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Hypothesis for Relaunch of the Pig Farming Sector in Piedmont: Medium/Heavy Pigmeat as the Raw Material in the Production of Cooked Ham

Alessandro BONADONNA*, Paolo ACETO**, Giovanni PEIRA***, Erica VARESE****

Abstract

The "Mediterranean approach" to quality has enabled the development of greater awareness with regards to products and territories and, as a consequence, has led to the creation of various systems for enhancing some aspects of food and agriculture production, such as geographical indications. One of the privileged characteristics of this approach is provenance, especially if the product is local, which is synonymous with high quality, freshness, safety and sustainability. Several studies show that consumers are particularly sensitive to these aspects that are also of absolute economic importance for production processes involving single products and/or segments, as in the case of the Italian swine supply chain. Italian swine production is based mainly on the breeding of heavy pigs (around kg 160) to be transformed into high-quality charcuterie products and hams, supplying the geographical indication products sector. This strong link with typical local products enabled an increase in breeding without fears from foreign competition, which was excluded from production codes. The recent issues (falling in the numbers of slaughtered pigs and pork legs certified for PDO production, falling in consumption of these products and the imbalance in distribution in the value chain) have opened the debate on the need to diversify primary pork production. This study analysed the hypothesis of medium/heavy pig introduction in the swine sector and assessed the degree to which this pig would be appreciated by operators in various sectors of production (cooked ham, speck, fresh meat).

Keywords: *cooked ham, medium/heavy pig, Italian swine sector, high-quality charcuterie products, Mediterranean approach.*

1. Introduction

One of the most debated aspects of food and agricultural produce in literature concerns the meaning that the term quality can have in different geographical areas. For example, in the European Union the term is given two different connotations in northern countries and Mediterranean area. For the northern area, quality in relation to food products refers to health and hygiene aspects and nutritional principles, as monitored and governed by public authorities. For southern countries, on the other hand, quality has different and varying meanings, all related to sensorial factors, involving elements such as geographic area of production, terroir, culture and resources, as well as more strictly sensory aspects and those related to the specificity of the product (flavour, odour, colour). In the latter case, it is clear how a place of origin and a method of production are decisive to define the quality of a product and how distant this is from the northern interpretation. (Barjolle and Sylvander, 2000)

The "northern approach" to quality has enabled implementation of HACCP (Hazard Analysis Critical Control Point) in the European food and agriculture system. Application of European norms has helped the industry and distribution operators to identify and evaluate the risks to the healthiness of food products, establish control mechanisms, monitor performances and record the results of control activities. This procedure could be seen as both an instrument for safeguarding health and hygiene and as a feature of business management. Introduced by EU Directive in 1994, the discipline has nevertheless undergone several modifications, partly dictated by the need to streamline and integrate the enacting terms (e.g. extending the obligation for application to primary production), and partly fuelled by the various food alarms occurring over the last 15 years. Dioxin-contaminated pork and chicken and the BSE (Bovine spongiform encephalopathy) crisis highlighted the need to establish a mechanism capable of safeguarding the consumer more (Cowan C., 1998), by monitoring the various stages in the production chain (Regulation EC No. 178/2002). Initially introduced for the beef industry, traceability was later extended to the entire food and agriculture sector (Contato R., 2005) under strong and determined pressure from the food and agriculture industry which saw this system as being necessary not only to regain the confidence of consumers (Bergeaud and Ferretti, 2006), but also as a means of competitiveness (De Cindio et al., 2011).

The "Mediterranean approach" to quality has enabled the development of greater awareness with regards to products and territories and, as a consequence, has led to the creation of various systems for enhancing some aspects of food and agriculture production, such as geographical indications. Thanks to these systems, food products are able to distinguish themselves on the basis of any intrinsic and measurable characteristics they may possess, which cannot be found in conventional products and provided these characteristics are perceived by the consumer (e.g. EU "Quality package").

One of the privileged characteristics of this approach is provenance, especially if the product is local, which is synonymous with high quality, freshness, safety and sustainability. In addition to the spread of events such as farmers' markets (Brown and Miller, 2008), local and regional foods (Sassatelli and Scott, 2001), several studies show that consumers are particularly sensitive to aspects concerning the provenance of raw materials and/or finished products in the food sector (Banterle and Stranieri, 2008) and related guarantees (Bernues et al., 2003), albeit sometimes with contrasting values (Belliveau, 2005).

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These issues are also of absolute economic importance for production processes involving single products and/or segments, as in the case of the Italian pork industry. Indeed, over the last few years, several structural fragilities have come to light in the Italian pork industry, which had previously been mitigated by favourable market dynamics. Italian pork production is based mainly on the breeding of heavy pigs (around 160 kg) to be transformed into high-quality charcuterie products and hams, supplying the geographical indication products sector. This strong link with typical local products, together with favourable market conditions which have long boosted the production of PDO hams and salamis (Paleari and Beretta, 2011), enabled an increase in breeding without fears from foreign competition, which was excluded from production codes. The recent fall in the numbers of slaughtered pigs and pork legs certified for PDO production (IPQ-INEQ, database), the fall in consumption of these products (ISMEA, 2010) and the imbalance in distribution in the value chain (CRPA, database) have reopened the debate on the need to diversify primary pork production. (Peira et al., 2010)

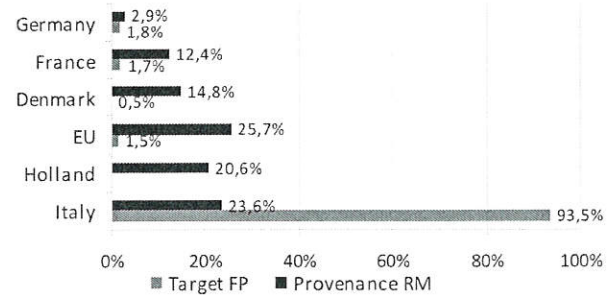
Proposals to introduce a smaller animal than the heavy Padano variety to Italian stock farms were made during talks held on animal husbandry (MIPAAF, 2008). Regione Piemonte has adopted the contents of the new guidelines devised for nation-wide application and in 2010 approved the "Regional strategic draft plan for the development and promotion of Piedmont pig farming" (Regional Decree Law no. 47-13133 of 25/01/2010) where the various strategies include the need to set up studies and research for the rearing of quality medium/heavy pigs (around 135 kg) for various sectors of the PDO circuit.

The Department of Commodity Science of the University of Turin, in collaboration with Regione Piemonte and APS Piemonte, led a two-year project (2010/2012) aimed at ascertaining whether there was a valid alternative to the production of heavy pigs. More specifically, the project analysed and assessed the degree to which medium/heavy pigs would be appreciated by operators in various sectors of production (cooked ham, speck, fresh meat) (Aceto P. et al., 2011), as the meat obtained from such an animal may, in addition to the fresh meat sector, also be directed at the production of high-quality charcuterie such as cooked ham, and speck, a cured ham obtained from the "*baffa*", a particular section of the leg.

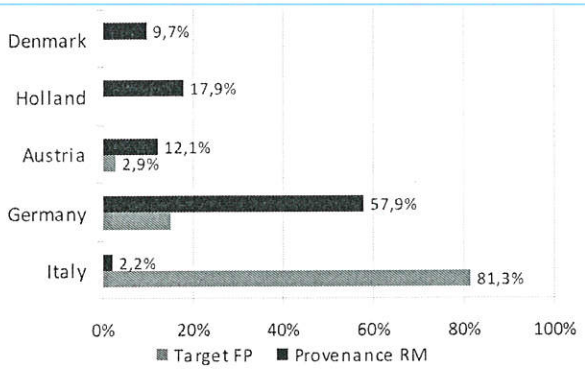
In the first year of the project (March 2010 – February 2011) interest in a medium/heavy pig was surveyed among Piedmont cooked ham producers, national speck producers, large-scale retail and Piedmont consumers (Peira et al. (4), 2011).

1.1. Summary of the first year of the project: survey of Piedmont cooked ham producers and national speck producers

In the first year, the production of cooked ham and speck were identified as a privileged area because of their well-known link with foreign procurement markets. The charcuterie producers interviewed (37 for cooked ham, 42 for speck) pointed to the north European markets as the privileged channels for Piedmont produced cooked ham (76.3%) and for almost all of the national production of speck (97.8%). The target market for the finished product, on the other hand, is the domestic market: 93.5% of Piedmontese production and 81.3% of speck stays in Italy. (*Graphs* 1 and 2)

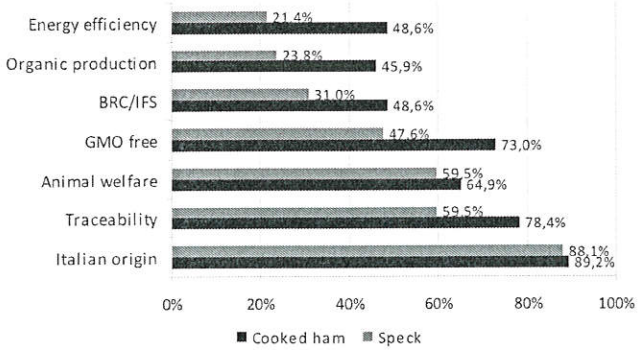


Graph 1. Provenance of raw materials and target market of finished product, percentage – Cooked ham



Graph 2. Provenance of raw materials and target market of finished product, percentage – Speck

In terms of the possible instruments for characterising raw materials, the possibilities of obtaining "Italian certified" raw materials, of assuring the chain of production from the "farm to fork" and the wellbeing of the animal were all met with the highest level of appreciation by the producers interviewed. Less appreciation was given to certificates for energy efficiency and organic production. (*Graph* 3)



Graph 3. Number of companies interested in purchasing certified raw materials – percentage

In terms of the specific characteristics to be possessed by the raw material obtained from medium/heavy pigs, the information supplied by the producers provides elements for constructing a hypothetical model pork leg for the production of ham and *baffa* for the production of speck (*Table* 1).

Table 1. Preferred characteristics of raw material obtained from medium/heavy pig

	Preferred option	
	Cooked ham	Speck
Backfat thickness (cm)	1.50 – 1.99	1 – 1.50
Size (*) (kg)	11 - 12	≤ 9
Marbling	moderate	moderate
Colour of leg	Light red	Light red
Optimal pH	from 5.50 to 6.00	–
Iodine number	< 70	–
Fat colour	white	Pinkish white
(*) *Baffa* for speck		

The data obtained in the first part of the project were encouraging, both from the Piedmont cooked ham producers (Peira et al. (3), 2011), and national speck producers (Peira et al. (1), 2011), and also highlighted the need to verify interest in medium/heavy pork among national producers of cooked ham.

Hence, during the second year of activity (March 2011 – July 2012), the study was extended to the entire national territory, in order to verify the favourable results achieved previously.

2. Materials and methods

The Italian companies identified as producers of cooked ham were chosen by cross comparing data obtained from several databases (AIDA, AMADEUS, Mercato Italia Agroalimentare) using the sector and level of turnover as criteria. 15 operators took part in the study, accounting in absolute terms for around 1/3 of all cooked ham production in Italy.

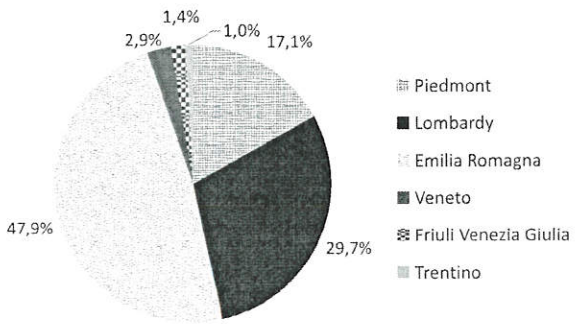
A questionnaire was provided to collect information, which had already been prepared for the activities of the first year (production of cooked ham and speck), divided into three sections dedicated respectively to the procurement of raw materials (α), instruments that may be adopted to characterise the product (β), any interest in raw material obtained from medium/heavy pork with an indication of the characteristics desired from it (γ). The questionnaires were delivered via the PAPI method (Paper and Pen Interview) to the subjects who had been chosen and referred directly by participating companies, based on their roles within the organisation. The SPSS statistics program was used to load and process the data.

There now follow the main data emerging from the study.

3. Results

The companies interviewed are located in several Italian regions: Piedmont (7 companies), Lombardy (3), Emilia Romagna (2), Veneto (1), Friuli Venezia Giulia (1) and Trentino (1).

Based on the information collected regarding section (α), the highest demand for pork legs for the production of cooked ham comes from companies located in Emilia Romagna: weekly procurement is 47.9% of the total. Demand for raw materials from ham factories located in Lombardy accounts for 29.7% of the total and Piedmont companies account for 17.1% of orders. (*Graph* 4)

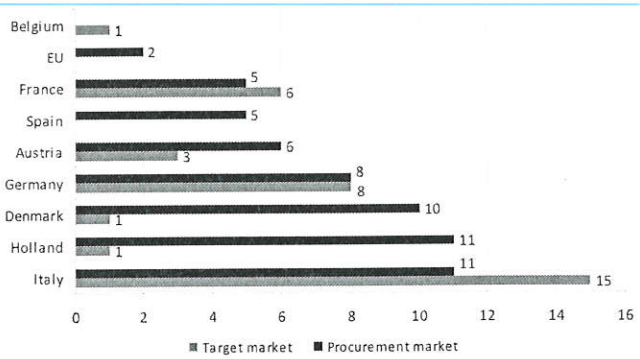


***Graph* 4. Procurement of pork legs by geographical area – percentage**

Overall, declared raw material exceeds 200,000 pork legs a week; so assuming constant production for a whole year, the sample questioned represents an annual production capacity of almost 11,000,000 cooked hams.

When the companies interviewed are divided into categories based on average weekly procurement, 5, operators required between 2,500 and 9,999 units and 4 required fewer than 2,500 units are 4. 3 companies processed between 10,000 and 24,999 pork legs per week and the same number required more than 24,999 units weekly (Graph 1). The first 4 ham factories in terms of the number of legs purchased per week (155,000, around 74.3% of the total) are located in Emilia Romagna and Lombardy.

The procurement markets preferred by most of the companies interviewed were Italy (11 preferences), Holland (11), Denmark (10) and Germany (8. Target markets for output, on the other hand, are mainly Italy (15), Germany (8) and France (6). (*Graph* 5)



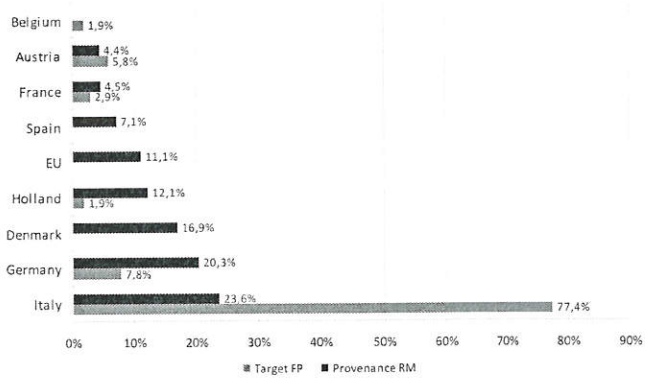
***Graph* 5. Procurement of raw materials and target market of finished product, by number of companies**

In terms of the provenance of the raw material, almost a quarter of the legs used (23.6%) are Italian. The rest comes from various European Union countries, with the main procurement markets being Germany (20.3%), Denmark (16.9%) and Holland (12.1%). Some ham factories indicated the EU as the generic area of provenance (11.0%). (*Graph* 6)

The main reason driving producers of cooked ham to look beyond national borders for three quarters of their supplies can be found in the specific characteristics of the product (15 preferences). Proper preparation (9), high standardisation of raw materials (9) and competitive pricing (9) are other criteria determining the choice of suppliers. Service quality (accuracy of orders, transportation and delivery times) is considered a secondary aspect (4).

Direct purchase from the abattoir and delivery to the jointing workshop are the preferred procurement channels of national producers of cooked ham (12 preferences each). Cooperatives of producers (7), agents (4) and dealers (1) are the channels favoured by a minority of operators.

Among those interviewed the main target market for production is the domestic market (77.4%) with over 160,000 units/week. The remainder goes mostly to European Union countries such as Germany (7.8%), Austria (5.8%), France (2.9%). Very small quantities are exported outside of the EU to countries like Japan (0.12%). (*Graph* 6)



***Graph* 6. Provenance of raw materials and target market of finished product, percentage**

In section (β), most of the companies interviewed (13 out of 15) stated the benefit of obtaining certified Italian raw materials (a.) often identifying greater economic value to certification (9 out of 13). Likewise, the need to certify the distance travelled by the food product and its components right from production of the raw material (b.) was highly appreciated by the producers (13 out of 15) some of whom (8) would be prepared to award it even greater value.

Certification attesting (c.) GMO-free (12 preferences), (d.) IFS/BRC (11) and (f.) BIO (9) and the wellbeing (e.) of the animal (10) were generally welcomed by the companies involved in the

project. IFS/BRC certificates, which are normally required by large-scale retail, seem to hold moderate importance for the producers of cooked ham. The increase in demand for branded products on the Italian market renders their implementation necessary. Application of an energy management system is not considered important (g.) (*Table* 2).

Table 2. **Number of companies interested in certification of raw materials – number of preferences**

Certification	(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)
For implementation	13	13	12	11	10	9	5
Awarding even greater value	9	8	5	5	4	8	0

Section (γ) was dedicated to identify desirable characteristics for the raw material, in order to assess the compatibility of medium/heavy pigs with the demands of the producers of cooked ham. Indicators such as backfat thickness, size, marbling, colour, pH, iodine value and fat colour were considered for the possible required characteristics of this raw material.

The information provided by the companies enables us to construct a hypothetical model of the optimal pork leg from a medium/heavy animal. Assuming a majority of preferences as the determinant for identifying the optimal leg, it is possible to hypothesise to a good degree of approximation that the raw material closest to the demands of cooked ham producers has backfat of between 1.50 and 1.99 centimeters, weighs 11-12 kilogrammes, is moderately marbled and is light red in colour. The optimal pH should be between 5.50 and 6.00 and iodine number should be 70. Lastly, fat should be whitish in colour. The indications collected national confirm the observations made during the first year among Piedmont producers (see *Table* 1).

The last section of the questionnaire investigated actual willingness to buy raw material from medium/heavy pigs. 10 companies would be inclined to purchase, whereas 5 would not. For some operators, interest is contingent on a preventive assessment of the characteristics of the raw material and a requirement to know the final cost of the product.

The companies indicating a minimum quantity (8) said they were willing to buy a total of around 7,000 legs, corresponding to 3,500 animals a week, which represents an average of 5.5% of their production. The same companies said they would be prepared to sign contracts aimed at determining the price of the legs which, in most cases (7), should preferably be set for a minimum period of six months.

4. Discussion

The analysis of data, which is backed by the evidence emerging during the first year, underlines the need to source national raw materials by operators in the cooked ham industry. The approach to the product characterisation tools are shared by most of the companies and is geared towards the need to guarantee the "farm to fork" process of the finished product, as well as the national provenance of the raw material. These convictions are also supported by a willingness to award greater value to certifications attesting these characteristics. The emphasis on these signs of quality are to be traced to the need to provide greater guarantees to consumers, who are increasingly aware of safety issues and interested in the country of origin of food products, as already demonstrated in the first year of the study. Indeed, Piedmont consumers said that certified Italian provenance was very important for cooked ham (81.7%) and placed greater value on this in terms of purchasing, corresponding to an average of +3.3% (Peira et al. (2), 2011).

If the opinions of the operators expressed in the completed questionnaires were confirmed by the market, there would be around 180,000 medium/heavy animals/year in the production chain, alongside the use of meat from heavy pigs, which would contribute to the objective of achieving balance between the market and production. Clearly, this hypothesis is restricted by the specific characteristics of the raw material obtained, which has to meet the required parameters of the production process and final cost, which cannot differ too greatly from the lighter northern European pigs. Implementation and sale of medium/heavy pigmeat and its products may bring useful indications for resolving these issues.

5. Conclusion

The evidence emerging from cooked ham producers suggests that introduction of medium/heavy pigs to Italian farms might be profitable. A controlled decrease in the numbers of heavy pigs bred in favour of a lighter animal appears to be a viable option that would enable a reduction in the consequences of price volatility among agricultural products (Frascarelli, 2012), by allowing more effective control of production costs and better redistribution in the value chain, leading to fewer tensions among operators.

Production of national pigmeat might also be supported by labelling-related decisions taken by Italian and European legislators. The recent European Union Regulation "*on the provision of food information to consumers*" (Regulation (EU) No 1169/2011) is directed at achieving greater clarity and transparency (Correra Ca., Correra Co., 2012). It actually includes the obligation to state the provenance of fresh meats on labels, and this obligation may later be extended to the raw materials of animal-based transformed products. (Varese et al., 2012)

While a need emerges to create the conditions for making the national pigmeat production chain more competitive, there is also a clear need to direct and adapt any type of initiative to the increasingly structured and complex demands of the consumer. The provenance of raw materials and its connection to the local territory are two elements that are considered important in food and agriculture consumption, as also seen among our sample of respondents. These aspects are the basis of the production flows developed and, in some cases, are already part and parcel of the company philosophy. **Q-as**

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