ICoMST
49th International Congress of Meat Science and Technology
2nd Brazilian Congress of Meat Science and Technology

The Ethnical Origin of the Main Meat Processed Products of Brazil

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SUMMARY

Charque and Jerked Beef and Carne-de-Sol (sun dried beef) are Brazilian ethnic product with an annual production of 600,000 tons. All these products are preserved by the lowering of its water activity thought salting and dehydration. The consumption of salted meats in Brazil is confounded with its history, Charque and carne de sol being manufactured since the beginning of the 17th Century. Jerked beef is a product derived from Charque, the main difference being that it is a nitrite cured product. Only Charque and jerked beef are regulated by the Brazilian legislation: charque might have a maximum of 45% moisture and 15% ashes whereas jerked beef can have a maximum of 55% moisture and 18% ashes. Carne-de-sol usually has salt contents around 2.6% and moisture around 70%. Other Brazilian industrial meat products have European origin. Fresh and cooked sausages, with Italian, Polish, and German recipes with annual production above 200,000 ton and mortadella of various formulations also reaching 200,000 tons.

INTRODUCTION

Among the Brazilian ethnic foods three products derived from beef, **charque**, **Jerked Beef** and **carne-de-sol**, may account for total yearly sales of up to 600.000 ton (Fayrdin, 1998; Bliska et al, 2000) , equivalent to 3,7 kg /per capita/year.

These products have in common the fact of relying on the reduction of water activity to different levels through salting and dehydration, to extend its shelf-life (Leistner, 1990; Shimokomaki et al, 1983; Youssef, 2000; Dzimba, 2001).

Salting and drying are very old techniques used for meat preservation. Salt has been used for thousands of years in many parts of the world for the preservation of Ýsh and meat from small animals. The development of preservation of foods by moisture reduction is one the greatest events in the history of mankind. In pre-Colombian South America, the Quechuas, an Inca people, developed this technique to perfection, applying it to a great number of food products. **Charqui,** their most widely known product, was made in the high plateaus of Peru from llama meat dehydrated to a level that would keep for years. Their technique of reducing the meat to thin strips, in order to accelerate water removal would be incorporated in the production of **charque** and other salted meats made from beef.

The consumption of salted meats in Brazil is confounded with the history of the country. Salted Ýsh was a staple food of the sailors in the Ðeet of Pedro Alvares Cabral, the Portuguese Admiral, who discovered Brazil during his Ýrst voyage to India.

Historical records indicate that **charque** and **carne-de-sol** have been manufactured since the beginning of the 17th century. Brazil was discovered in 1500 and by 1534 beef cattle, a genus unknown in pre-Colombian America,

Keywords

Charque, jerked beef, carne-de-sol , sun dried meats, meat products, ethnical meat products.

was introduced into S„o Vicente, a village in the Southeast and by 1550 into Bahia, a state in the northeast of the country. Bovines, by then, were used for milk, transport and work in the sugar mills.

In the Northeast, cattle soon sprawled throughout other states and by the beginning of the 17th century beef was being used for the production of salted and dehydrated meats that would be known as **charque** and **carne-de-sol**.

It is reasonable to assume that when the production of salted and dehydrated meat started in Brazil, a small part of the meat obtained from the slaughtering of a bovine was used on the same day to feed the people living in the cattle ranches and in the small communities nearby. The meat that would be consumed in a few days would receive brief salting and drying, while the meat that would be eaten in the weeks or months ahead would be salted and dried accordingly.

New products with salt and moisture contents that would satisfy the keeping requirements were developed by the empiric processes of trial and error, through the control of meat thickness, the type of salting process used and the time the meat was exposed to salt. The Ýnal moisture and salt content was also controlled by duration of the exposure of the salted meat to the wind in covered areas during the night and or to sun-drying during the day.

This almost inÝnite gradation of treatments resulted in a variety of products that would be known generally as **carne-de-sol** and **charque**. These products varied in composition and stability from **carnes-de-sol** that would need no desalting before cooking to **carnes-de-sol** with moisture and salt content not very different from **charque-de-vento** (**charque**-of-the-wind), a particular type of **charque** usually made for consumption within 30 days at cattle ranches, to traditional **charque**, the product whose moisture is saturated by salt, that would keep for 3 to 6 months or longer at tropical temperatures.

During the 1600ís, **carne-de-sol** sold in towns and villages was usually manufactured from cattle slaughtered locally but brought from far away ranches. **Charque** was transported from neighbouring states to Pernambuco, the state in the northeast of Brazil where production of sugar cane had started in 1534. The sugar production, then a highly proÝtable enterprise, demanded increasing quantities of salted/dehydrated beef for feeding an ever increasing workforce of slaves brought from Africa.

The droughts of the 1780ís killed most of the cattle in the Northeast forcing the production of the salted and dehydrated **charque** to be moved to Rio Grande do Sul, a state in the extreme south of Brazil, to make use of huge numbers of its wild cattle.

Brazilian records show that beef cattle from S„o Vicente was introduced to the South in 1556, and at about the same time, cattle was brought from Peru, where it was introduced by the Spaniards. (Marques, 1987).

From the middle of the 16th century and for the next 200 years beef cattle were bred by the Jesuits and used for feeding Amerindians in about 30 settlements known as **Reduções** . In these settlements, having each a population of 3.000 to 7.000 Indians, the daily distribution of meat in generous amounts demanded the rearing of cattle in large herds.

It is believed that in 1759, when the Jesuits were expelled from Brazil, there were over a 1.000.000 heads of beef cattle spread over the region comprising what is nowadays Uruguay, the northeast of Argentina and the Brazilian State of Rio Grande do Sul.

The remnants of the Jesuits¥ cattle were slaughtered for the production of **charque** after the setting up of the Ýrst **charqueada** in Rio Grande do Sul in 1779. The production of **charque**, known in some Spanish speaking countries as **tasajo**, may have started around 1786 in Uruguay and in Argentina in 1810, where the establishments responsible for its production were known as **saladeros** (Fagundes, 1982). Later on, **charque/tasajo** was also manufactured in Paraguay.

The Brazilian demands for **charque** were satisÝed by the production in Rio Grande do Sul up to 1830, when Uruguay and Argentina dominated its production for the next 100 years. The production of **charque** in South America in 1890 topped 140.000 ton, from which the State of Rio Grande do Sul was responsible for less than 18% (Costa, 1905).

In the Ýrst decades of the 20th century, the **charqueadas** and **saladeros** were, eventually superseded by establishments, mainly of British and American origin, producing frozen and canned meat for foreign markets, which yielded better returns.

In the 1940ís the bulk of the Brazilian production of **charque** moved to the central states of S„o Paulo, Minas Gerais, Goi·s and Mato Grosso. S„o Paulo transformed in **charque** the beef Ðanks and forequarters, which had restricted markets. In the other states, cattle introduced during the gold rush of the 18th century, gave rise to herds, from which castrated males were sent for fattening and slaughtering in the populous State of S„o Paulo. The cattle left behind at the end of their reproductive and working life were slaughtered and transformed into **charque** for many decades, until the old **charqueadas** were modernized into abattoirs with refrigeration chambers.

In the 1970ís the bulk production of **charque** moved to the State of S„o Paulo, now using as its raw material the refrigerated Ðanks and forequarters that could not be absorbed by industries and the retail market.

The migration of hundreds of thousands of people from the Northeast to the states of S„o Paulo and Rio de Janeiro, starting in 1950, during the industrialization boom, created a strong market for **charque** in this region. **Feijoada**, and more recently, **arroz de carreteiro**, transformed into national dishes have reinforced the consumption of salted/dehydrated meats, contradicting the expectations of specialists who believed that widespread refrigeration would decree the disappearance of the traditional products (Pardi, 1961, 1996).

In the 1970ís a product derived from **charque**, which was later to be known as **Jerked Beef** (Biscontini, 1995; Pinto, 1996), with a shorter shelf-life due to its higher moisture content, began to be marketed in the Southeast. Nitrite, which is forbidden in the manufacture of **charque**, was used in the production of **Jerked Beef**, to give the product the colour of cured meat, because the consumer used to **charque** would not accept the greyish colour of salted beef (Oliveira, 1980). Although unpackaged **charque** has a greyish colour on the surface, due to salting and exposure to the sun, its interior has an attractive reddish colour of concentrated myoglobin.

Physicochemical characteristics of Brazilian salted and dehydrate meats

Charque

According to RIISPOA, the Brazilian Regulation on the Industrial and Sanitary Inspection of Animal Products (Brasil, 1962), **charque** is the product resulting from salting and drying of beef, marketed as CHARQUE - SALTED AND DEHYDRATED BEEF. When the product is manufactured using meat of any other species, this must be disclosed on the label. The moisture content of **charque** in the muscular portion is limited to a maximum of 45% and ashes to 15%, variations being allowed to the limit of ± 5%.

Although there is no speciÝcation for its water activity, most **charque** has an water activity around 0,76.

Jerked Beef

Jerked Beef is the industrial product resulting from the addition of common and curing salts followed by maturation and dehydration. The product is classiÝed as a cured and dehydrated raw meat, marketed as ìSALTED, DEHYDRATED AND CURED BEEF - JERKED BEEFî. The water activity of **Jerked Beef** must not exceed 0,78 and the moisture and ashes contents in the muscular portion are limited to a maximum of 55% and 18,3 %, respectively. **Jerked Beef** must be marketed pre-packaged (Brasil, 2001).

Carne-de-sol

There are no ofÝcial regulations regarding composition and physicochemical characteristics for **carne-de-sol**. The product is extremely popular in the northeast of Brazil, where it has been manufactured for centuries in almost every butcher shop of some states and in large number of municipal slaughterhouses. Techniques for its production vary in the different regions and even among the producers, a fact reÞected in its composition, safety and stability. Recently, with the widespread availability of refrigerators and freezers, the salt content has been reduced by some manufacturers to as low as 2,4 to 2,8% from 5 to 6% of 20 years ago, when moisture content used to vary between 64 and 70%. **Carne-de-sol** continues to be sold in large amounts, due to its sensorial attributes, as a substitute and alternative for fresh meat. Refrigeration has reduced the importance of water activity for its safe keeping. The product today is kept in the refrigerator at home and consumed within a few days of purchase.

Brazilian salted meats - Origin and evolution of the technology

Charque

When its production started in Rio Grande do Sul, **charque** was a revolutionary product that gave economic value to the big herds of wild cattle, which used to be hunted by Portuguese and Spaniards for the hides, hoofs and fats, the carcasses left in the Ýelds for consumption by vultures and wild animals. **Charque**, with its 40% protein content, was a meat product prized in the Northeast for feeding the growing number of slaves in the sugar plantations.

In Brazil up to 1880 **charque** was manufactured as thin sheets of meat that resembled the **charqui** made by the Quechuas in the Andes. The meat was cut to a 15 mm thickness, dry salted by rubbing and piled-up in layers of salted meat followed by salt, left to rest for one or two days and then sun dried. Afterwards, **charque** in Brazil was made following the **platino** process, which had originated in Uruguay and Argentina. Immediately after slaughtering the carcass was deboned and the hot meat was cut into **mantas** of uniform thickness of 25 mm, left to cool until the rigor had set in and put into brining tanks containing saturated salt solutions. The meat was kept submerged for about 50 minutes, an operation called ìto burn the meatî, where the fascia changed colour to blue and the meat surface to a brownish-grey due to the formation of metmyoglobin.

The subsequent operations were the same as the ones currently used in most establishments processing **charque**.

The operation following wet salting is the dry salting in which the **mantas** are transferred to the salting room to form a pile holding the salted meat of a dayís kill. The salting pile starts with a thick layer of salt on the SSoor followed by a layer of the wet salted meat, another layer of salt, followed by a layer of meat, and the layers repeated in an alternating manner until the pile reaches the desired height, usually not exceeding 1,60 to 1,80 m. It is very important that the entire meat surface is covered with salt so that an efÝcient osmotic dehydration and reduction of water activity through moisture removal and salt uptake can occur in all parts of the **manta**, preventing growth of undesirable microorganisms. In the salting pile, the corns of salt on the meat surface remove water from the meat eventually forming a brine containing 18% of dissolved salt (Gutheil, 1960). Pure brines of sodium chloride of equivalent concentration have a water activity of 0,862 (Chirife & Resnik, 1984).

The Ðoor in the salting room should be slightly inclined to allow the draining, to lateral channels, of the brine formed with the water and soluble material liberated by the meat. This brine should be discarded.

The salted meat in the salting room is moved in piles, the Ýrst one made near the brining tank, as just described, and the last one located at the opposite end of the salting room next to the drying area.

Re-salting of the mantas takes place the following day after salting. In this process, the uppermost **mantas** of the salting pile are transferred to the top of the thick layer of salt on the Ðoor towards the end of the salting room and the process of intercalating layers of salt and **mantas** repeated until the mantas at the bottom of the salting pile are moved to the top of the re-salting pile. This operation is important for the replenishment of salt and for the equilibration of pressure on the **mantas** in the salting room. The **manta** that is at the top of the pile one day is at the bottom of the next pile in the following day. This process of inverting the position of **mantas** in the piles is known as tumbling the pile.

The next day, the **mantas** from the re-salting pile will be examined by the foreman for the need of being re-salted again, in the operation called **pilha-volta**, in which a new pile will be formed as described earlier, alternating layers of salt and mantas. In most cases this operation is omitted and the **mantas** of the re-salting pile after removal of superÝcial salt, but the adhering crystals, are transferred to the next pile in successive layers of meat and salt. This operation, known as **tombo**, is repeated three times in the following days, at 24 to 48 hours intervals. The objectives of the **tombo** are to let the gradient of salt concentration across the **manta** to equilibrate, to aerate the meat and to inspect for the growth chromogenic of halophylic bacteria forming red spots on the surface of **mantas**, a most feared defect in the processing of **charque**.

After the 4th **tombo**, the salting operation is completed and the salted **mantas** are fed to the washing tank, located between the salting room and the drying area, through a window on the wall of the salting room.

The **mantas** are subjected to a rapid washing in running water to remove adhering crystals and transferred to a **pedra** to drain the excess water. **Pedra** is a rectangular platform surfaced with ceramic tiles elevated about 40 cm from the concrete Ðoor of the drying area.

Nowadays the washing of salted meats is an essential operation because most **charque** is packaged in plastic bags under vacuum and salt crystals on the surface of the Ýnal product might puncture the package. In some establishments lactic or acetic acid may be added to the water to lower the pH bellow 5,5 to control chromogenic halophylic bacteria. Hypochlorite added to a level of 500 ppm has the same function.

Washing increases somewhat the moisture content on the **manta** surface, which favours a better control of the drying operation. The wet **mantas** can be taken directly to dry or left to drain overnight.

The drying of the **mantas** is carried out by repeated daily exposures to the sun, each exposure called a **sol**. Usually the actual number of exposures to the sun depends on the judgement of the foreman, based on the climatic conditions and the particular characteristics of the batch. Changes in the processing and in commercial practices, such as vacuum packing and a shorter shelf-life, have allowed the product to be considered dried after three exposures to sunshine.

Mantas are dried on **varais** (rails) built north to south so that the meat receives a balanced distribution of sunshine. Temperatures in excess of 40 žC should be avoided (Costa, 1978).

The **mantas** are put to dry in the **varais** in the morning, removed late afternoon while sunshine is still hot and taken to a **pedra** near the **varais**. In the **pedra** the mantas are piled up and the pile is covered with a large sheet of impermeable material such as a high density polyethylene which is kept tight on the pile by the use of plastic ropes, until the following **sol**. This set-up keeps the meat warm, which accelerates the drying on the following day, and protects it from rain and absorption of moisture during the night. The settling of the meat in covered piles is considered by many an important step for the quality of the Ýnal product, i.e., the stage where **charque** acquires the bouquet that is appreciated by the consumers.

Sun drying not only removes the water taken up during washing but gives the product its Ýnal and attractive characteristics. The colour of the fat will turn golden-yellow and the muscle surface greyish. When cut, the interior will look dark-red, with a Ýrm texture, with no sign of excess humidity.

After drying is complete, the **mantas** are taken to the packaging room where they are rolled and put into thick metal forms for pressing before being cut and packed according to the desired weight.

The production of **charque** has evolved from the time of hot processing the entire carcass to present day situation, where its raw material is increasingly restricted to chilled Ðanks. Forequarters used for **charque** are being directed for the production of Jerked Beef, a more proÝtable product, due to the higher moisture content allowed in it.

The wet salting process in brine vats has been, in the majority of establishments, substituted by salting in tumblers batches of 70 to 90 mantas for 15 to 20 minutes (Picchi, 1991). The introduction of wet salting in tumblers has allowed the thickness of the **mantas** to be increased to 4 to 6 cm, reducing the work in the boning room.

Sun drying is still the preferred process for the drying of **charque**. Cabinet drying was introduced in the Ýrst part of last century in the southern state of Rio Grande do Sul due to its climatic limitations to sun drying. Drying in traditional cabinet-driers, however, has not prospered because of the low sensorial properties of the Ýnal product, pale colour and absence of bouquet, rejected by the consumer.

Charque is currently vacuum packed for the retail market in packages containing 500g, 1 kg, 2 kg or 5 kg. Bulk packages containing 30 kg of **charque mantas** vacuum packed may be also marketed in card box for selling at retailers according to consumer demands. The main advantages of vacuum packing are the inhibition of chromogenic halophylic bacteria and protection against loss of weight and contamination of the product during distribution. Additional information on the technology used for the production of **charque was** published by Hardman (1962) and by Norman & Corte (1985).

Jerked Beef

The technology being used in the production of **Jerked Beef** differs somewhat from the one used for **charque**. The main difference is that **Jerked** Beef is a vacuum packed cured product with appearance very similar to fresh meat. In its production, wet salting is usually carried out by multi-needle injectors and the meat is not sliced into **mantas**. The forequarter and less valuable cuts from the hindquarter, such as the silverside (**m. biceps femoris**) and the eye of round (**m. semitendinosus**) are used for the production of **Jerked Beef**. In some establishments, when Ðanks are used for the production of **Jerked** Beef, the wet salting is usually done in tumblers. Nitrite and nitrate are dissolved in the brine used in tumblers or in multi-needle injectors (Picchi, 2002).

Multi needle injectors have important advantages over tumblers, the main one being that there is no need for preparation of the traditional **mantas**. A few cuts to open up the thickest muscles are all that is necessary. Another main advantage is that brine injection transforms the wet salting operation in a continuous process, eliminating the problems associated with batch processes, such as tumbling and brine tanks. Brines are injected to the level of 30% and typical brines contain sodium chloride (26ž Be), nitrite (200 ppm) and nitrate (500 ppm). In some premises brine pH is adjusted bellow 5,5 to control chromogenic halophylic bacteria. The Ýnal product has the typical colour of cured meat and the residual nitrite content is usually less than 10 ppm (Picchi, 1998).

Most **Jerked Beef** has been dried the traditional way, by exposure to the sun. Recently, a new type of drier has been developed, which solves the sanitary problems of sun drying and produces a **Jerked Beef** with a mild bouquet and a pale yellowish fat. These driers are derived from greenhouses, using transparent plastic, which allows the passage of solar heat and light. Temperature in the drier is maintained through Ðaps which allow mixture of exterior air when the temperature or relative humidity increases too much. Air temperature is kept around 37žC by a heater exchanger burning diesel. According to the manufacturers, these driers, built in modules for 5.000 kg of salted meat, can reduce moisture content to the legal limits in about 13 hours.

Jerked Beef by law has to be marketed packaged. The product is usually vacuum packed for the retail market in packages containing 500g, 1 kg and 2 kg or 5 kg. Bulk packages containing 30 kg of **Jerked Beef mantas** vacuum packed are also marketed in card box for selling, cut according to consumer demand, at the retailer premises.

It is interesting to notice that the main supermarket chains and hypermarkets have refused to buy **charque** for some time, preferring instead the marketing of **Jerked Beef**, a product well accepted in the south but no yet appreciated in the Northeast, where the traditional product still reigns.

Carne-de-sol

Carne-de-sol is a much appreciated meat due to its Ðavour and higher stability than fresh meat, which it replaces after being soaked for a short time in fresh water, according to its salt content (NÛbrega, 1982; Lira, 1998)

Carne-de-sol is usually roasted, and served with **feijão-de-corda** (green beans cooked under pressure with bacon and thereafter briskly fried in oil added of garlic and a lot of shredded onions), cooked pumpkin (fried in oil with garlic, onions, parsley and other herbs and then stewed) and **farofa**, a recipe prepared with manioc Ðour fried with small pieces of bacon and seasonings. During roasting, **carne-de-sol** is basted with **manteiga-de-garrafa**, which is responsible for much of the Ýnal taste of the cooked meat. **Manteiga-de-garrafa**, is a butter typical of the Northeast that keeps liquid at room temperature, sold in small bottles.

Carne-de-sol has been manufactured in a large number of small establishments and by almost every butcher in some regions of the Northeast. Its production is characterized by regional and even particular manufacturer's variations on the processing, resulting in products with differences in appearance, taste and stability (Vieira Neto, 1982).

Although **carne-de-sol** continues to be made in some places from hot meat of entire carcasses, the best cuts are the ones from the hindquarter. When produced from hot meat, the carcass is usually divided in quarters, with two ribs left on the hindquarter. The quarters are hung for a few hours before deboning ìto allow the meat to lose its heatî The hindquarter will produce Ýve to seven primal cuts, depending on the region of production. About four to seven hours after killing, each meat cut is sliced to uniform thickness (3 ñ 5 cm). Some cuts, like the loin, receive transverse cuts every 10 cm, penetrating most of the depth of the meat, to increase the surface area for salt penetration.

The prepared meat is immediately salted manually, taking care that every part of the surface receives an amount of Ýne salt. The salted meat may be piled up on tables or in a masonry tank lined with ceramic tiles, in which the brine formed may or may not be allowed to drain. In some places after two hours of salting the meat is revised and additional salt rubbed on it if judged necessary.

The traditional procedure of hanging up the salted meat overnight in covered places to allow removal of superficial water by the night breeze has been abandoned by many producers. This procedure was replaced by packing the meat after salting for about four hours in polyethylene bags, which are then put into domestic cabinet freezers for speed cooling before transportation to regional markets in the cooler hours of the evenings or before sunrise in trucks with insulated bodies.

Marketing is mostly carried out in the traditional manner in fairs of the hinterland. The cuts, fixed in metal hooks, are suspended in poles in stalls, the individual cuts being touched and smelt by the prospective buyer (Costa, 1999; Silva, 1991). **Carne-de-sol** manufactured in the huge number of butcher shops of the Northeast from hot or chilled beef is usually exposed for sale at ambient temperature for the choice of the consumer. In the most modern establishments the meat is hung in refrigerated displays.

The large market of salted meats and the deficient sanitary conditions in the traditional fairs have prompted the modern markets and supermarkets chains in the main cities of the Northeast to explore the demand for **carne-de-sol** manufactured under good sanitary conditions. This product is manufactured in inspected meat plants using selected refrigerated vacuum packed hindquarter cuts bought from federally inspected slaughterhouses. Due to the traditional habits this ìmodernî **carne-de-sol** continues to be exposed, during its sale, at ambient temperatures.

The consumption of salted meats has decreased with the widespread availability of refrigeration, less expensive meats, such as poultry and cheap manufactured products, such as an imitation of mortadella. Changes in eating habits by the incorporation of alien foods such as pasta, the reduction in family size and the trend for foods that can be prepared in shorter time has diminished the consumption of salted and dehydrated beef. Although the consumption of such meats has declined more than 2/3 in a century, some changes in the market point out that this class of products will be manufactured in large quantities for a long time to come. The consumer longs for variety in his diet and these products have taste and texture appreciated by many. The consumption is decreasing among the poorer but increasing in the higher classes. Almost every cookery book published in the last decade and the schools training chefs for the best restaurants all over the country keep alive the use of these meats in traditional recipes and develop scores of new ones. A large number of fashionable restaurants in S„o Paulo and Rio de Janeiro have included, in recent years, **charque** and **carne-de-sol** as an obligatory ingredient in some of their gastronomic options. Although **carne-de-sol** has been a product not available and virtually unknown to the vast majority of the population of the richer states of the South and Southeast, for the first time it is produced in the Southeast in industrial quantities. Soon it may be incorporated as an option in the runs of grilled meats in the steak houses.

Other Industrial products

Brazil has some big meat companies well equipped and technically staffed producing in large scale, which are responsible for the majority of the products consumed in the country. Brazilian meat products reflect in their composition the fact that beef is the cheapest meat to the industry. The reduction of cost also stimulates, whenever possible, the use of mechanically separated poultry meat, soy protein (textured or isolated) and starches.

Among the industrial products, sausages accounted for nearly 700.000 ton in 2.000. Three products: frankfurters, raw and cooked sausages and mortadellas, the Italian bologna, comprised 94% of that total.

Most frankfurters are manufactured with mechanically separated poultry meat, pork fat and limited amounts of TSP (3%) and starch (2%) as their main raw material and ingredients.

Linguças (coarse grained fresh or cooked sausage) containing beef or a mixture of beef and pork or pork and pork fat are a very popular meat product in Brazil. Cured fresh sausages are usually packaged and marketed frozen to be sold at retail after thawing. The actual production is much greater than the 231.794 ton recorded in 2.000, the excess manufactured in small factories and butcher shops in the smaller towns.

Mortadella is usually made from beef and pork fat, formulation varying according to quality. The best products would include meat from bovine forequarters and pork fat as the main ingredients. Increasing amounts of mechanically separated poultry meat, soy protein (TSP or ISP) and starch are associated with cheaper quality products. The big manufacturers are marketing mortadella vacuum packed and refrigerated due to economical and microbiological considerations. One such factory manufactures 3.000 ton/month of various classes of mortadella. The national production in 2.000 amounted to 192.380 ton. Not included in this total is a sausage product, made in modest amounts in the Southeast to be sold to the poorer of the Northeast that resembles mortadella, that in reality is an intermediate moisture product having as main ingredients starch, texture soy protein, mechanically deboned poultry meat and fat. The product, properly labelled as an imitation of mortadella, has a tougher texture and its popularity among its consumers relies on spicing. This product, instead of being sliced, is cut in small chunks and eaten as cheaper alternative for **charque** in the main meals.

Fermented sausages are produced in much smaller amounts (22.000 ton in 2.000) and the variety of products quite limited. Just four or five types of **salames**, from fewer than 10 different manufacturers are the choice available to the consumer even in the best supermarkets of the richer Southeast. This type of product is much popular in the South, where original recipes brought with the immigrants from Spain, Germany, Poland and other European countries, are still manufactured in a great number of rural properties

to add value to their livestock production, although the products lack consistency in quality and safety.

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