

The Technological Researches in Some Traditional Meat Products of China

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SUMMARY

China is one of the most ancient countries in the world. During the long years, Chinese people have produced some meat products, which are of national flavours. Some products have beautiful appearances, special savours and rich nutrition. In addition, they are so portable and storable that it is convenient to have them at home and on tour. For these reasons, they are welcome by consumers. This paper expounds three kinds of famous traditional meat products of China, which possess special savours. They are Chinese Sausages (La Chang), Dried Meat Floss and Dried Meat Slices. Their histories, kinds, places of production, quality specification, material choosing, technological processes, processing techniques, eating and preserving methods are given in details. This article emphatically states the recent scientific researches in improving the quality of the products for the world to know more about them, and gives a hope that these Chinese traditional meat products will be welcome all over the world.

INTRODUCTION

China has a long history of meat processing. As early as nine century BC, ancient Chinese had known how to make sausages (the original form of La Chang). Chinese Sausages, which are fragrant, tasty and good-looking, are a famous meat product of national savours. The Chinese sausages industry has developed since the foundation of new China. More factories are built and personnel are trained. The integrate manufacturing and quality norms of the product are formulated to improve it, so it is more welcomed by all consumers.

Dried Meat Floss and Dried Meat Slices also originated in China, the former being about 100 years old and the other 60 years old. Loved by consumers, they have got medals on many exhibitions. Besides domestic markets, they have also been exported to Japan, France, Singapore, Hongkong etc.

1. Chinese Sausages (La Chang)

The kinds of Chinese sausages (CS)

According to regional distribution, there are Guangdong Sausage, Beijing sausage, Wuhan sausage and Harbin sausage etc. There are baked sausage and air-dry sausage in the light of different processing methods. In line with distinct tastes, there are northern sausage and southern sausage. The weather of December is fit for processing CS in China, so CS get its name-La Chang, which means December sausages.

CS are Chinese's favorite traditional products.

Lean and fat cut into a definite size and accompanied by natural spices, are filled into casings and made up through fermenting and drying. The mature process is so peculiar that no other sausage in the world is made in this way. The excellent savour depends on recombination of ingredients and its special spices. Now many researchers in the world are studying this traditional meat product. Besides its special savour and quality, the researchers are also interested in its good quality and property of storage.

Production Regions

Most Chinese Sausages are named after their production regions Guangdong Sausage (southern sausage) and Harbin Sausage are the most famous of all.

Guangdong Sausage is well-known all over the world. Among them, those produced in Guangzhou, Shiqi and Jiangmen find special favour in consumers' eyes. Harbin Zhengyanglou Sausage is noted in the country. The two kinds of sausages, which have different technology, are introduced as follows:-

The processing technology of Guangdong Sausage.

The Selection of Raw Materials and Supplements.

Pork from the pigs, which has proper lean fat and which proves to be qualified after slaughter tests, is commonly used as raw material. As meat of legs and buttocks has less connective tissue and more lean, it is considered as the best. Fat is from dorsal subcutaneous one.

Since Chinese Sausages are high-grade meat products, the supplements must be the best, without any impurities. The supplements include refined table salt, top-grade granulated sugar, yeast spirits or sorghum wines which have more than 50 percent of alcohol (50°), colorless top-grade soy or pale, white crystal nitrates without peculiar smell, and top-grade Chinese spices.

Cutting Fat and lean are separated after bones are picked from the raw materials, and the lean is deprived of tendons, veins and lymph vessels etc. Lean and hard fat are cut into 1 to 1.2cm cubes.

The Ingredients of Guangdong Sausage:

Lean 35 kg, Granulated Sugar 4.5 - 5kg, Top-grade Soy 1-1.5 kg, Sodium Nitrate 2.5 g, Fat 15kg, Fen Wines (55°) 1.5-2kg
Table Salt 1.25 - 1.5 kg.

The Ingredients of Harbin Sausage:

Lean 45kg, Fat 5kg, Colorless Top-grade Soy 9kg, Sharen 75g, Sodium Nitrate 50g, Nutmeg Powder 100g,
Chinese Cassia (tree) powder 100g, Peper red 50g, Fresh Ginger 250g, Gourmet Powder 1kg.

Ingredients Blend First stir lean and fat in a mixer until they are evenly blended, then pour evenly mixed spices and and soy in and continue blending till the mixture is sticky.

Filling Process Generally, small-sized pig casings or sheep casings are used. Dried casings should be soaked in tepid water, washed and the dripped. Filling methods are as follows: meat stuffing is filled by a filling machine. The sausage is ligated with cotton ropes every 15-25 cm.

Then the sausages are pricked on needle board to give out the air. At last, the sausages are washed with tepid water to remove greasy dirt.

Sunning and Baking .The clean sausages hung on bars are sunned for 2 to 3 days, and then hung in a ventilating place. The temperature of the baking house should be kept between 42°C and 49°C. Too high temperature may cause the fat to melt and the lean to fade. Too low temperature can result in longer baking time, slower evaporation and fermenting deterioration. Baking time is between 24 hours and 48 hours.

Fermenting The tied sausages are hung in a cool and ventilating warehouse. Through about 10 days' fermentation, the sausages are finished.

Table 1 The Quality Norms of Guangdong Sausages

Items	Sensory Norms
Appearance	The surface color must be bright and smooth. The lean must be red or claret, and the fat white. The casing should be dry, clean, and completely sticky to the stuffing. The sausages should have no mucus and moulds and should be elastic and even.
Tissue situation	The section should be compact and elastic.
Smell	They should have the special savour of Guangdong Sausages and the smell of sugar, wine and meat, but no rank smell.

Research in Improving Chinese Sausage Quality.

Keeping Raw Materials Fresh. It is imperative that all materials be qualified for hygiene norms. We should not ignore their other qualities even if they are qualified for hygiene norms. We must pay special attention to blood-smelling meat and sultry meat. The former refers to the meat which has gathered too much blood and been suffocated. The latter is caused by stiffness. If the meat has been piled for too long, during picking bones period the temperature rises as high as 30°C. In such a warm circumstance for several hours, bacteria rapidly propagate as the result of frequent contacts between hands and meat, therefore blood smell appears.

Table 2 - Physical and Chemical Norms

Items	Norms
Water	< 22 %
Table salt(NaCl)	< 9 %
Acid value(NaOH) I	< 4 (mg/g-fat)
Nitrite(NaNO ₂)	< 20(mg/g)

Table 3 - Nutritional Norms

Items	Norms	
	Top grade	First grade
Protein	> 20 %	> 15 %
Fat	< 39%	< 45 %
Total carbohydrate	< 22 %	< 22 %

Table 4 - Storing Period

Size	I Time(days)	
	Normal atmospheric temperature (15-25°C)	0-5°C
Bulk	25	45
Common package	45	90
Vacuum package	90	120

The TVB- N content of the meat, which had been piled for 24 hours in a meat processing factory was 13.46 mg/100 g. Though the meat had no much difference from normal one in texture and color under low temperature, it smelt terrible.

Such meat though washed several times and air-dried for 15 to 30 days, but sensory tests show that there is rank smell from the section. After the sausage is cooked, there is a little mudd~ substance in the soup which tastes acid puckery. Tests show that the acid values are 7.8, 9.79, 8.94, 13.04, but the acid values of normal sausage that tastes good are only 5.54, 5.31, 6.6, 7.45, 7.24. So suffocated meat is not fit for the raw materials of sausages.

Technological Requirements

Repair and Maintain of raw materials is an important link to improve the sausage quality. Lean and fat of the meat pieces cut from carcasses should be separated in order to calculate lean-fat proportion. The veins and tendons etc. must be picked out.

Washing - Its aim is to remove bloody and greasy dirt and impurities etc and make meat stuffing and sausages appear beautiful and be stored longer. Meat pieces are washed 1 to 3 times with clean tepid water, whose temperature is between 50°C and 60°C, until bloodstains and extravasated blood are away. The large quantity of haemoglobin and myoglobin in the meat do not affect coloring. The fat cubes must be washed 3 times, until there is no sticky sign. The washed lean and fat cubes can be used when the water are trickled away. Though there is loss of nutritional substance, in washing process, it is necessary in the view of improving the sausage quality.

Making Stuffing is also an important process of sausage production. There are two ways in making stuffing: one is by mincing machine, the other is by chopping. The results of the two methods are very different. Fat and lean adhere to each other during mincing process. Lean cubes which are covered with grease of fat have less contact opportunities with chromogen (Nitrate) and directly affect coloring, thus the beauty of sausages obviously decreases and bad-looking tone appears.

Fat and lean must be cut into cubes in favor of storage and coloring, as well as maintaining Chinese sausages' savours. Lean is cut into 10 to 12 mm cubes and at 9 to 10 mm cubes.

Blending Blending evenly is rather important, uneven blending of nitrate may do harm to coloring and sausages beauty. But uneven blending of salt, sugar and other supplements can effect sausages taste and storage. Sugar and salt can reduce water's activity and play an important role in prolonging sausages' storage period.

Watering and Pricking - Watering too much or too little during filling process does harm to sausages' quality. Water in sausages of small-sized dry casing is controlled at about 30%. Special needle boards are used to prick the filled sausages to let out remnant air and water, which are advantageous to the growth of microorganisms, so that there are gaps in sausages.

Ligating - Ligating has a direct effect on sausages' appearance. If sausages are ligated improperly, with different lengths, their beauty and quality are affected. When ligating, you should use one hand to measure the length of sausages with a marked wooden strip, the other to pull the cotton rope. Before ligating, you should squeeze the ligating point to make stuffings tightly towards two ends to let out air and water.

Washing sausages. After filling, pricking and lagating, there are still some dirt on the surface of sausages, which must be removed. In winter or low temperature days, tepid water should be used to remove the impurities, which damage the sausages' beauty.

Baking - Baking has a direct effect on sausages' coloring and storage. Baking temperature has much to do with sausages color and quality. Practices show that centre temperature of sausages (CTS) should be controlled at 45°C when the temperature of baking house (TBH) is 45°C to 50°C. The temperature of baking house must also be adjusted according to the size of sausages. If thick sausages are baked, temperature of baking house may be controlled at 50°C to 57°C. Too high TBH has bad effects on sausages quality. If TBH is above 65°C and CTS is 60°C, protein denatures. If CTS is more than 70°C, fat melts and sausages become pale. A hard crust is formed, but the centre is soft with no heat in and water out, the enzyme resolution and microorganism propagation cause the sausages to deteriorate and smell terrible.

Inversive Hanging - Sausages hung on poles must be inverted at a certain time with a definite distance among themselves to improve the sausages quality. The former ones hung on the centre of poles must be moved to the ends. If two sausages are hung against each other, the contact spot which becomes pale and wet, can cause deterioration into both the sausages. Position exchanges can make sausages radiate freely and evenly. Sausages are often inverted 2 to 3 times. Thin sausages are inverted every 1.5 to 2 hours, and thick sausages are inverted more than 2 hours each time.

Sunning and Storage - The most important thing of the process are ventilation, dryness and drainage of heat and humidity. It is suggested that sausages not be sunned too much, because light and heat may make fat turn yellow and go bad. Besides, too much sunshine causes sausages to drip oil and to wrinkle, so airing sausages is encouraged. If it rains during sunning period, doors and windows of sunning house must be closed to stop the humidity, and air-blower must be used. Sausages should be hung at a distance of 3 to 5 cm to prevent suffocation.

2. Dried Meat Floss (DMF)

History - DMF has a 100 years history. It is divided into two kinds, one is Taicang DMF, the other is Fujian DMF.

Taicang DMF was invented by a Taicang cook called Nide about 100 years ago. The product was soft and delicate, it was loved by all people. It got gold medal at Panama International Exhibition in 1915. It got first prize at Jiangsu Goods Exhibition in 1923.

Fujian DMF was invented by a cook named Lin Ding-Zhi. The granular floss praised by hangerson was sent to the Capital as a article of tribute, so it was well-known.

Producing Regions Chinese DMF were mostly named after their producing regions, such as Taicang meat floss, Shanghai meat floss, Amoy Huang jinxiang meat floss, Shantou meat floss, Fujian meat floss etc.

Technology and Ingredients - Making meat up : Tender and high quality lean from pigs' hinder legs is used as raw materials. The lean must be removed of bones, skin and tendons etc. and be cut into 0.5 kg meat blocks.

The norms of Ingredients

The Ingredients of Taicang DMF:

Lean 100 kg - Table salt 1.67 kg, Soy 7 kg, Sugar 11.1 kg, 50 Spirit 1 kg, Anise 0.38 kg, Ginger 0.28 kg, Gourmet powder 0.17 kg.

The ingredient of Fujian DMF : Meat : 100 kg, top grade soy 10 kg, sugar 8 kg, red brewer's grains 5 kg, lard 0.4 kg (per kilogram of DMF).

Cooking :

Put ginger and anise etc wrapped in gauze cloth and meat blocks, as well as the same quantity of water into the sauce pot. The meat is cooked over fast fire with constant watering to prevent the pot from drying, until it is cooked soft. Oil layer on the surface should be removed at times. Drop yellow rice wine in when the meat is soft, and continue cooking. By the time meat blocks are loose, put sugar in and gently stir with cooking shovel. Add soy and gourmet powder half an hour later. Moderate the fire when the soup is about to dry. After several stirrings, muscle fibers become soft, and roasting period begins.

Roasting - Take out the ginger and spices, and cook the meat over moderate fire. Press meat blocks, roast and stir them often with cooking shovel. When all meat blocks become loose. Cook them over slow fire until they are dry and become golden with a special savour.

There is an additional crisping process in making Fujian DMF. Semifinished floss in a smaller pot is heated over slow fire. Stir the semifinished floss. Without a stop until 80 % of it become crisp powder. Then sift the grains off. Put the powder floss back into the pot, and add in proportion melted lard. Continue stirring for 30 minutes with small fire, finally round crisp meat floss is done.

Package and Storage - As DMF is hygroscopic, it can be stored in plastic bags for a short term. The best way to store it is by vacuum packages and cartons. For a long storage glass bottles and tinplate jars must be used. Taicang DMF is stored in 200 g-tin, 250 g-tin and 500 g -tin etc. The DMF should be put into clean and dry bottles immediately and be stored in a dry place. The storing term is half a year.

Eating Methods - Taicang DMF has high protein and low fat, which is fit for the old, and those who suffer from coronary heart disease and high-blood pressure and must avoid greasy food.

Fujian DMF has higher fat, which is fit for children and pregnant women, as well as some recovering patients. DMF is also convenient for tour and at home.

3. Dried Meat Slices (DMS)

History DMS are produced all over the country. Jingjiang eat slices which are the most famous of all, has a 50 years' history. Three persons from Shantou, Guangdong province, set up Three Friend Food Factory to produce DMS at Jingjian then. Oversea Chinese called them three friend dried meat slices. Since liberation, the factory has changed old technology, extended workshops and renewed equipment, and the products quality has been improved. Because of the strict chosen raw materials, fine processing and good quality,

DMS are welcomed by customers and exported to Japan, France, Singapore and Hongkong etc. In 1981, DMS got high quality prize of Jiangsu Province and National medal. Since 1956, DMS with two fish brand were exported without examination.

Kinds DMS are mixed and dried lean slices without cooking process. According to different raw materials, there are pork slices, beef slices, rabbit meat slices and chicken meat slices etc. In views of different tastes, there are spiced DMS, fruit juice DMS, prickly and peppery DMS etc.

Producing Regions DMS are produced all over the country. There are Jinjian DMS, Tianjin Dried Beef Slices, Huangyan DMS, Anshan Maple DMS, Sichuan DMS etc.

Technology - Choose lean meat from pigs' hinder legs and remove bones, fat, tendons. Cut the lean into blocks along muscle fibres and wash greasy dirt off. Press them in moulds and quickfreeze them. Cut them into 2 mm thick slick slices after meat deep layer reach -2°C to 4°C . Then unfreeze and mix them.

The ingredients of Sichuan DMS are as follows : (per 100 g raw meat)

Sugar 2 g, Chinese Prickly Ash a little, Yeast Spirit 0.5g, Gourmet Powder 0.05 g, Sodium Nitrate 0.05 g, Peppercorn a little, Chilli a little, Sesame oil a little.

Mix the above ingredients evenly and put it in an enamel basin. Add meat slices and stir them evenly. The slices must be soaked for 30 to 60 minutes to let the condiments in. Then the slices are placed according to meat grain on iron sieves (76 cmX 46 cm) or bamboo sieves (85 cm x 85cm) which have been smeared with grease.

Baking - After dried in the air, the slices are placed in baking house with a temperature of 65°C for 5 hours, shift position of slices and dry them into semifinished product. Then the slices are cooled down in the air.

Rebaking- Place cool semifinished slices on revolving iron net of far-infrared stove and rebake them at 200°C to 250°C for about a minute to make them preheat, contract, appear brown-red and glossy. Press slices flatly and cut them according to norms. The finished DMS have 10 % of moisture.

Package and storage - The finished DMS are packed in plastic pockets with vacuum sealing. There are 20 g, 25 g, 50 g, 250 g, and 500 g package styles. They are stored in wooden or paper boxes in which there are bamboo leaves and dampproof paper. The boxes must be piled up in ventilating and dry warehouses.

Eating Methods DMS have high nutrition, the protein content of which is 46 %. They also have some vitamins and minerals. It is very convenient to eat them during tour or at home, for no cooking is needed. After being steamed, they can be made into every taste according to requirements. They are so delicate that you will not forget once you eat them.

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