

Prague ham: the past and the present

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Historical evidence indicates that already the Romans conserved rump on the bone by sea salt, and there are even coins in the shape of raw ham surviving from the days of the Roman Empire under Emperor Augustus (Plate V, Figure 1). The penetration and diffusion of salt into meat has been, and still is, one of the basic flavoring and preserving techniques for ham on the bone (Plate V, Figure 2) which, when properly timed, ensures a continued safety of the manufacturing process.

At the present time, the effort is to obtain a product with high added value that would be prized primarily for its typical sensory qualities (Monfort 1998). Ham is one of the first foods named after the place of origin (Sardinian, Iberian, Arascen, Parma etc.). This is in fact the first glimmer of Protective Designation of Origin (PDO) as we know it today.

A regular commercial production of cooked ham on the bone in Europe has a tradition that goes back to the turn of the 19th century, when sodium nitrate (also called Chile saltpeter) and potassium nitrate (also called sanitr) began to be added into brine solutions intended for long-term curing, at the level of 2-3% of the salt by weight.

According to the materials known today, Mr. František Zvěřina, a master butcher in Prague, was the first one who, in 1857, marinated the whole leg of pork (Steinhauser 1991). The juicy, pinkish ham on the bone, covered by a thin layer of fine fat and some skin, smoked to a golden luster first gained popularity in Prague and Dresden under the name of Prague Ham. In Karlsbad, this type of ham on the bone was also called Spa Ham.

The best-known producer of ham on the bone was Antonín Chmel, who operated his business in Prague-Zvonařka in 1879. He founded a smokehouse in Královské Vinohrady (Royal Vineyards) in Prague and ran it like a factory. Initially, 28 people worked in the smoke house, but by the year of the World Exposition in Prague (1929), the enterprise of Antonín Chmel employed 250 workers and the company became a world-known producer and exporter of ham on the bone. A pictorial documentation from the Prague World Exposition may be seen in L. Steinhauser's publication „700 Years Under the Lion Emblem“ (2010), which shows the Chmel Company's magnificent stand, with the ham being deposited in cellars and undergoing smoking (Plate VI, Figure 3-4). At that time, there were approximately 300 manufacturers of Prague ham in the country, the firms like Dlouhý, Malý, Cibulka, Jeřábek, Hulata, Potměšil, to mention just a few. The shipping weight of a ham on the bone used to be 3-5 kg; today it is 10-11 kg.

The Chmel Company became the best-known producer because it exported wholesale and gained a legendary reputation built on quality and nobility. Ham on the bone was originally preserved by deep salting, smoking, with the surface decorated only by aspic glazing (see the Chmel Company brilliant advertising, Plate VII, Figure 5). The Prague ham at that time became synonymous with the highest quality ham on the bone in the world. It was crisp, juicy, light in color and lightly smoked to a golden hue, covered by 1 cm of fat and an aspic glaze.

Ham on the bone of the traditional Prague type can nowadays be found, for example, in Italy (Plate VIII, Figure 6), wrapped in heat-shrink film. The traditional ham-on-the-bone masterpieces are now injected with simple phosphate-free brine to a 10% level. The

first application of Cozzini technique of injecting a meat suspension into whole muscles (the so-called MIM technology) was in France, specifically for these top-quality hams so as to meet the legislative requirement of high muscle protein content in the final product, thereby eliminating a sizeable loss in weight due to heat processing. That was the original application of the MIM technology, in specialized production of masterly crafted phosphate-free hams (Nicolai and Budig 1996). Only later was this MIM technology established in this country as well, for the production of steamed hams of other categories.

But let's get back to the 1930s, when the traditional Prague ham reigned. The export of Prague ham in pre-war years reached even into the United States. The production technology of Prague ham eventually adjusted to the long transport of the final product to the American shore. A salted rump was de-boned and the whole muscles were arranged as an anatomical unit in egg-shaped pre-cookers configured as the metal shipping containers.

After the heat treatment in these pre-cookers, the ham was placed into the metal containers, a couple of slices of gelatin were added, the containers were closed and vacuumed, which essentially completed the manufacturing process. The production process of this "modern Prague ham in sheet metal" was eventually streamlined to increase productivity with the product pasteurized directly in the metal containers. For example, in Studená in the 1930s, Jan Satrapa began to specialize in large-scale production of ham in metal cans for export under the name of Bohemia Ham, offering Bohemia Prague Ham and Bohemia Prague Ham Rolls (Plate VIII, Figure 7).

Now let's go back twenty or thirty years, to Prague, to Královské Vinohrady, to the Chmel Company. The classic Prague ham at the turn of the 20th century was made from the legs of Czech Large White pigs of selected breeds, and later from the Přeštice Black Pied breed, which were juicier due to better marbling. Chosen were well-muscled pigs with the live weight of 60-70 kg. The rumps had to come from healthy, rested animals, well-fasted prior to slaughter.

Proper attention was also given to feed composition. In the last stage of fattening, the pigs did not get green fodder but a kernel-type feed (60% corn, 25% barley, 15% bran), plus whey and milk.

After the slaughter, proper cooling and grading by master the hams weighing 3-5 kg were covered by dry, coarse, edible salt mixed with 3-5% of annealed sodium nitrate and 4% of granulated sugar. The salt mixture was rubbed into the meat with the surplus shaken off, and then the hams were placed into wooden vats, skin down. The second or the third day, the hams were covered with 12° Bé brine prepared from the same salt mixture. After 14 days, the ham were repositioned and allowed to rest for 4-6 weeks. A variety of refinements were devised to produce hams of robust flavor and taste. For example, the salting process was done so that the ham was repositioned every 14 days and the temperature raised at that point. The curing started at 4 °C, after 14 days the temperature increased to 8 °C, and after another 14 days to 12 °C. This method was practiced at the Chmel Company in Zvonařka, but it was rather demanding on the refrigeration equipment (Linde refrigeration technology), which is why it never caught on. The time required to achieve good salt saturation in hams along with perfect coloration depends, to a large extent, on the ham size and the curing temperature. With an average temperature of around 6 °C, it takes about 4 weeks to salt-cure hams weighing 5 kg (Klíma-Blanka 1967). Mr. Nachmüllner, a butcher in Prague, was a ham producer, but he was better known as the manufacturer of fast-curing nitrite salting mixture called Praganda. It was a mixture of sodium chloride with 0.5-0.6% of sodium nitrite. A rapid diffusion of salt into chunks of meat during the production of Prague ham on the bone was achieved by injecting the brine into the blood ways (Plate IX, Figure 8), using long hypodermic needles.

Injecting into the blood vessels of whole hams was done even after the World War II, until 1955. It necessitated an undisturbed blood circulation system. The brine was injected

into the rear hip artery (arteria iliacea externa) or the abdominal artery (aorta abdominalis). A disadvantage of this method was that the pigs could not be halved. Having been hung and chilled, the two rumps were separated by a cut between the fourth and the fifth lumbar vertebrae. The blood vessels were injected with highly concentrated brine at 20-22 °Bé in quantities of 6-8% of the rump weight, using a special injection gun. The level of injection was checked on a specially modified „injection balance“.

Injection into the blood ways was complemented by punctures with a hollow, perforated needle into the lumbar muscles that were less bloody.

The 12-pound hams in cans were thermally processed immersed in water in open tubs. The bath was initially heated to 90 °C for 30 minutes. It was believed that the surface of the ham will „pull tight“, keeping the meat juices inside. These open hot tubs were still in service in Vamberk as late as in 1986. The water temperature was then lowered to 80 °C. This treatment was based on the formula of 1 hour per each kilogram of meat, therefore a 12-pound container would be pasteurized for 5 and 1/2 hours.

In the 1950s, a transition from the manual ham injection to mechanical industrial production was under way, as injectors for whole hams and smoked meats with concentrated nitrite solution at the 8% level relative to the weight of the rump were being introduced into the process. This resulted in an 8-10 fold increase in productivity. Ascorbic acid, in the quantity of 30-50 mg per 100 g of meat, was being added as an antioxidant (color stabilizer) into the brine, boiled and chilled to between +1 and +2 °C. This method of rapid and uncomplicated salt saturation with nitrite brine was eventually adopted for its simplicity and the ability to process the hams by heat shortly after the injection.

In the 1960s, making the classic Prague ham by injecting the whole boned hams with nitrite brine quickly gave way to an industrial production of boneless braised ham in metal cans for export, using polyphosphates from the food industry.

In the days of the Czechoslovak Socialist Republic, the production of Bohemia Prague Ham in square 12-pound containers completely conformed to the requirements of exporting to the USA. The addition of polyphosphates had already been allowed in these hams, but other parameters were strictly monitored, such as the PFF (Protein Fat Free) values. In the 1970s, the foreign exchange earned from ham exports (about 5 000 metric tons a year) made it possible to acquire new production lines for steamed ham in stretch-film packages. That could not have been done without the addition of polyphosphates, because of a necessity to minimize the exudate which created a negative impression when seen through the transparent package. November 1989 brought a big boom in the use of a variety of highly functional food ingredients (carrageenans, gum arabic, protein concentrates, modified starches, etc.) in ham production, and the problems with broth were resolved (Budig 1992 and 2011). In 2001, in an effort to introduce order, classify the products, and bring the situation under control, the Ministry of Agriculture issued Directive No. 326 in an attempt to describe the parameters of different product categories. In terms of the whole-muscle steamed-ham type products, the directive, as subsequently amended, outlines the required properties and parameters. It recognizes three categories of ham: highest quality, selection quality and standard quality. Pork rump is the only meat allowed. The presence of another meat must be mentioned in the name. Unlike the standard ham, the first two categories also stipulate the whole muscle, not granulated or otherwise comminuted meat (Král 2011). These legislative changes and the real need to offer quality products in the marketplace inspired some manufacturers to resurrect the production of traditional, boned Prague ham (Plate IX, Figure 9).

Next in a historical sequence is the whole-muscle boneless Prague ham in 12-pound semi-cans exported to the USA. Today, this whole-muscle Prague ham is offered sliced, in a package with modified atmosphere (Plate X, Figure 10).

We must not forget „the egg“ – a one-pound can of „Bohemia Prague Ham“ intended for unrefrigerated gift baskets and often bought by tourists as a souvenir. Since it is a can, the uninitiated consumer may be disappointed to find that the only thing that this product has in common with the original Prague Ham is the name.

In Brussels, Czech Association of Meat Processors has applied for the three stated forms of the Prague Ham registered trademark in the Czech Republic to be included in the GTS category, i.e. guaranteed, traditional specialty.

Prague ham on the bone remains to be our specifically Czech phenomenon. Whoever now tries to revive this traditional product actually pursues the restoration of guaranteed sources of high-quality materials. The classical method of salting with nitrate brine is today obviously surpassed in many ways. It is now impossible to go by the rule „as much salt as the meat will take“ because the uncontrollable fluctuation of salinity as well as the excessive content of nitrites and nitrates in the final product is legally and hygienically unacceptable. As much as it is important to recognize and honor the nostalgia surrounding the tradition of making and serving the Prague ham, the success is contingent on meeting the requirements of safety and productivity in the manufacturing process.

To be competitive today means to be well equipped technologically, and to be in full control of production, logistics, promotion, and marketing.

Why does the idea of producing a high-quality, Prague-type steamed ham continue to be an appealing but challenging proposition? The education level of the population in the field of gastronomy and healthy nutrition is on the rise. Ham is a popular, ready-made food with minimal fat content, individually packaged, something that inspires consumers' self-confidence. It is good for people of practically all ages, especially for women pursuing a healthy lifestyle, who believe that eating premium steamed ham will make them look better.

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Fig. 1. The coin shaped as a raw ham during the reign of Emperor Augustus



Fig. 2. The salt diffusion into the leg muscle during Parma Ham production



Fig. 3. A magnificent exhibition booth of Chmel company at Prague world exhibition



Fig. 4. A smoking of Prague Ham in Chmel company

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FILIALE UND RESTAURATION KARLSBAD,
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Fig. 5. A great advertisement of company Chmel



Fig. 6. The Italian steamed ham on the bone - the type of Prague Ham, present time

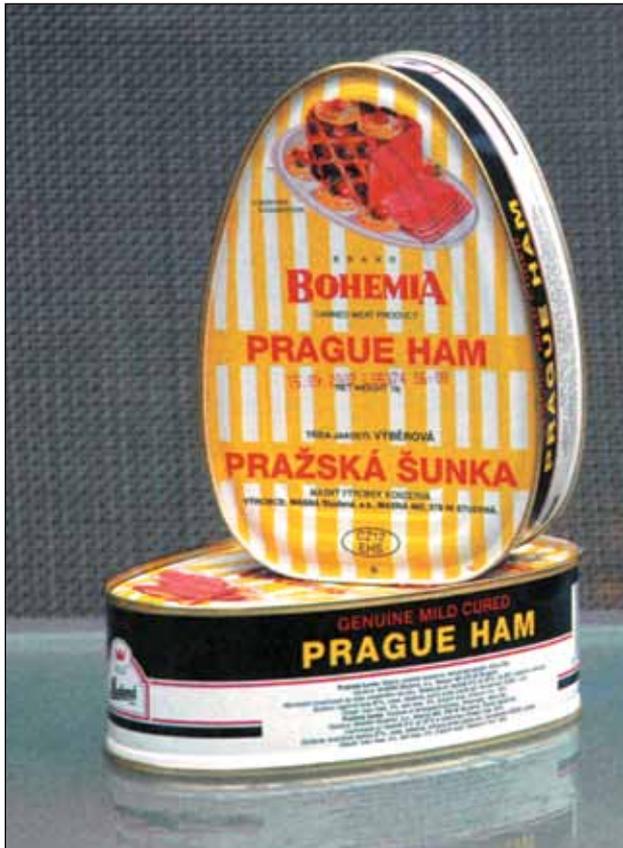


Fig. 7. The original product of meat processing factory Studená - Bohemia Prague Ham

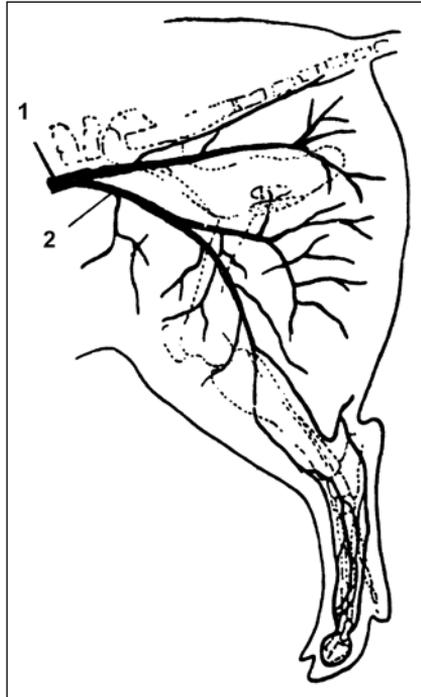


Fig. 8. The scheme of brine injection in blood vessels

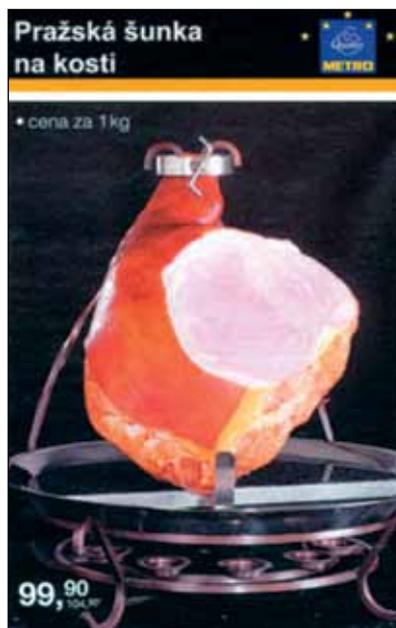


Fig. 9. Bohemia Prague Ham on the bone - company MAKRO/HORECA



Fig. 10. Sliced Bohemia Prague Ham - company LE & CO