Contribution of Protected Designation of Origin (PDO) beef for sustainable agriculture and meat quality in Portugal

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Protected productions in UE

- Protected Designation of Origin (PDO)
- Protected Geographical Indication (PGI)
- Traditional Speciality Guaranteed (TSG)

PDO - used as a designation for an agricultural product or a foodstuff:

- which comes from such an area, place or country,

- whose quality or properties are significantly or exclusively determined by the geographical environment, including natural and human factors,

- whose production, processing and preparation takes place within the determined geographical area.

PDO status: product must be traditionally and ENTIRELY manufactured (prepared, processed AND produced) within the specific region and thus acquire unique properties.
Protected productions in UE

PGI status: product must be traditionally and at least PARTIALLY manufactured (prepared, processed OR produced) within the specific region and thus acquire unique properties.

TSG status: product does not have to be manufactured in a specific geographically delimited area; it is sufficient that it be traditional and different from other similar products.
Protected productions in EU

Objectives

- Protect the reputation of the regional foods,
- Preserve traditional methods of food production,
- Promote rural and agricultural activity,
- Encourage people to stay settled in rural areas,
- Help producers to obtain a premium price for their products,
- Eliminate the unfair competition and misleading of consumers by non-genuine products, which may be of inferior/different quality,
- Increase consumer confidence by certifying that foods with a PDO/PDI/TSG label are produced to a basic standard.
PDO beef in Portugal

PDO & PGI in PORTUGAL (2003)

- Borrego do Baixo Alentejo (PGI)
- Borrego de Montemor-o-Novo (PGI)
- Borrego Serra da Estrela (PDO)
- Cabrito das Terras Altas do Minho (PGI)
- Cabrito da Gralheira (PGI)
- Cabrito da Beira (PGI)
- Cabrito Transmontano (PDO)
- Carne Barrosã (PDO)
- Carne Maronesa (PDO)
- Carne Mirandesa (PDO)
- Vitela de Lafões (PGI)
- Borrego da Beira (PGI)
- Cabrito de Barroso (PGI)
- Borrego Terrincho (PDO)
- Carnalentejana (PDO)
- Carne Arouquesa (PDO)
- Carne Marinhoa (PDO)
- Carne Mertolenga (PDO)
- Cordeiro Bragançano (PDO)

- Specific genotype
  +
- Geographic region
  +
- Traditional agricultures practices
  (…)

Sustainable production
Nutritive Value
Physical
Sensory
Food safety
Animal Welfare

- 19 PDO/PGI “meat” labels in 2003
- 12 PDO/PGI beef labels in 2007

Portugal is the country of the EU with the largest number of beef with protected names.
Barrosã

PDO beef Breeds

Cachena
Minhota

PDO beef Breeds

Preta
Garvonesa PDO beef Breeds

Mirandesa PDO beef Breeds
Mertolenga Alentejana
PDO beef Breeds

Mertolenga
PDO beef Breeds
## PDO beef framework in Portugal

### Actors
- **producer group** (collect animals for slaughter, marketing of meat)
- **certifying entity** (verifying compliance with the specifications book)
- **entity holding the herd book** (genealogy, records, identification)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Carne Arouquesa (Veal: 6-9 months)</td>
<td>ANCRA</td>
<td>5,800 (2008)</td>
<td>Norte e Qualidade</td>
<td></td>
</tr>
<tr>
<td>Carne Cachena da Peneda</td>
<td>CAA Arcos Vald.</td>
<td>1,300 (2008)</td>
<td>Norte e Qualidade</td>
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<td>Carne Maronesa (Veal)</td>
<td>CA Vila Real</td>
<td>5,928 (2006)</td>
<td>Trad. e Qualidade</td>
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<td>CAPOLIB</td>
<td>7,500 (2004)</td>
<td>Norte e Qualidade</td>
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<tr>
<td>Carne Mirandesa (Veal)</td>
<td>AGROPEMA</td>
<td>5,821 (2008)</td>
<td>Trad. e Qualidade</td>
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</tr>
<tr>
<td>Carne Marinhoa (Veal)</td>
<td>ACB Marinhoa</td>
<td>2,300 (2008)</td>
<td>Norte e Qualidade</td>
<td></td>
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<tr>
<td>Carnalentejana (young bull: 16-24 m)</td>
<td>CARNALENTEJANA</td>
<td>9,744 (2008)</td>
<td>Certialentejo</td>
<td></td>
</tr>
<tr>
<td>Carne da Charneca (young bull)</td>
<td>MERTOCAR</td>
<td>5,126 (2007)</td>
<td>Certialentejo</td>
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</table>

PDO beef in Portugal

<table>
<thead>
<tr>
<th>PDO/year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carne Arouquesa</td>
<td>39.5</td>
<td>35.6</td>
<td>36.0</td>
</tr>
<tr>
<td>Carne Barrosã</td>
<td>266.2</td>
<td>243.2</td>
<td>248.8</td>
</tr>
<tr>
<td>Carne Maronesa</td>
<td>81.0</td>
<td>110.0</td>
<td>134.5</td>
</tr>
<tr>
<td>Carne Mirandesa</td>
<td>296.4</td>
<td>310.0</td>
<td>325.3</td>
</tr>
<tr>
<td>Carne Marinhoa</td>
<td>24.1</td>
<td>124.4</td>
<td>181.0</td>
</tr>
<tr>
<td>Carnalentejana</td>
<td>991.4</td>
<td>623.9</td>
<td>1051.5</td>
</tr>
<tr>
<td>Carne da Charneca</td>
<td>9.2</td>
<td>9.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Carne Mertolenga</td>
<td>261.0</td>
<td>267.0</td>
<td>334.0</td>
</tr>
<tr>
<td><strong>Total (carcass tons)</strong></td>
<td><strong>2114</strong></td>
<td><strong>1901</strong></td>
<td><strong>2479</strong></td>
</tr>
</tbody>
</table>

Although a study revealed that 34% of the consumers are willing to pay an higher price for PDO labelled beef, the PDO beef production was less than 5% of the total beef production in Portugal (118 000 carcass tons in 2005).
Specific Genotypes

- High genetic diversity. Some breeds with ancestral haplotypes derived from Aurochs [6]
- Some native breeds are in high risk

<table>
<thead>
<tr>
<th></th>
<th>Mirandesa</th>
<th>Maronesa</th>
<th>Barrosã</th>
<th>Cachena</th>
<th>Minhota</th>
<th>Arouquesa</th>
<th>Jarmelista</th>
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<tbody>
<tr>
<td>Genotype</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>n&lt;50</td>
<td>n&lt;200</td>
<td>n&lt;1000</td>
<td>n&lt;200</td>
<td>n&lt;500</td>
<td>n&lt;200</td>
<td>n&lt;50</td>
</tr>
</tbody>
</table>

**Trees and Diagrams:**


[9] Phylogenetic tree comparing Aurochs with other breeds.

**Images:**

- Alentejana
- Garvonesa
- Mertolenga
- Ramo Grande
- Brava
- Marinhoa
- Preta
Geographic region + Production system

• PCA using IMF FA profile distinguishes PDO beef of meat obtained in intensive production.

• Barrosã and Arouquesa (Maronesa, Cachena and Mirandesa) PDO meats have their origins on purebred calves fed with farm products and suckling from cows grazed on natural pastures.

<table>
<thead>
<tr>
<th>Lipid fraction</th>
<th>Alentejana</th>
<th>Mertolenga</th>
<th>Barrosã</th>
<th>Arouquesa</th>
<th>Intensive</th>
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</thead>
<tbody>
<tr>
<td>IMF (mg/g)</td>
<td>11-22</td>
<td>12-18</td>
<td>16-23</td>
<td>17-30</td>
<td>9-15</td>
</tr>
<tr>
<td>Colest. (mg/g)</td>
<td>0.42-0.49</td>
<td>0.40-0.50</td>
<td>0.42-0.56</td>
<td>0.49-0.53</td>
<td>0.35-0.37</td>
</tr>
<tr>
<td>PUFA/SFA</td>
<td>0.32-0.63</td>
<td>0.36-0.68</td>
<td>0.19-0.29</td>
<td>0.17-0.29</td>
<td>0.40-0.84</td>
</tr>
<tr>
<td>n-6/n-3</td>
<td>10-14</td>
<td>7-15</td>
<td>3</td>
<td>2</td>
<td>17-20</td>
</tr>
<tr>
<td>CLA (mg/g IMF)</td>
<td>4-5</td>
<td>3-4</td>
<td>7-9</td>
<td>7-9</td>
<td>4</td>
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</tbody>
</table>

• Alentejana and Mertolenga PDO meats are obtained from young bulls, in general, finished on concentrates.
Nutritional Composition

• Portuguese PDO meat is lean (< 3% intramuscular fat: longissimus L4-L6).

• Arouquesa Barrosã and Mirandesa PDO veal have typical pasture fed characteristics (high levels of n-3 PUFA and t11c13 and c9t11 CLA isomers).

• Alentejana and Mertolenga PDO beef have typical values close to those obtained in animals raised on concentrates. [12;13;14]

• Barrosã (15-34 mg/150 g) > 2× total CLA than Mertolenga (7-15 mg/150 g). [15]
The role of PDO Beef - Conclusions

- Preserve native breeds (Portuguese understanding) - maintain overall diversity and biodiversity in rural areas.

- Establish farmers in rural areas.

- Refrain desertification of mountain areas (maintenance of mountain pastures).

- Preserve traditional methods of beef production.

- Help producers to obtain a premium price for their meat.

- Protect small-scale differentiated productions.

- Obtain meat with unique sensory attributes (resulting from a unique interaction genotype × environment).

- Obtain healthier meat from extensive production systems (IMF with more favorable n-3 PUFA, CLA and P/S levels).


Thank you