE an Italian sausage from Modena, where the meat is stuffed into the skin of the leg of pig trotters.
40. ZUNGENWURST a large German smoked sausage made of pork fat, pork tongue and sometimes liver and blood

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