



## ***Entremeada* and *Paia de Toucinho***

**Marta Laranjo, Miguel Elias, Luís Patarata, and Maria João Fraqueza**

### **Abstract**

*Entremeada* or pork belly is a fatty cut of meat from the underside of the pig belly. The breeding of autochthonous pig breeds, such as the Portuguese Alentejano pig and Bísaro pig, has always provided alternative nourishment and counteract the deficit caused by bad agricultural years. Several meals and sausages are prepared with the less noble meat cuts obtained from these animals, such as the *entremeada* or pork belly with a higher valorization and improving the sustainability of small family and middle-size industries. Traditional manufacturing processes differ hugely between countries and regions, but also between different manufacturers. Thus, specific characteristics have been established to ensure the quality of these meat products.

The present chapter presents the *entremeada* or pork belly as a meat cut that has been valued in the form of different meat delicatesses such as artisanal bacon or *Paia do Toucinho* or other different meat products with either Protected Geographical Indication (PGI) or Protected Designation of Origin (PDO) made in different Mediterranean countries. Additionally, the formulation and the different stages of manufacturing of the Portuguese meat-based product *Paia de Toucinho de Estremoz e Borba* is described in detail.

**Key words** Traditional meat products, Pork belly, Salted meat products, Smoked meat products, Portuguese traditional meat products, Mediterranean diet, Manufacturing process

---

## **1 Introduction**

*Entremeada* or pork belly is a fatty cut of meat from the underside of the pig belly. Fresh pork belly can be consumed grilled as the Portuguese style grilled *entremeada*, which is a tasty crisp bacon-like grilled meat, due to the rendering down of the fat during grilling. It can also be salted, cured, and smoked to make an artisanal bacon or salted and cured, but not smoked, which differs from the industrial cooked bacon, available in every supermarket.

This type of artisanal bacon (*barriga de porco*) (Fig. 1) is still manufactured in some small industries, particularly in the North of Portugal. The artisanal bacon can be manufactured from pork belly, obtained from the carcasses of Bísaro pigs. It is dry-salted, in a process similar to that used to salt the hams. The salted bellies are



**Fig. 1** (a) Sliced *Paia de Toucinho de Estremoz e Borba*-PGI; (b) Artisanal bacon

then desalted and smoked with the other meat products. The curing and drying allows the lean part of the belly to acquire the characteristic red of cured products, and the chemical modifications on the fat and on the lean results in a very rich aroma. In some regions, small producers use the unboned belly, still with the ribs attached. In certain small industries the process evolved to a salting in brine, and aromatization can be done with the traditional ingredients used for dry-cured sausages, as garlic, wine, and laurel. In any case, the smoking occurs by exposing the bellies to smoke obtained by slow-burning hardwoods, like holm oak. Nowadays, the cured belly available in the big distribution is mostly a pasteurized product, injected with the brine to achieve high production yields.

Furthermore, several Protected Geographical Indication (PGI) or Protected designation of origin (PDO) pork belly meat-based products have been registered (<https://ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/>

[quality-labels/geographical-indications-register/](#)) in European Mediterranean countries, namely:

- *Paia de Toucinho de Estremoz e Borba* (PGI-PT-0156), Portugal (Fig. 1).
- *Pancetta di Calabria* (PDO-IT-1567), Italy.
- *Pancetta Piacentina* (PDO-IT-1497), Italy.
- *Dalmatinska pancetta* (PGI-HR-02455), Croatia.
- *Kraška pancetta* (PGI-SI-0833), Slovenia.

Although the Spanish *panceta* has no recognized PGI or PDO status, it is also largely produced and highly appreciated by consumers [1].

According to the EU Regulation (PGI-PT-0156), the meat and fat used to produce *Paia de Toucinho de Estremoz e Borba*-PGI are exclusively from the carcasses of Alentejano pigs (*Sus ibericus*). The Alentejano pig is part of the Mediterranean group, which also includes the Iberian breed pig, with origin in the ancestral *Sus scrofa mediterraneus* [2]. Raised in agrosilvopastoral extensive systems, such as the Portuguese *Montado* or the Spanish *Dehesa*, and fed on acorns under the *Montanheira* regime [2], their meat has particular organoleptic characteristics, highly appreciated by consumers [3]. Their meat-based products are highly valued, have specific sensory traits, and are manufactured throughout the Mediterranean, in countries such as Portugal, Spain, and Italy, among others, being highly appreciated by consumers.

The *Paia de Toucinho de Estremoz e Borba*-PGI is obtained from the transformation process of a whole pork belly meat cut of Alentejano pig (*see Note 1*), in which the fat content must be not less than 50% (*see Note 2*). After selecting and cleaning (*see Note 3*) the meat, the remaining ingredients (salt, red pepper, garlic) are added. After the preparation of the meat cut and the addition of seasonings, the product undergoes a maturing process, and then the piece is curled, so that it takes the shape of a “snail.” Once the *Paia* is formed, the next step is bagging, tying, and curing using regional holm oak wood.

The characteristic flavor of *Paia de Toucinho de Estremoz e Borba*-PGI is largely due to the influence of the region’s oak orchards. The Alentejo breed’s diet is rich in acorns and holm oak wood is used in smoking. The *Paia de Toucinho de Estremoz e Borba* (PGI-PT-0156) is produced in Portugal, in the Évora region, specifically in Alandroal, Borba, Estremoz and Vila Viçosa.

Thus, the main aim of the present chapter is to describe in detail the distinct manufacturing stages of the salted and smoked pork belly, taking all the above mentioned into account.

---

## 2 Materials

The traditional cured belly is made from the pork belly, in some regions still with the ribs. The meat is dry-salted intercalating the bellies and salt in a salting box, which allows the excess liquid to drain. After a few days, the meat is withdrawn from the salt, the excess of salt on the surface is washed out or brushed, and the bellies are hanged in the smoking house. During this phase, the piece dries, acquiring a golden-brown characteristic color. These pieces might continue in the traditional smokehouse with almost no smoke or are transferred to a drying room for several weeks, and several modifications occur resulting in final flavors and in a color of the lean part of the belly similar to cured ham.

The raw materials used to produce *Paia de Toucinho de Estremoz e Borba* are exclusively the following:

- Pork belly, obtained from the carcasses of Alentejano pigs, born, reared, fed, and slaughtered under the conditions laid down in the Product Specification File (Council Regulation (EEC) No. 2081/92 and Commission Regulation (EC) No 1258/2004 [4, 5]).
- Table salt (*see Note 4*).
- Water (*see Note 4*).
- Red pepper paste (*see Note 3*).
- Non-germinated garlic cloves (*see Note 5*).

The *Paia de Toucinho de Estremoz e Borba*-PGI has a cylindrical shape with a length of 20–45 cm and a diameter of 6–15 cm (Fig. 1a).

This meat-based product has a pleasant aroma, a pleasant, mild, garlicky flavor, smoked and with a balanced sweet/salty ratio. The fat is aromatic and has a pleasant taste. The texture is not very fibrous and is reasonably smooth.

The following characteristics of the *Paia de Toucinho de Estremoz e Borba*-PGI are covered by the Protected Geographical Indication (PGI):

### External Characteristics

- *Color*: light brown.
- *Appearance*: smooth and glossy.
- *Consistency*: semi-soft.
- *Casing*: unbroken, completely filled with the mixture and adhering closely to it.
- *Tying*: sewn in the meat joints, tied with red and white cotton twine at the ends with a double knot, and wrapped with the

twine in a spiral along its length (every 3 cm) around the entire outer surface of the product.

#### Internal Characteristics (When Cut Obliquely)

- *Color*: the fat is predominantly white in color with a reddish snail-shaped phase for the streaky meat.
- *Paste*: perfectly bound, with a perfectly defined distribution of meat and fat.
- *Appearance*: heterogeneous, marbled, with brightness and intramuscular fat infiltration.
- *Fat*: white in color.

#### Chemical Characteristics

- *Moisture content of the meat fraction*: <65%.
- *Total fat*: >50%.
- *Chlorides*: <7%.

The manufacturing process of the *Paia de Toucinho de Estremoz e Borba*-PGI as defined in the “Product Specification File,” will be described in the next section of the current chapter.

---

## 3 Methods

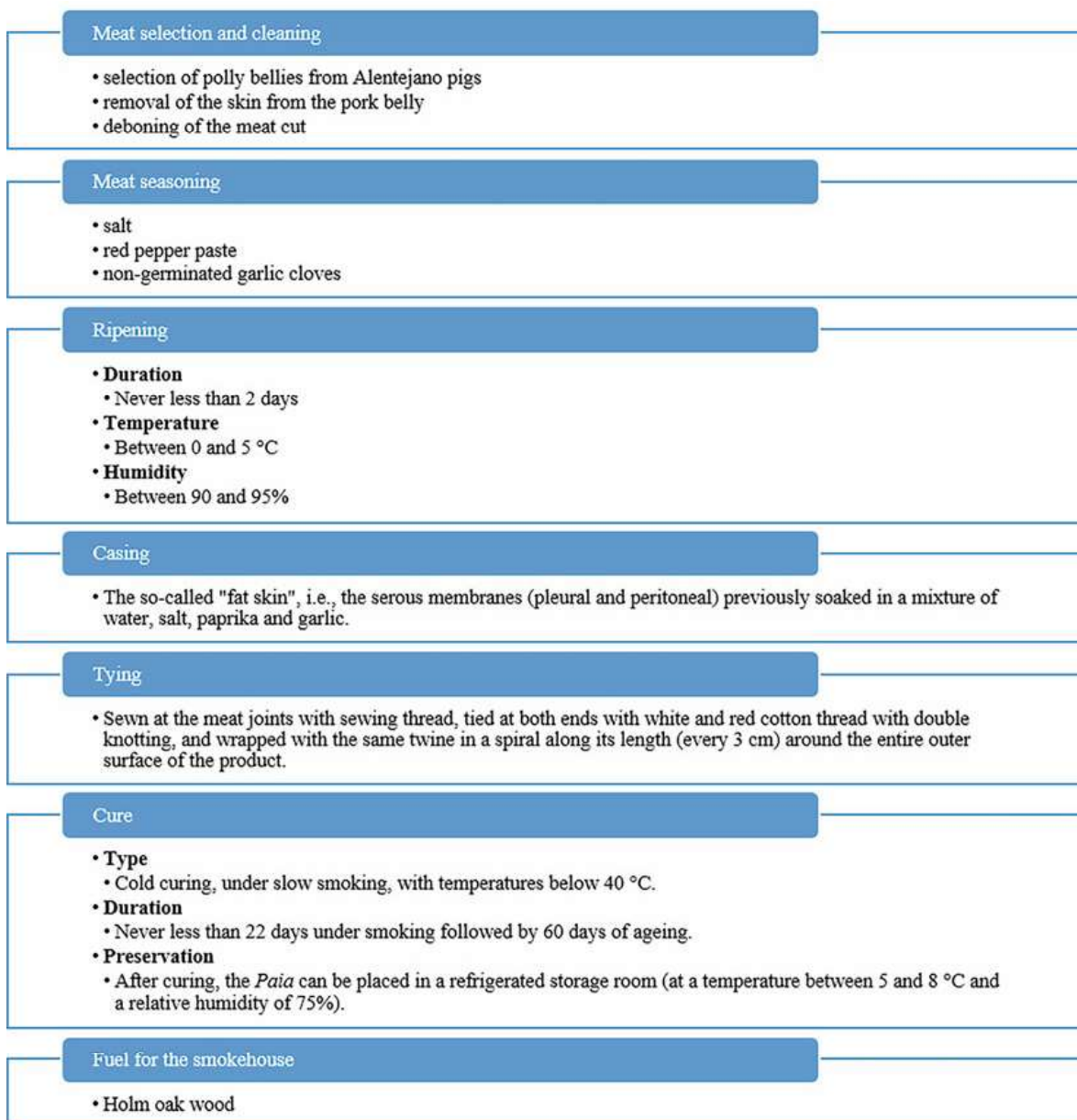
The different steps of the manufacturing process will be carried out in accordance with the ancient traditional knowledge of local producers to obtain a high-quality product.

The manufacturing process of the *Paia de Toucinho* includes several steps (Fig. 2), namely meat selection, meat cut cleaning, addition of ingredients, ripening, curling of the meat cut, bagging, tying, and curing, which will be carried out as described below.

The *Paia de Toucinho de Estremoz e Borba*-PGI is obtained from the processing of whole pieces of pork belly from Alentejano pigs, in which the quantity of fat must never be less than 50%. After the selection and cleaning of the meat cut (*see Note 3*), the remaining ingredients, previously listed in the Subheading 2 (Materials) of this chapter, are added (without the *Paia* losing the original designation).

After preparation and seasoning of the meat cut, the product is left to mature for approximately 2 days, after which it is curled, so that the *Paia* takes the shape of a snail. Once the *Paia* is formed the following steps are bagging, tying, and curing.

To obtain the final product, the technological parameters shown in Fig. 2 must be taken into account. The chemical composition of the final product (after the drying-ripening period) is specified in Table 1.



**Fig. 2** Manufacturing diagram and technological parameters of the *Paia de Toucinho de Estremoz e Borba*-PGI

Regarding the commercial presentation of the *Paia de Toucinho de Estremoz e Borba*-PGI is available to the consumer in whole piece, in pieces or sliced (see **Notes 6** and **7**).

About the consumption of this meat-based Alentejano pig product, the *Paia de Toucinho de Estremoz e Borba*-PGI is particularly appreciated raw. It can be eaten as snacks, titbits or as appetizers at meals, lunch, or dinner (see **Note 8**).

To sum up, it can be said that the *Paia de Toucinho de Estremoz e Borba*-PGI has a great reputation associated to its region of origin and has quality characteristics that are indistinguishably

**Table 1**  
**Chemical composition of the *Paia de Toucinho* and the artisanal bacon, according to the Food Composition Table (<http://portfir.insa.pt/>) [6]**

	<i>Paia de Toucinho</i>	Artisanal bacon
Energy (kcal/100 g)	361	500
Energy (kJ/100 g)	1500	2090
Water	37.9	32
Fat	30	50.1
Saturated fatty acids (SFA)	13.7	16.8
Monounsaturated fatty acids (MUFA)	15.7	19.4
Polyunsaturated fatty acids (PUFA)	4.6	7.6
Protein	22.8	13.7
Carbohydrates	0	0
Ash	9.1	4
Salt content	4.4	3.6
Cholesterol (mg/100 g)	77	55

All values are given as g/100 g, except where otherwise indicated

linked to both the region where it is produced and to the traditional ancestral know-how of the people of that region.

#### 4 Notes

1. The meat and fat raw material used in the manufacturing of the *Paia de Toucinho de Estremoz e Borba*-PGI are exclusively obtained from carcasses of Alentejano pigs.
2. The fat content of the pork belly meat cut must not be less than 50%.
3. The meat cuts are carefully selected, the skin is removed, and the meat cut is deboned.
4. There are no specific amounts for water and salt, so each manufacturer mixes these ingredients according to their own criteria.
5. The garlic must be dried as referred to in the Annex to Council Regulation (EEC) No 10/65 [7].
6. When the *Paia de Toucinho de Estremoz e Borba*-PGI is commercially presented in pieces or sliced, it must be pre-packaged at the manufacturer.



7. When presented as whole pieces, the *Paia de Toucinho de Estremoz e Borba*-PGI does not need to be labeled with the net quantity, provided that it is weighed in the sight of the consumer.
8. It is advisable to keep it stored in a cool and dry place, in order to enhance its *sui generis* qualities.

---

## Acknowledgments

Maria João Fraqueza is a member of network Red CYTED HEALTHY MEAT (119RT0568). We thank projects GO49 PDR2020-1.0.1-FEADER-031359 funded by National Funds and co-funded by the European Union, and UIDP/00276/2020 (CIISA), UIDB/05183/2020 (MED) and UID/CVT/00772/2020 (CECAV) supported by National Funds through FCT-Foundation for Science and Technology.

## References

1. Bejarano SM (2001) Enciclopedia de la carne y de los productos cárnicos. Martín & Macías, Plasencia
2. Charneca R, Martins J, Freitas A et al (2019) Alentejano Pig. In: Candek-Potokar M, Linan RMN (eds) European local pig breeds - diversity and performance. A study of project TREASURE. IntechOpen, Londres
3. Albuquerque A, Neves JA, Redondeiro M et al (2017) Long term betaine supplementation regulates genes involved in lipid and cholesterol metabolism of two muscles from an obese pig breed. *Meat Sci* 124:25–33
4. EC (2004) COMMISSION REGULATION (EC) No 1258/2004. In: EC (ed)
5. EEC (2002) COUNCIL REGULATION (EEC) No 2081/92. In: EEC (ed)
6. INSA (2019) Food composition table. <http://portfrinsapt/>
7. EEC (1965) Regulation No 10/65/EEC of the Council. In: EEC (ed)