

**First progress report from the European  
declaration on alternatives to surgical  
castration of pigs (16/12/2010)**

***Report from the Expert Group on ending the  
surgical castration of pigs (2012 – 2014)***

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For the first time within several years experts and main European actors of the pig chain decided to adhere to a common European declaration on alternatives to surgical castration of pigs. The main goal here is to stop the surgical castration of pigs from 1<sup>st</sup> of January 2018 by voluntary agreement.

The goal is ambitious and the work done in the past years has been capable to catalyse exchange of information between scientists, farmers, representatives of industry, representatives of consumers and animal welfare non-governmental organisations.

The European Commission supports the work of the Expert group promoting information exchange, supporting studies and coordinating research on the alternatives to surgical castration. All this actions take place to support the uniform application of the European legislation.

This report shows that much is already achieved and it furthermore points to the challenges that still need to be resolved. The European Commission will conduct new studies in the coming years, the first call for tender is planned to be published this autumn. The expected results of these studies hopefully will put the work a great step forward.

Despite the seen progress the Expert group points the fact that according to the targeted end in 2018 half of the time is elapsed, but when it comes to results we're not halfway.

Closing I would like to underline that from the Expert group's view it is still possible to achieve the objectives. The tipping point at which more companies will succeed in the transition towards alternatives to surgical castration of pigs seems to be coming closer.

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# Abstract

On the invitation of the European Commission and the Belgian Presidency of 2010 and following a workshop on alternatives for pig castration, representatives of European farmers, meat industry, retailers, scientists, veterinarians and animal welfare NGOs signed the European Declaration. This Declaration stated that the surgical castration of pigs is an animal welfare concern. That although castration is practiced to avoid undesirable sexual or aggressive behaviour and the development of boar taint, research has proven that this surgical procedure inflicts pain and discomfort, even in very young pigs.

The Declaration contains two steps, the first being to perform, as of 1 January 2012, the surgical castration of pigs with prolonged analgesia and /or anaesthesia. As a second step, the surgical castration of pigs should be abandoned by 1 January 2018. The signatories established an Expert Group to ensure the implementation of the European Declaration in transparent, efficient and manageable manner. Part of the work is to exchange information between member states on the barriers involved and options for solutions. This public report represents the first progress report as foreseen in the Declaration.

Experience of producing entire (i.e. non –castrated) male pigs is extremely varied. It ranges from those countries with a lot of experience such as the United Kingdom Ireland, Spain and Portugal, to countries in which companies have only recently started such as The Netherlands and Belgium or are considering to start such as in Austria, Denmark, France, Germany, and Sweden, finally there are countries with little or no perceived sense of urgency (Czech Republic, Poland, Romania, Hungary, and Italy).

The Expert Group aims at realising several tools to support the ambition of the declaration. Realising the first tool, stimulating broad acceptance of products from pigs not surgically castrated, varies from country to country. Another important tool, agreement on a common understanding of boar taint has to be realized yet. A cost-benefit analysis<sup>1</sup> is being conducted on the consequences of ending surgical castration, initial results show that raising entire male pigs can yield the highest benefits compared to all other options. However, the market risk of acceptance in third countries was not explicitly included in this analysis. Several other research projects are also under way, but the coordination of national projects across member states is lacking. The expert team on developing information and training is preparing a proposal to intensify communication and knowledge exchange across the members of the partnership and other actors. Members of the Expert Group

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<sup>1</sup> Study and economic analysis of the costs and benefits of ending surgical castration of pigs, CIVIC Consulting December 2013

have to establish a list of traditional products requiring heavier pigs for which, at the current state of knowledge, castration is still considered unavoidable to meet the current quality standards.

The case for complete 'non-castration' poses both business opportunities and threats. It contributes to solving an important animal welfare issue, and can reduce feed costs via better feed utilisation. However it poses risks from consumers reducing consumption of pig-meat due to the presence of boar tainted meat. However this risk can be mitigated by actively marketing boar meat as some companies are doing. Based on the information we have collected we reach a number of conclusions:

- (1) not all castrated piglets within the European Union are treated with prolonged analgesia and/or anaesthesia, and the applied methods are not mutually recognised,
- (2) we are halfway through the period of 2010 to 2018, but not halfway towards achieving the goal of abandoning castration. Companies are facing a complex transition with market barriers related to institutional, organizational and social-cultural aspects. Some companies have already found directions for solutions, while others are still working on them,
- (3) the substantial funds for research that are available are not being used in an efficient manner on a national level. There is a need for more coordination of the national research projects, especially for the research on unravelling boar taint to achieve a common understanding on the phenomenon, and
- (4) the results of the research projects underway will assist in reaching the goal to end castration by 1 January 2018. But this is only if point 3 is seriously addressed and international collaboration is set up shortly as recommended below.

It has to be emphasized that the status of the report is of an informal nature and that some points are still under discussion. Based on the collected information and on the above conclusions the Expert Group recommends:

- (1) that the signatories intensify their knowledge exchange on bottlenecks and directions for solutions, and develops a road map for the second half of the period 2010-2018, and
- (2) DG SANCO works to allocate funding into mutually recognised methods using anaesthesia and
- (3) DG SANCO and national funding organisations to enforce coordinated research actions on pre competitive issues, of which unravelling boar taint and the definition of accepted detection parameters are the most important ones.

# 1. Introduction

The non-anaesthetised castration of young boars (male pigs) is regarded as an infringement of the wellbeing and integrity of the animal. Partly for that reason, the issue of the castration of male piglets has grown in importance in the last decade. The complexity of the subject represents an enormous challenge for all those concerned. Not only does it involve many different parties across the pork supply chain, but the practical aspects are complex and multi-faceted.

On the invitation of the European Commission and the Belgian Presidency of [2011] and following a workshop on alternatives for pig castration, representatives of European farmers, meat industry, retailers, scientists, veterinarians and animal welfare NGOs met in Brussels to discuss the issue of pig castration and its possible alternatives, and to consider an to end this practice. The working group met on 2 September, 13 October and 19 November 2010. They decided to sign the European Declaration on alternatives to surgical castration of pigs. As a first step, from 1 January 2012, surgical castration of pigs, if carried out, shall be performed with prolonged analgesia and/or anaesthesia with methods mutually recognised. As a second step and in the long term, surgical castration of pigs should be abandoned by 1 January 2018. Various alternative measures can be applied for reaching the long term goal, from breeding, feeding, farm management, to a safety net at the slaughter line using a detection system for boar taint. To ensure the implementation of the end of surgical castration these tools shall be available and applicable. The participants argued in favour of voluntary introduction and against regulation. The parties wished to use the market to solve the issue. Their ambition was to practice nothing other than castration with prolonged analgesia and/or anaesthesia in 2012 and to end surgical castration throughout the EU in 2018. An annual public report to assess the progress and the implementation costs is foreseen in the Declaration.

The signatories established an Expert Group, to take care of the progress towards meeting the medium and long term ambitions of the Declaration. Part of the strategy is to exchange information across member states on barriers and options for solutions. Therefore, the Expert Group has established four expert teams on: 1) reporting annual progress, 2) communication, 3) training and information, and 4) specifying a list of traditional products requiring heavier pigs. The Expert Team responsible for the progress report is: Gé Backus (Wageningen UR), Susanne Støier (DMRI/Danish Technological Institute), Michel Courat (Eurogroup), Michel Bonneau (Independent expert), and Miguel Higuera (Copa-Cogeca). The Expert Team will evaluate and report on the listed activities foreseen in the Declaration (see Appendix 1). Another part of its work is to make an inventory of national research projects devoted to alternatives to the surgical castration of pigs, including surgical castration with anaesthesia / analgesia, immunocastration, sperm sexing and rearing entire male pigs.

## 2. State of play 2012-2014

### 2.1. Developments differ by country

The European declaration on alternatives to surgical castration of pigs was signed on December 2010. Till then it was estimated that out of the 250 Million pigs reared in the EU, 125 million were male, and 79 % (100 million) of them were castrated without anaesthesia or analgesia. The situation was very variable from one country to another, with some countries not castrating at all, e.g. United Kingdom, Ireland, Portugal, or just a low percentage (Spain). Entire male pig production on a large scale started in the 1970's in UK, Ireland, Portugal and Spain. In other countries like the Netherlands pigs are castrated under CO2 anaesthesia, or not castrated at all. Most piglets in Germany are castrated, more than 95% receive since April 2009 pain relief after castration. Analgesia is required in the German animal protection law. Equally, in Denmark the main part of male piglets is castrated and pain relief is used.

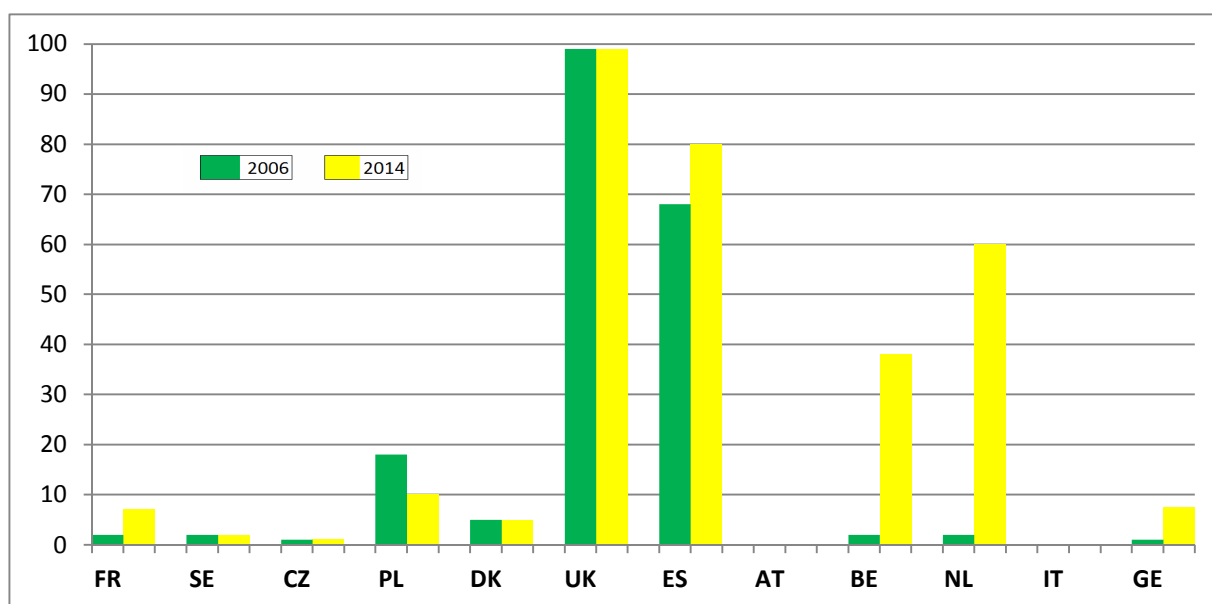
According to the European Declaration, since 01 January 2012 all castrated pigs shall be treated with prolonged analgesia and/or anaesthesia. Animal welfare organisations have accepted this practice as a compromise, pending the abandonment of surgical castration by 2018. This, however, has not been the case and the applied methods are not mutually recognised. There is no common understanding between animal welfare organisations and industry partners on whether prolonged analgesia is sufficient to alleviate the pain provoked by the surgical castration and whether it can be used as a substitute to anaesthesia, or the use of immunocastration. The view of animal welfare organisations is that analgesia - used at the right dose at the right time - will alleviate the pain after the surgical act, but will not have any effect on the pain during the surgical act.

The developments in the percentage of non-castrated male pigs in selected EU countries during the period 2006-2012 are illustrated in figure 1. These selected member states represent approximately 85% of the total pig production in the 28 member states of the European Union.<sup>2</sup>

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<sup>2</sup> [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro\\_mt\\_lspig&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_lspig&lang=en) consulted 22-04-2014.

Figure 1. Percentage non-castrated male pigs in selected EU countries during in 2006 and in 2014.



Source: 2006 data from PIGCAS, 2014 data based on best professional judgement country experts and members of the Expert group.<sup>3</sup>

### 2.1.1. Countries with a long history in producing entire male pigs<sup>4</sup>

**United Kingdom and Ireland<sup>5</sup>:** Male piglets in the United Kingdom and Ireland are not castrated.

These countries have a long history of producing pigs at a relatively low slaughter weight of 65 kg in the 1970s and 1990s.<sup>6</sup> However, slaughter weight has increased in these countries during the last years, to 70.8kg in the year 2000, and to 78.2 kg in the year 2012.

**Spain and Portugal<sup>7</sup>:** All male pigs below 100 kg slaughter weight are not castrated, unless for (Iberico) ham production and other extensive systems. Entire male pigs represent 80% of the male production, 20 % of the male piglets are castrated. Iberico pig equals 5-8% of the production. Iberico pigs are castrated. The Ibérico pigs are aged animals of 12 to 18 months compared to commercial pork that is slaughtered at 5 to 7 months. These pigs are grown under extensive production

<sup>3</sup> For Belgium we did not receive an expert judgement. On the domestic retail market either meat from entire male pigs or from immuno castrated pigs is used. The domestic consumption of pork meat was equal to 38% in 2010 (source: <http://m.hln.be/hln/m/nl/942/Economie/article/detail/1806314/2014/03/06/Meer-varkens-geslacht-in-eeen-jaar-dan-er-Belgen-zijn.dhtml?originatingNavigationItemId=942>). The percentage meat from entire male pigs and from immuno castrated pigs is thus estimated at 38%.

<sup>4</sup> There is no actual information available for the other European Member States

<sup>5</sup> BPEX, Pig Pocketbook 2013, page 14.

<sup>6</sup> <http://www.teagasc.ie/publications/2003/pigconf/paper09.asp> consulted 22-04-2014

<sup>7</sup> Source: Copa-Cogeca

practices. Heavy pigs required for other production systems are also castrated, and represent 12-15% of the production. In Spain no prolonged analgesia is given, but it is perceived as an alternative solution by Iberico producers. Very few farms use immunocastration.

### 2.1.2. Countries which recently started to produce entire male pigs

**The Netherlands:** Castrated pigs in the Netherlands have received general anaesthesia with CO<sub>2</sub> since 2009. An increasing number of Dutch pig farmers have stopped castrating their male piglets.<sup>8</sup> The percentage of entire male pigs increased from 5% in 2009, 45% in 2011, to approximately 65% by early 2014<sup>9</sup>. In May 2013, the Dutch Foodstuffs Trade Organisation posted a message which referred to the fact that Dutch supermarkets would no longer sell meat from castrated pigs as of 1 January 2014.

**Belgium:**<sup>10</sup> The Belgium export market is - as in Denmark and the Netherlands – more important than the domestic retail market. On the domestic retail market either meat from entire male pigs or from immuno castrated pigs is used. One major retail organisation only sells meat from immuno castrated pigs. The other retailers sell meat from either entire male pigs or from immuno castrated pigs. For the export market, meat from castrated male pigs (using analgesia) is used. Reliable statistic data on the market shares are not available. Most retailers are sourcing pork meat from entire or immunocastrated male pigs.

### 2.1.3. Countries<sup>11</sup> starting to prepare for ‘take off’

**Denmark**<sup>12</sup>: In Denmark the level of entire male pigs is approximately 5 %. The main population of male piglets are castrated using prolonged analgesia which is compulsory by law. The Danish industry does worry about acceptance of meat from entire male pigs especially outside the EU. They do not consider immunocastration as a solution. In their opinion, a European solution is needed. Mid-March 2014, an agreement of intention for improving pig welfare standards has been reached between the Danish Minister for Food, Agriculture and Fisheries and Danish organisations with an interest in pig

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<sup>8</sup> <http://boars2018.com/wp-content/uploads/2011/05/history-boars-eng-fin-18-11-2018.pdf>

<sup>9</sup> Based on a quick scan among major Dutch feed companies

<sup>10</sup> <http://m.hln.be/hln/m/nl/942/Economie/article/detail/1806314/2014/03/06/Meer-varkens-geslacht-in-eeen-jaar-dan-er-Belgen-zijn.dhtml?originatingNavigationItemId=942>

<sup>11</sup> There is no actual information available for the other European Member States

<sup>12</sup> Personal communication Susanne Stoier



production. These parties include Denmark's leading animal welfare campaigners. At a "Welfare Summit" involved parties agreed on a declaration covering six main topics including lower mortality for piglets, free range sows, reducing tail docking, avoiding stomach ulcers, providing a better possibility for consumers to choose animal welfare products, and ending castration. One goal is to stop castration without anaesthesia no later than 2018. Involved parties have been discussing an action plan to implement the goals and provide a road map. Details in the action plan have to be further negotiated with the interested parties.

**France**<sup>13</sup>: Prolonged analgesia is used in France for pigs belonging to VPF (French Pork Meat, scheme, i.e. 95% producers). In September 2012, the largest French pork products group Cooperl Arc Atlantique announced that it would stop castration as of March 2013. The group has a 20% market share. Cooperl has an integrated pork supply chain and commercialised their initiative during a trial period in 2013. That year, entire males pigs accounted for approximately 60% of Cooperl production. In 2014 this percentage increased to 70%, which equals about 7% of French production of male pigs. French producers that have adhered to producing entire males pigs do favour this development, because they no longer have to castrate the pigs.

**Finland**<sup>14</sup>: Almost all piglets in Finland are castrated. Anaesthetising or using an analgesia is perceived as possible directions for solution.

**Sweden**<sup>15</sup>: Conventional Swedish pig farmers use prolonged analgesia. General anaesthesia will become compulsory in Sweden as of 1 January 2016. In organic production (KRAV) a combination of anaesthesia plus analgesia is applied. Few pig farmers (less than 5%) market meat from immuno castrated pigs through one small retailer. The percentage of entire male pigs in Sweden is at the most 1 - 2%. Farmers consider boar management as a problem in relation to aggressive behaviour.

**Austria**<sup>16</sup>: In Austria using prolonged analgesia is compulsory by law. Ongoing research in Austria does focus on taking away the pain during and after castration.

**Germany**: In Germany approximately 5-10% of male pigs were not castrated in 2014. The three main processors representing 55% of production (Vion, Westfleisch and Tönnies) are accepting entire male pigs.<sup>17</sup> Retailers demand guarantees for the absence of boar tainted meat. In Germany, the Quality System organisation (QS-organisation) accepted a protocol for the human nose detection method. This protocol was included in the German QS quality management system audits as of July 1, 2012.<sup>18</sup>

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<sup>13</sup> Personal communication Michel Bonneau

<sup>14</sup> Source: Copa-Cogeca

<sup>15</sup> Source: Copa-Cogeca

<sup>16</sup> Source: Copa-Cogeca

<sup>17</sup> [http://www.q-s.de/schlachtunternehmen\\_geben\\_abnahmegarantie\\_fuer\\_jun.html](http://www.q-s.de/schlachtunternehmen_geben_abnahmegarantie_fuer_jun.html) consulted 22-04-2014.

<sup>18</sup> [http://www.q-s.de/schlachtunternehmen\\_geben\\_abnahmegarantie\\_fuer\\_jun.html](http://www.q-s.de/schlachtunternehmen_geben_abnahmegarantie_fuer_jun.html) consulted 22-04-2014.

Entire male pigs are also included in the recently launched `Tierwohl Initiative'<sup>19</sup>. Castration using anaesthesia with CO2 or isoflurane is not viewed as a viable alternative. German pig farmers operating according to rules of QS, are using analgesia since April 2009. Pigs under the Neuland assurance scheme are receiving general anaesthesia with Isoflurane (applied by a veterinarian under special case authorisation, as isofluran is not officially authorised for this use) plus prolonged analgesia.<sup>20</sup> Castration without the use of an anesthetic will be forbidden by 2019.<sup>21</sup>

#### 2.1.4. Countries with little or no perceived sense of urgency

**Czech Republic, Poland, Romania and Hungary<sup>22</sup>:** Industry partners in these countries consider their high carcass weight as an obstacle for stopping the castration of male pigs. There is no sense of urgency on this issue in Eastern European society. Industry partners doubt whether reaching 2018 is feasible, due to the lack of market acceptance. They wonder if immunocastration is a direction for solution. Anaesthesia and/or analgesia are not used.

**Italy:** Male pigs are castrated, some with analgesia. Anaesthesia is not used. The majority of the Italian pig production is located in the Protected Designation Origin region for Parma ham (province of Parma - Emilia-Romagna *region, Italy*).<sup>23</sup> Pigs in this region are slaughtered at 9 months at a live slaughter weight of 160kg. As heavy older pigs are more likely to have boar-taint, Italian industry partners do not consider producing and marketing entire male pigs as an option.

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<sup>19</sup> <http://www.tagesspiegel.de/wirtschaft/spielzeug-im-stall-keine-ferkelkastration-bauern-sollen-fuers-tierwohl-bezahlt-werden/10182192.html>

<sup>20</sup> <http://www.kritischer-agrarbericht.de/fileadmin/Daten-KAB/KAB-2009/Deininger.pdf>

<sup>21</sup> [http://www.bmel.de/DE/Tier/1\\_Tierschutz/texte/Ferkelkastration.html](http://www.bmel.de/DE/Tier/1_Tierschutz/texte/Ferkelkastration.html) consulted 22-04-2014.

<sup>22</sup> Source: Copa-Cogeca

<sup>23</sup> [http://www.prosciuttodiparma.com/pdf/en\\_UK/Specifications.pdf](http://www.prosciuttodiparma.com/pdf/en_UK/Specifications.pdf)

### 3. Evaluation of listed actions

To ensure a sustainable and competitive pig meat supply chain in the EU, the Expert Group on alternatives to surgical castration of pigs, supported by the European Commission, was established in order to realise the several actions needed to support the ambition of the declaration. *a. Ensure the acceptance of products from pigs not surgically castrated by the authorities and the consumers in the European Union but also in third country markets (ongoing)*

Acceptance of products from pigs not surgically castrated by public bodies and market parties in the European Union and in third country markets is necessary for realising the ambition of the European partnership. This acceptance depends on several factors, of which boar taint is a major one. The percentage of meat from boars in the market varies from country to country. It is high in the United Kingdom, Ireland, Spain, Portugal, Belgium and the Netherlands, but low in all other countries.

*b. Agree on a common understanding of boar taint (ongoing)*

The CAMPIG project studied<sup>24</sup> consumer acceptance in the European Union and in third countries of meat obtained from male pigs not surgically castrated. Scientists in this project are making progress in unravelling boar taint, and will provide valuable insights to support companies in their decision making on threshold values for androstenone and skatole. The Commission has also signed an administrative agreement with the Joint Research Center (JRC)<sup>25</sup>, Institute for Reference Materials and Measurements (JRC-IRMM). The objective of this agreement is to develop reference methods recognised by the European Union for the detection and the measurement of the main compounds responsible for boar taint. Despite the progress being made, many questions about the complex phenomenon of boar taint remain to be answered. Agreement on a common understanding of boar taint is a crucial element which requires further coordinated scientific action across countries.

*c. Perform or coordinate research and development and achieve results on (cost) effective measures (2012 – 2014):*

DG SANCO has funded several projects.<sup>26</sup> Besides the CAMPIG study on consumer acceptance of alternatives for castration, and the JRC study on reference methods, studies were approved on rapid detection methods for boar taint used or being developed at slaughter plants in the European Union (BOARCHECK) and on how to achieve reduction of boar taint compounds by breeding, feeding and management techniques. Finally, a study

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<sup>24</sup> CAMPIG is a Wageningen UR project: Consumer acceptance in the European Union and in third countries of pig meat obtained from male pigs not surgically castrated (not published)

<sup>25</sup> JRC project: Inter-laboratory validation of a reference method for the determination of boar taint compounds by GC-MS and LC-MSMS (not published)

<sup>26</sup> Boarcheck is a NOVIMA project: A study on rapid methods for boar taint used or being developed at slaughter plants in the European Union (not published)

on the costs and benefits of ending surgical castration of pigs<sup>27</sup> has been conducted. A total of twenty national research projects have been further identified, with a total budget of 9 million euro. The projects vary in budget and focus, from preventive measures to reduce boar taint prevalence to market acceptance. Analysing the projects in more detail reveals a picture of several countries choosing the same research topics. It seems as if the same efforts are carried out in several countries without cooperation or coordination.

*d. Develop information and training of farmers and other members of the whole pork chain (started at 2014)*

The work of the two expert teams on developing information and training is currently in a very initial phase. They are preparing a proposal to intensify communication and knowledge exchange across the members of the partnership and other involved actors. The groups decided to prepare terms of reference (mandate) for each group that would include the main objectives of the group and scope of their actions. The communication group would like to prepare a communication plan in order to coordinate all communication activities of the group and the training and information group would like to develop a training and information plan.

*e. Cost benefit analysis on the consequences of the end of surgical castration, including an analysis of the change in production costs in various production systems, the costs/benefits affecting the different levels of the pork chain and the cost sharing plans within the pork supply chain (ongoing)*

The Civic Consulting Group has reported a cost-benefit analysis on the consequences of ending surgical castration. The results of the analysis of costs and benefits indicate that the range of the net benefits resulting from the production of immuno castrated male pigs is lower compared to raising entire male pigs. Raising entire male pigs yield the highest benefits compared to all other options analysed, including when compared to the surgical castration of male pigs without analgesia and anaesthesia. It is notable that the result is independent of whether animal benefits for society are considered or not. However, Civic Consulting is rightly pointing out in the synthesis report, that the evaluation of cost and benefits of raising entire males is more complex, and that the market risk in third countries was not explicitly included in this analysis. This market risk in third countries must be taken into account as exports are an important element of the competitiveness of the pig sector in several EU member states. Moreover, some stakeholders question if all relevant economic aspects and parameters are included in the cost-benefit analysis (costs of: boar taint detection, excessive aggressive behaviour, discarding boar tainted pork meat, consumer rejection of boar tainted pork).

*f. Develop a list of traditional productions requiring heavier pigs covered by the derogation mentioned above.*

The expert team that works on this list has a non-conclusive first outcome, pending the scientific work under way in the fields of (a) reduction of boar taint compounds by pig

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<sup>27</sup> CIVIC Consulting, 2013: Study and economic analysis of the costs and benefits of ending surgical castration of pigs(not published)

breeding and /or management and feeding; (b) alternatives to surgical castration with analgesia and/or anaesthesia; (c) test on meat quality for traditional products before any alternatives to surgical castration is used; (d) full costs benefits analysis on alternatives to surgical castration with analgesia and/or anaesthesia.

The Expert Group will further discuss the definition of “heavy pigs” to be agreed upon during the next meeting. Carcass weight, carcass classification and risk of high boar taint prevalence will be taken into account in the discussion on which criteria to be included.

*g. Publish an annual report including a part on the costs for implementing the end of surgical castration and their distribution.*

The progress report is the result of this listed action.

## 4. Conclusions

Based on the collected information the Expert Group formulated four main conclusions:

1. Not all castrated piglets are treated with prolonged analgesia and/or anaesthesia, and the applied methods are not mutually recognised. There is no common understanding between animal welfare organisations and industry partners on whether prolonged analgesia is sufficient to alleviate enough the pain provoked by the surgical castration, and to be used as a substitute of anaesthesia, or use of immunocastration. The signatories consider that the situation calls for considerable efforts for improvement, in line with the commitments of the Declaration.
2. The European Declaration was signed in 2010 with the aim to abandon surgical castration by 1 January 2018, it being 2014 means it is now the halfway point. Meanwhile, a network has been established ensuring regular contact and "learning from each other." This is an important mile stone. The progress is on the halfway the period from 2010 to 2018, but the results are not that far advanced. Companies are facing a complex transition with market barriers related to institutional, organizational and social-cultural aspects. Some companies have already found directions for solutions, while others are still working on them. Additional actions of the signatories and other involved parties are required to accelerate the process to achieve the stated ambition. Then, the signatories still believe that it is possible to realize this ambition.
3. There is substantial research funding at the national level. But it is not used in an efficient manner. The overview of research projects in the appendix illustrates the need for more coordination of the national research projects. This is especially true for the research on pre competitive issues, of which unravelling boar taint to achieve common understanding on the phenomenon is the most important one. For more competitive matters like boar taint detection and genetic solutions, projects could be funded by private companies and/or national agencies.
4. Results of several research projects are under way. Through the projects funded by the Commission on information on consumer acceptance, costs and benefits, detection, preventive measures and on reference methods will be provided to the public domain. In these projects new young scientists have been included with new ideas and approaches. This will pay off in the years to come.

It has to be emphasized that the status of the report is of an informal nature and that some points are still under discussion. Based on the collected information and on the conclusions the Expert Group recommends that the signatories intensify their knowledge exchange on barriers and options for solutions across all segments of the pork supply chain, and to develop a road map for the second half of the period 2010-2018. Special knowledge is required for raising entire males (farm level management), e. g. in relation to feeding or avoidance of injuries. The European Commission is further recommended to allocate funding into mutually recognised methods using analgesia and anaesthesia. The European Commission and national funding organisations need to enforce coordinated research actions on pre competitive issues of which unravelling boar taint is the most important one. The Expert Group considers it important that more comprehensive EU funding will be allocated to unravel the boar taint issue. Furthermore, especially for the countries exporting pork to non EU markets it is of outmost importance to get access to accepted detection methods for sorting carcasses/meat from entire males. In order to meet this demand, it is important not only to understand boar taint but also to define relevant measuring parameters responsible for boar taint.

## Appendix 1: European Declaration on alternatives to surgical castration of pigs

On the invitation of the European Commission and the Belgian Presidency and following a workshop on alternatives for pig castration, representatives of European farmers, meat industry, retailers, scientists, veterinarians and animal welfare NGOs met in Brussels to discuss the issue of pig castration and its possible alternatives, and to consider the possibilities to end this practice. The working group met on 2 September, 13 October and 19 November 2010.

Surgical castration of pigs is an animal welfare concern. It has been scientifically proven, using physiological and ethological parameters, that surgical castration is a painful intervention even when performed on very young animals. Castration is practiced to avoid the development of undesirable sexual or aggressive behaviour, and to avoid the development of boar taint, since the expected taste and odour of pig meat is a very important aspect that consumers take into account when buying pork. Castration is not a producer's decision but a market driven choice. Castration always has an impact on the type, quality and quantity of meat and fat. On the other hand, non surgical castration has a positive impact on feed conversion and consequently, on the environment. Different alternatives to surgical castration are already being applied in and outside the EU such as rearing of entire males or vaccination to reduce boar taint. In some countries castration is carried out with analgesia and/or anaesthesia in order to relieve pain. Several countries have already committed themselves to the long term phasing out of surgical castration of pigs. Some European retailers source pig meat from entire males, vaccinated male pigs or pigs which were surgically castrated with anaesthesia or analgesia. Since different approaches within the European Union could create problems for the functioning of the Internal Market and also for exports to third countries, a European wide approach and mutual recognition will facilitate trade in pig meat.

As a first step, from 1 January 2012, surgical castration of pigs, if carried out, shall be performed with prolonged analgesia and/or anaesthesia with methods mutually recognised. As a second step and in the long term, surgical castration of pigs should be abandoned by 1 January 2018. To ensure the implementation of the end of surgical castration the following tools shall be available and applicable:

- a) Mutually recognised methods for the assessment of boar taint;
- b) European recognised reference methods for the measurement of each of the compounds responsible for boar taint;
- c) Rapid detection methods for boar taint at slaughter plants;
- d) Reduction of boar taint compounds by pig breeding and/or management and feeding;
- e) The production systems and management of entire males during rearing, transport and at slaughter, to minimise sexual and aggressive behaviours.

The costs for implementing the end of surgical castration shall be shared between the economic actors of the chain. An annual public report shall assess the progress in the development and effectiveness of the tools mentioned above as well as the costs for castration and their sharing between the economic actors of the chain.

However, in the case of pig meat registered under "traditional specialties guaranteed" or with "geographical indications" (Protected Geographical Indication (PGI) or Protected Designation of Origin (PDO)) and pig meat produced for traditional high quality products to be listed in accordance with point 6, castration is unavoidable to meet the current quality standards.

To ensure a sustainable and competitive pig meat chain in the EU, a European partnership on pig castration, supported and funded by the European Commission, should be established in order to:

1. Ensure the acceptance of products from pigs not surgically castrated by the authorities and the consumers in the European Union but also in third country markets.
2. Agree on a common understanding of boar taint.
3. Perform or coordinate research and development and achieve results on:
  - a) *mutually recognised methods for the assessment of boar taint;*
  - b) *European recognised reference method for the measurement of each of the compounds responsible for boar taint;*
  - c) *rapid detection methods for boar taint at slaughter plants;*
  - d) *reduction of boar taint compounds by pig breeding and/or management and feeding;*



*e) the production systems and management of entire males during rearing, transport and at slaughter to minimise sexual and aggressive behaviours;*

*f) alternatives to surgical castration with analgesia and/or anaesthesia in the case of pig meat registered under "traditional specialties guaranteed" or with "geographical indications" (Protected Geographical Indication (PGI) or Protected Designation of Origin (PDO)) and pig meat produced for traditional high quality products as listed in point 6.*

4. Develop information and training of farmers and other members of the whole pork chain.
5. Launch a cost/benefit analysis on the consequences of the end of surgical castration, including an analysis of the change in production costs in various production systems, the costs/benefits affecting the different levels of the pork chain and the cost sharing plans between the economic actors of the chain.
6. Develop a list of traditional productions requiring heavier pigs covered by the derogation mentioned above.
7. Publish the above mentioned annual report. The report will also include a part on the costs for implementing the end of surgical castration and their distribution.

This declaration is drafted and signed by several actors in the European pig sector, European retailers and NGO's. The declaration is an open invitation for every actor in the European pig sector and European retailers to join this voluntary initiative. The European Commission and the Belgian Presidency act as facilitators to encourage private parties to subscribe to this declaration.

We hereby call on everyone to join this declaration by publicly endorsing it.

## Appendix 2: Signatories to the European Declaration

- [COPA-COGECA](#) (European farmers and European agri-cooperatives)
- [Eurogroup for Animals](#)
- [UECBV](#) (The European Livestock and Meat Trading Union)
- [CLITRAVI](#) (Liaison Center for the Meat Processing Industry in the European Union)
- [FESASS](#) (The European Federation for Animal Health and Sanitary Security)
- [EAAP](#) (European Federation for Animal Science)
- [EFFAB](#) (European Forum of Farm Animal Breeders)
- [FVE](#) (Federation of Veterinarians of Europe)
- [Danish Agriculture and Food Council](#)
- [DBV](#) (German farmer association)
- [VDF](#) (German meat industry association)
- [HDE](#) (German retail federation)
- [Scientific experts from INRA](#) (Institut National de la Recherche Agronomique)
- [COV](#) (Dutch red meat slaughterhouses)
- [LTO Nederland](#) (Dutch pig farmers organisation)
- [NVV](#) (Dutch pig farmers organisation)
- [NBHV](#) (Dutch livestock traders organisation)
- [ANAS](#) (Associazione Nazionale Allevatori Suini) - Italy
- [DMRI](#) (Danish Meat Research Institute)
- [OIVO](#) - CRIOC (Centre de Recherche et d'Information des Organisations de Consommateurs)
- [FEFAC](#) (European Feed Manufacturers' Federation)
- [CIWF](#) (Compassion in World Farming)
- [The Dublin Society for Prevention of Cruelty to Animals](#) – Republic of Ireland
- [Finnish Farm Animal Welfare Council](#)
- [Galician Meat Technology Centre](#) – Spain
- [Dutch Society for the Protection of Animals](#)
- [PROVIEH VgtM e.V.](#) – Germany
- [SCIENTIFIC EXPERT from IFIP](#) - "Institut du porc en France"
- [PMAF](#) - Protection Mondiale des Animaux de Ferme
- [Soil Association](#), UK
- [ANPROGAPOR](#), Spain
- [Le Centre Wallon de Recherches agronomiques](#)
- [Dyrenes Beskyttelse](#) (Danish Animal Welfare Society)
- [Comité Régional Porcin de Bretagne](#) (CRP Bretagne)

## Appendix national research projects

### I. National Research Projects in the UK (University of the West of England)

1. Title of the project: Proof of Concept of Boar Taint Detector (funded by the UK industry)

Start date: 2010 End date: 2011

Main objectives: To provide proof of concept of novel technology for rapid on-line detection of skatole and androstenone

2. Title of the project: Initial Market Research for novel technology for boar taint detection (funded by the UK Research Council BBSRC)

Start date: 2011 End date: 2012

Main objectives: To conduct initial market evaluation, cost and licensing options for the novel technology for on-line boar taint detection

3. Country: UK (University of the West of England) funded by industry

Title of the project: Effect of Improvac on lipogenic enzyme expression and fatty acid composition in pigs.

Start Date: 2011 End Date: 2012

Main objective: to compare effect of Improvac and surgical castration of fatty acid composition of pigmeat.

4. Country UK (University of the West of England)

Title of the project: Evaluation and validation of the novel technology for on-line detection of boar taint (funding source cannot be disclosed)

Start date 2013 End date 2014

Main objective: 1. To evaluate the novel technology on real meat/fat samples; to compare the novel technology with a traditional method (HRGC)

### II. National Research Projects in France

1 Title of the project: Reduction of pig backfat skatole content by the use of diets rich in fiber

Start date: 01/01/2014 End date: 31/12/2015

Main objectives: Test the effects of different kind of fibers (solubility, fermentability, lignin content) from sunflower meal, wheat bran and potatoes on skatole production during the last weeks of fattening

Cost: 35000 €

2. Title of the project: Raising entire males and assessment of the "Human Nose" detection method in industrial conditions

Start date: June 2012 End date: October 2013

Main objectives:

- Production of 2000 entire males in 20 different piggeries
- Selection of odor testers in 2 slaughterhouses (sensitivity to androstenone and skatole, correct answers to trial test...)

- Training of the testers in Lab conditions to the scoring scale use (3 levels of scores: 0 (no odor), 1 (small odor), 2 (strong odor))
- Implementation of the Human Nose method in 2 slaughterhouses (2 different speed line: 350 and 650 pigs/hour). Selection of the heating equipment, organisation of the implementation on line (procedure, security, documentation...)
- Chemical analyses of back fat for the determination of androstenone and skatole levels at INRA Laboratory
- Comparison between tester's scores and concentrations of androstenone and skatole in fat
- Conclusions on the relevance of the Human Nose Method (false positives and negatives in correspondence with androstenone and skatole threshold values)

Partners: Nine Cooperatives of pig producers, Federations of Brittany and French Pig Producers (ARIP, UGPVB, INAPORC), slaughterhouses

Cost: 220 000 €

### 3. Title of the project: SG-Boar taint

Start date: 07/2012      End date: 12/2014

Main objectives: Use of Utopige data in order to study phenotypic correlations between boar taint and reproductive performances.

Partners: IFIP, INRA, BIOPORC, Artificial Insemination Centres,

Cost: 186.000 €

Project funded by : FranceAgrimer, INAPORC, IFIP

### 4. Title of the project: Utopige, towards the optimal use of genomic information in pyramid schemes.

Start date: 2011      End date: 2014

Main objectives: Performance control of 3000 entire males in an animal testing station in order to implement genomic selection including boar taint traits: about 2,000 genotyped Pietrain type pigs (3 different P lines) or cross-type Pietrain x Large White pigs (3 F1 crosses) and 1,000 crossed slaughter pigs (Pietrain boars x various cross-bred breeding sows).

Partners: INRA (Génétique Animale Rennes, Génétique Animale et Biologie Intégrative, Laboratoire de Génétique Cellulaire, Station d'Amélioration Génétique des Animaux, Unité Expérimentale de Testage de Porcs), IFIP, SYSAAF, Novogen, BIOPORC (ADN, NUCLEUS, GENE+, CHOICE GENETICS FRANCE)

Project funded by : ANR, BIOPORC, IFIP, NOVOGEN

### 5. Title of the project: Optimization of the dietary energy supply to the entire male pigs and consequences on growth performance, behavior and boar taint risk

Start date: 01/10/2014      End date: 31/06/2014

Main objectives: Higher concentrations in androstenone are often obtained in ad libitum fed pigs, with rather variable levels from one batch to another due to environmental conditions and their consequence on spontaneous feed intake. Maximizing the daily feed supply or even feed restriction could prevent from this problem. But when entire male pigs are restrictively fed, they exhibit more negative behaviors and they are more active in general. Then, the question is whether an energy restriction with diluted diets, i.e. with a less severe restriction when expressed in kg/d, could help to prevent from the inconvenience of dietary restriction.

Cost: 73000 €

### **III. National Research Projects in Denmark**

Title of the project: Sorting and utilization of entire male pigs

Start date: 2012 End date: 2015

Main objectives:

Describe minimum requirements for future detections methods and reference analysis in relation to boar tainted meat.

Generate the knowledge basis for a future differentiated utilization of cuts from boar tainted meat

Based on consumer response, generate the knowledge basis for sorting limits for boar tainted carcasses

Optimize a detection system to be able to quantify both skatole and androstenon on-line

Partners: DMRI, Copenhagen University, Scan AB, Danish Crown, Tican

Cost: ~ 1.8 million euro

Title of the project: Possibilities to reduce incidence of boar taint in the primary production

Start date: 2012 End date: 2015

Main objectives:

Investigate the effect on boar taint of genetics, feeding and management

Partners: Pig Research Center/Danish Agriculture & Food Council, Copenhagen University, Aarhus University

Title of the project: Eliminating the need for castration of male piglets

Start date: 2010 End date: 2013

Main objectives:

The project aims at developing a measurement instrument that can be used in slaughter houses as a fast and reliable means to identify the carcasses that will develop the boar taint. Describe minimum requirements for future detections methods and reference analysis in relation to boar tainted meat.

Partners: Carometech A/S, Copenhagen University

Cost: ~ 1.5 million euro

### **IV. National Research Projects in Belgium**

1. Title of the project : Selection against boar taint

Start date: 2009 End date: 2014

Main objectives are to evaluate the impact of selection against boar taint on:

- the technical performance
- possible side effects on social behaviour
- carcass and meat quality

Partners: ILVO, KU Leuven

Cost: 346.438 €

2. Title of the project: Farm-specific strategies for the reduction of boar taint

Start date:01/10/2013 End date:30/09/2017

Main objectives: To develop strategies for the pig farmer raising entire male pigs to reduce the prevalence of boar taint. As well as testing detection methods for use in the slaughterhouses.

Partners: ILVO, University of Ghent, University of Leuven

Cost: 861.450€

3. Optimal production of entire male pigs and immunocastrates

Start date:01/07/2013 End date:30/06/2015

The final goals are 1) to create expertise on how to raise and adapt management of entire males and immunocastrates in order to optimise animal welfare, performances and carcass traits, and 2) to stimulate knowledge transfer between farmers that already stopped castrating and those that will have to stop in 2018.

Partners: ILVO , University College Ghent, Vives University College

Cost: 100.000€

## **V. National Research Projects in Germany**

**For more and recent information, see also**

[http://www.ble.de/DE/03 Forschungsfoerderung/Forschungsfoerderung\\_node.html](http://www.ble.de/DE/03_Forschungsfoerderung/Forschungsfoerderung_node.html) (search ebermast)

Title of the project : Strategies to prevent boar taint (Strat-E-Ger)

Start date: 2012 End date: 2014

Main objectives:

- Genomic analysis to Identify DNA-Chips responsible for boar taint using
- Evaluating trained assessors in a human nose scoring system
- Developing a Biomarker, as an alternative for detection

Partners: University of Bonn, a slaughter company, AI station, and a biotechnology company

Funding: Ministry of Agriculture (1,14 Million Euro)

Title of the project : Evaluation of strategies to implement raising boars in organic farming

Start date: 2012 End date: mid 2015

Main objectives:

- Evaluation of different sire lines in organic farming w.r.t. boar taint
- Evaluation of feeding strategies to reduce boar taint
- Use of boar tainted meat for further processing

Partners: University of Gießen (lead), Federal institute for organic farming (TI), University of Göttingen, University of Anhalt (Bernburg), small scale slaughter companies

Funding: Ministry of Agriculture (1 Million Euro)

**Title of the project:** Qualitative and quantitative conditions of meat production with entire male pigs

Start date: 01.06.2012 End date: 31.05.2014

**Main objectives:** - Determination of the carcass value of boars, classification of boar carcasses

- Processing of boar meat for meat products and sensory assessment
- New approaches to diagnostic methods for boar meat with odour
- Reduction of odour aberrations by means of animal handling at the abattoir

**Partners:** Max Rubner-Institut Kulmbach (lead), University of Hohenheim, Tönnies

**Funding:** Ministry of Agriculture

## VI. National Research Projects in the Netherlands

Title of the project : Stopping castration of piglets

Start date: 2009 End date: 2013

Main objective is to develop directions for solutions that support international market acceptance for producing and marketing entire male pigs. Specific research objectives are

- Evaluating consumer acceptance of meat products for entire male pigs
- Determining the (cost)effectiveness of preventive measures (genetics and feeding) to reduce boar taint
- Developing and evaluating an in-line humane nose score system as a safety net at the slaughter plant
- Identifying the relationship between farm level management and aggressive behaviour and boar taint

Partners: Wageningen UR, LTO, NVV, slaughter companies, breeding company

Funding: Ministry of Agriculture, Product board (1 million Euro in 2013)

## VII. National Research Projects in Spain

BOARMARKET – Potential market and meat quality from entire male pigs, facing new EU-policies towards the banning of piglet castration. Dr. M.A. Oliver (INIA) 2011-2014.

Budget : 107.760 €

MONTANERA- Animal welfare indicators in extensive production systems of acorn-fed Iberian pigs and alternatives to surgical castration of males and females: consequences on ethological, productive, reproductive and carcass and meat quality traits. Dr. Antoni Dalmau (INIA) 2010-2014.

Budget: approximately 100.000 euro

Effect of the use of entire male pigs fat in the aroma quality of healthy meat products and its impact in boar taint perception. (MICIN 2012) : Dra. Monica Flores.

CSIC-Valencia (90.000€)