# Biotechnology and Public opinion: The results of a citizens' jury case study

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## Summary

*Genetically Modified Organisms (GMOs) have been a controversial topic in recent years: while the scientific community has largely accepted the validity and safety of using this biotechnology in the food industry, public opinion still shows a certain suspicion and fear. The legislator is interested in knowing how public opinion could be engaged and what policy decisions regarding the assessment of the risks and benefits of GM animals and derived products might be addressed. This paper focuses on a Citizens' Jury event organized in Parma (Italy) in 2012 in the context of the EU project PEGASUS (Public Perception of Genetically modified Animals – Science, Utility and Society, 7th FP). The main goal of the Citizens' Jury was to address public perspectives and demonstrate 'best practice' in public engagement in order to develop future policy recommendations regarding innovation in the area of GM animals. The process, the potential role of citizens' juries as a technique for engaging with the public about the development and application of Genetically Modified (GM) animals in the food and pharmaceutical industry and significant results are presented here. In particular, two case studies have been presented: growth-enhanced GH transgenic salmon and polyclonal antibodies from transgenic rabbits.*

Keywords: Genetically modified (GM) animals, public consultations, citizens' jury, GM policies.

JEL Classification codes: Q57, Q18, D11

# Biotechnology and Public opinion: The efficacy of using public engagement as a policy tool

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## 1. INTRODUCTION

In recent decades, increasing food demand, technological innovation, global exchange and asymmetric information have changed the relationship between food consumers and producers. In addition new legislation on food and agriculture issues have failed to adequately embrace public opinion during the policy making process. In the last years, many policy makers have agreed that involving the wider community in setting priorities for decision making is desirable (Rowe et al., 2008). Such a community may include different stakeholders as representatives of the public, consumers, environmental and industry interest groups, etc. (Walls, 2011).

In this sense, the role that bio-economy activities can play in economic recovery and future economic development strategies depends also on public opinion and on the definition and testing of methodology to involve people in agri-food policy making, such as public engagement experiments.

One method used in public engagement exercises is the Citizens' Jury (CJ). The principle of deliberative democracy relies on the idea that jurors gain sufficient knowledge and expertise to reach informed conclusions (Gooberman-Hill et al., 2008). The CJ is a research tool for achieving informed citizen opinions and translating them into policy recommendations. The jury is asked to listen to evidence (from witnesses), discuss the evidence presented and debate the emerging policy options (Gooberman-Hill et al., 2008; Govender et al., 2011). The CJ method was first developed by Ned Crosby and the Jefferson Center in the 1970s (Jefferson Center, 2004) and has been widely used across the US, Europe, Australia and New Zealand (Crosby, 1995), while in Italy there have been only few pioneering works (Carson, 2006).

This paper examines results of a Citizens' Jury event organized in Parma (Italy) in 2012, as the final phase of the EU project PEGASUS (Public Perception of Genetically modified Animals – Science, Utility and Society, 7th FP). The objective of the exercise was to understand the elements which generate the development of policy recommendations for drugs derived from polyclonal antibodies from GM rabbits, and policy recommendations associated with the development and commercialization of GM salmon (Mora et al., 2011; Mora et al., 2012; Menozzi et al., 2012).

## 2. RESEARCH METHODOLOGY

Two public engagement activities were conducted in Newcastle, UK and Parma, Italy (Brennan et al., 2012a). This paper describes the second event which was held in Parma, the 21st/22nd April 2012. This paper reports only on the event held in Parma.

The overall organization of CJ process is a very complex, long and expensive methodology which involves different preparatory steps, such as planning the outline of the CJ, selecting the venue for the event, juror recruitment and incentives, and testing activities with volunteers. In addition, organizers and experts witnesses must prepare material (e.g., presentations, handouts, etc.) for the non-expert jury and such material must be sent out for reading to the participants of CJ some weeks before the event.

**Table 1**. Age of jurors and wider population, Italy citizens' jury

| Age | **Italy(%)** | **Parma (%)** | **Citizens' Jury (n)** | **Citizens' Jury (%)** |
|---|---|---|---|---|
| 18 to 29 | 16 | 14 | 3 | 19 |
| 30 to 44 | 27 | 28 | 5 | 31 |
| 45 to 64 | 33 | 32 | 5 | 31 |
| 65 and over | 24 | 26 | 3 | 19 |
| Total | 100 | 100 | 15 | 100 |

Source: own elaboration from Population Census 2010

**Table 2**. Occupation of jurors

| Social class** | **Citizens' Jury (n)** | **Citizens' Jury (%)** |
|---|---|---|
| A, B | 3 | 19 |
| C1 | 4 | 25 |
| C2 | 5 | 31 |
| D | 3 | 19 |
| E | 1 | 06 |
| Total | 10 | 100 |

Source: own elaboration

AB = Higher and intermediate managerial/administrative/professional;

C1 = Supervisory clerical junior managerial/administrative/professional; C2 = Skilled manual workers;

D = Semi-skilled and unskilled manual workers; E = On state benefit, unemployed, lowest grade workers

The actual CJ event lasted two days and involved 16 jurors, all members of the general public, recruited in the Parma metropolitan areas. The event was managed by a planning team and two facilitators. In addition, expert witnesses presented scientific evidence on the food and pharmaceutical application of GM animals to the participants. All processes and outputs were reviewed by an independent observer with the objective of guaranteeing that the process was carried out in the proper way. In addition, some sessions of the CJ were voice recorded and additional notes taken by assistant moderators in order to accurately capture the thoughts, ideas and suggested recommendations of the jury. Nevertheless, during the activities it was stressed that information would remain strictly confidential within the identified planning, research, facilitating and evaluator team. The Parma CJ involved a mix of witness presentations, juror only discussion sessions, question and answer sessions (cross examination) between the jury and the witnesses, and two sessions dedicated to the development of policy recommendations. As a conclusion, a final juror vote was carried out where the jurors were asked to consider whether they supported the development and application of genetically modified (GM) animals, and associated derived products, in the EU Food and Pharmaceutical sector (Brennan et al., 2012a). Due to the complex and multi-sectorial nature of the question, the final judgment that jurors were asked to make was split into two sub-judgments:

1. Do you support the development and sale of GM salmon in the European Union?
2. Do you support the development and use of GM rabbits to produce polyclonal antibodies in the European Union?

## 3. THE PARMA CITIZEN JURY EVENT

On the first day of the CJ, three witness presentation sessions were held and provided evidence on life science and technical aspects, public perceptions, ethics, economics, and policy issues related to the applications of GM animals. After each set of witness presentations, a juror-only discussion session took place. Jurors were asked to discuss the concerns and benefits they considered to be associated with the development of GM animals, on the basis of the evidence presented by witnesses. In order to record jurors' thoughts and deliberations about concerns and the potential benefits/advantages of GM salmon and GM rabbit, a group facilitation toolkit called Ketso and post-it notes have been used (Brennan et al, 2012a).

On the second day the CJ's efforts were firstly dedicated to developing questions and then subsequently cross-examining the witnesses, followed by Juror-only discussions (willingness to accept GM salmon, trade-off assessment matrix between animal suffering and human health benefits). At the end, the participants were asked to produce (with the support of the facilitators) a written report that represented the breadth of their positions and policy recommendations. Several weeks after the CJ event, a post-evaluation questionnaire and a draft juror report was sent to jury member to collect feedback and comments. The aim was to gather feedback that would help improve the accuracy of the final report. The policy issues developed by the jury have been used for the discussion during the subsequent stakeholders' workshop with public and private institutes and food organizations representatives (Brennan et al., 2012a). Table 3 outlines the Parma CJ event schedule which took place at *Hotel Parma Congressi* on 21st/22nd April 2012.

**Table 3**. The Parma CJ event schedule

| |
|---|
| **DAY 1** |
| 1. Welcome jurors to venue and obtain informed written consent |
| 2. Introduce event |
| 3. Witness presentations (Generic and case study material) |
| 4. Juror-only deliberation |
| (There were 3 groups of witnesses. Events 3 and 4 were conducted for each witness group i.e. 3 times in all.) |
| 5. Social event for Jurors on evening of Day 1 |
| **DAY 2** |
| *Morning* |
| 6. Juror-only deliberation and development of jury questions for witnesses |
| 7. Translation of questions into English; preparation and translation of witness answers |
| 8. Cross-examination of all witnesses |
| *Afternoon* |
| 9. Juror-only discussion and definition of policy recommendations. |
| 10. Drafting of jurors' report |
| 11. Short evaluation questionnaire for jurors. |

Source: own elaboration

### *3.1. Welcome Procedure*

On arrival, jurors were greeted by the event team, completed registration and were issued with name badges which facilitated the first interaction among participants. They were given a duplicate copy of the study information sheet to read, a copy of the CJ agenda, and were asked to sign an informed consent form. Then the CJ presentation started and all jurors were welcomed on behalf of the Pegasus Consortium and

information was provided about the Pegasus project and the purpose of the CJ. The jury was informed that the evidence from the six witnesses had been translated into Italian by the Parma team and would be presented in Italian by the staff of the University of Parma. It was explained that all jurors have the right to intervene at anytime, and that everyone should engage with and listen to the witness presentations and participate in the jury-only deliberations. The role of the facilitators was clarified and it was confirmed that they would manage the discussion sessions, support and facilitate the jurors in undertaking the activities asked. In addition, the facilitators were independent of the witnesses and were not present during witness presentations or cross-examination. The presence of the witnesses, Consortium members and Pegasus Advisory Board members was also explained to the jurors, and the jurors were introduced to an independent evaluator who would be observing all sessions including the jury-only discussions, and might like to talk to jury members outside the formal CJ sessions, such as at meal breaks or while relaxing at some of the hotel facilities.

The second stage of the introduction involved a presentation prepared by the project's scientific co-ordinator, Professor Lynn J. Frewer. The presentation was delivered in Italian by a native speaker to allow every participant to understand. This communication outlined the different controversies that have been associated with the development and application of GMOs in the last decades.

### *3.2. Witness presentations and juror discussion*

All witness presentations were scheduled for Day 1 and organized into three sessions (Life Sciences and Technical Evidence; Public Participation and Ethics; and Economics and Policy). Prior to the event, witnesses were requested to reconfigure the material they had presented over two sessions at the Newcastle citizens' jury into a single presentation of 25 minutes duration encompassing both generic and case study evidence. Each presentation was translated into Italian and presented by members of the Parma team. After each session, jurors were allowed to ask short questions and/or clarifications, and sequential translation between Italian and English was performed by the staff of the University of Parma.

After the first witness presentation session, 2 groups of 8 jurors were facilitated to prepare conceptual maps that reflected their initial ideas/reactions/discussion about the development and application of GM animals in the food and pharmaceutical sectors. A specially developed group facilitation toolkit called Ketso (www.ketso.com) was used to support jurors' familiarization with the topic, and to map their thoughts and deliberations. The (physical) starting point for the Ketso activity is a base, rather like a table cloth, in the centre of which a large adhesive label displays the core issue/question that the group has to discuss. From this centre, 'branches' made of felt (with adhesive backing) are placed. Each branch is labelled and represents a major theme or important grouping which is relevant for the topic under discussion. Participants are asked to write their thoughts and questions relating to the topic onto 'leaves' which are stuck close to the appropriate branch. Four different colours of leaf allowed jurors to categorise their thoughts and reveal them as 1) concerns, 2) perceived benefits, 3) surprises and 4) questions. The jury's outputs reflect the inclusion of both generic and case-specific evidence (Table 4).

After finishing the 2nd witness presentation session, a flipchart activity was undertaken by the Parma Jury. The jurors undertook this activity individually though they were allowed, and encouraged, to discuss issues with each other. Jurors were asked to reflect on their views in relation to the evidence heard and write their opinions on Post-It Notes (PINs). Yellow PINs were used to record jurors' concerns about the development and application of GM animals, and multi-coloured PINs for the potential benefits / advantages

which they had identified. They were then asked to allocate each PIN to one of the 5 categories for each of the case studies under consideration (GM salmon & GM rabbit). The five categories were the same as those used in the Newcastle event and inspired by the Ethical Matrix (Kaiser et al., 2007), and namely: 1) people, 2) animals, 3) environment, 4) business, and 5) other (Brennan et al., 2012a). The jury was reminded to write only one concern/benefit per PIN and was encouraged to prepare as many PINs as they wanted. By the end, the jurors had produced a comprehensive list of concerns and benefits across the five categories for each of the case studies under investigation (Table 5).

A wine-tasting event, hosted by a local sommelier, took place before dinner. All jurors, witnesses, facilitators, advisory board members and the independent evaluator took part. A private dinner for the jurors followed the wine tasting. All members of the Parma CJ stayed overnight at the hotel.

**Table 4**. The outputs of the Day 1, Ketso activity

| | |
|---|---|
| **Concerns** | The main concerns identified by jurors regarding the development of GM animal applications were: animal suffering, loss of biodiversity, ecosystem alteration, increase in new diseases, allergies, altered taste of food, higher food and medicine prices, human health risk. |
| **Benefits** | The major benefits regarding the development of GM animal applications were identified as: resistance and prevention of animal disease, benefits for human health, protection of biodiversity and ecosystems, the greater availability of vaccines, more food, lower price of products, more control of mutations. |
| **Surprises** | The major surprises about the development of GM animal applications: sterility of the animal, animal suffering, the benefits of pharmaceutical products, reducing production costs in Europe does not advance the GMOs for ethical reasons, research is not so advanced. |
| **Questions** | The major questions about the development of GM animal applications: Any alteration of the psyche of the animal?, Why the sterility of animals?, Test for the health of animals and humans?, GM Animals increase biodiversity?, The potential benefits to human health can be obtained from identical "natural" methods?, Who manages the product's evolution?, The taste of GM animals is different?, Who will be responsible for monitoring trials?, Are food / pharmaceutical GM already sold?, What resistance to climate change?, How to predict the long-term effects?, Were investigated any speculations?, How much psychological impact does the word "GM" have?, Is there any advantage from an economic standpoint? |

Source: own elaboration

### *3.3. Juror-only preparation of questions for cross-examination of witnesses*

Day 2 started with a jury-only session based on the concerns/benefits identified in the Post-It Notes activity at the end of Day 1. These concerns/benefits were summarized in tables which had been produced overnight by the facilitators, using the material developed by the jurors (Table 5). For each item in the tables, jurors were asked to assess the level of their concerns/benefits, and also to assess how likely it was that this benefit or risk would occur/generate. Next, jurors were asked to prepare questions for the cross-examination of the witnesses. Due to time and translation constraints, each juror was asked to prepare a maximum of four questions: two on GM salmon and two on GM rabbit. Once the jurors had developed their questions individually, a facilitated plenary discussion identified which were the most important/relevant questions. A maximum of 4 questions per witness were selected. The Parma team then translated the selected questions into English and presented them to each witness for consideration. The witnesses were given 30 minutes to prepare their answers. After this, the answers to each question were translated from English to Italian.

All jurors, witnesses and the translators were present during the cross-examination of witnesses. The answers to each question were delivered in Italian by the staff of the University of Parma. Although steps had been taken to minimize the need for sequential translation, a modest amount was necessary so that witnesses could respond or clarify any remaining issues (Brennan et al., 2012a).

**Table 5**. Outputs of PINs activity

| | **GM rabbit** | **GM salmon** |
|---|---|---|
| ***People*** | - major concerns: the logic of corporate profit outweighs the interests of society (human health); long-term side effects are not known yet, so that the control authorities are not effective; the costs are not accessible to all.<br>- major benefits: the ability to treat serious diseases and generally more therapeutic opportunities due to new treatments. | - major concerns: long-term health diseases (allergies, intolerances); the GM salmon technology is not in favor of developing countries.<br>- major benefits: higher availability of animal protein; more use of healthy foods (presence of Omega 3) |
| ***Enterprise*** | - major concerns: the control of this technology in the hands of few companies that care only about the profit; the deficiencies in the regulatory system; higher costs.<br>- major benefits: the monopoly of patents and more money for companies. | - major concerns: economic damage to small-medium enterprises; monopoly by multinational corporations which only aim to increase profits.<br>- major benefits: increased productivity and profits for companies. |
| ***Animals*** | - major concerns: health risks and animal suffering.<br>- major benefits: improvement of controls on the animals. | - major concerns: malformations induced; escape of salmon from farms; infertility is not guaranteed and suffering for no reason.<br>- major benefits: may be higher productivity. |
| ***Environment*** | - major concerns: the process of using rabbits' blood is ethically dubious and in case of escape there is the risk to the environment. | - major concerns: serious threat to marine biodiversity; risk of damage to the environment in case of leakage; contamination with non-GM species; the process of breeding salmon is ethically dubious.<br>- major benefits: protection from loss of salmon in nature. |
| ***Other*** | - major concerns: not clear the long-term effects on humans; difficult relationship between consumer and environment protection with the profits generated by patents; not clear the role of the company in the decision making process. | - major concerns: long-term effects are unclear; lack of a harmonic law; doubts on the quality of GM products. |

Source: own elaboration

### *3.4. Juror-only discussions*

On completion of the cross-examination of witnesses, the jurors returned to juror-only sessions. To motivate discussion, a number of activities developed specifically for the Parma CJ were undertaken. During the activity "Willingness to accept GM Salmon" the team asked jurors to consider their willingness to accept and consume GM salmon products. In additionthe jurors were asked to consider what information they would like to be present on a label of a GM salmon and at what price discount (if any) against conventional salmon the jurors would be willing to purchase GM salmon.

### *3.5. Development of Policy Recommendations and Juror Report*

Following the activities described in section 3.4, two members of the Parma team facilitated a plenary policy discussion with the objectives of developing policy recommendations and drawing up a draft report. To help focus the discussion, jurors were asked to imagine a hypothetical situation in which they as individuals met the Italian President at a bus stop. The jurors were asked to develop the view they would communicate to the President (in the short time available until the bus comes) about the development and application of GM animals in the food and pharmaceutical industries. This exercise aimed to provide a platform from which the jury collectively developed their draft policy recommendations, with facilitation support, which formed the basis of the draft juror report. The jury was asked to develop policy recommendations for each case-study and for the development and application of GM animals more

generally. A full summary of the policy recommendations developed by the jury are contained in the "Draft Juror Report on Policy Recommendations" (Brennan et al., 2012a).

After drafting the Report, the facilitators, organisers and the PEGASUS project co-ordinator (on behalf of the whole Consortium) thanked all the jurors for the time and efforts they had put into the CJ event. The jurors were asked to complete a short evaluation questionnaire. Before leaving they were presented with their incentive for participating.

The jurors were reminded that an edited version of their draft report would be sent out to them for consultation within 6 weeks when they would also be asked to send their comments/reflections to the organizers to finalize the "Juror report on Policy Recommendations".

After receiving the juror feedbacks, an event analysis of the policy recommendations was undertaken jointly by the Newcastle and Parma team leaders. The comments made recommended minor changes only, rather than identifying new ideas or major omissions. It appears that juror views have changed little since the CJ event. This adds to the reliability of the method, since, if large changes had been observed, then it would have suggested that what was discussed at the CJ event was perhaps not a true reflection of jurors' viewpoint.

### *3.6. Key Policy Recommendations and final juror vote*

The Parma CJ developed and refined (through their feedback) 32 policy recommendations. Both case specific, i.e. policy recommendations for drugs derived from polyclonal antibodies from GM rabbits, and associated with the development and commercialisation of GM salmon, and general. The CJ ruled that every business development and marketing of products (drugs or food) derived from GM animals must follow certain 'guidelines' or general recommendations as reported in Appendix 1.

At the end of Parma CJ events, the jurors were asked to vote on whether they supported the development and sale of GM salmon in the European Union and the development and use of GM rabbits to produce polyclonal antibodies in the European Union (Table 6). Results show that the development of GM animal applications aiming to produce new drugs are more acceptable compared to food applications, such as GM salmon.

**Table 6**. Result of Parma CJ Final Juror Vote (n)

| | **Yes** | **No** |
|---|---|---|
| Do you support the development and use of GM rabbits to produce polyclonal antibodies in the European Union? | 10 (*62.5%*) | 6 (*37.5%*) |
| Do you support the development and sale of GM salmon in the European Union? | 6 (*37.5%*) | 10 (*62.5%*) |

Source: own elaboration

## 4. CONCLUSION

The Parma CJ aimed to assess both possible policy recommendations and the effectiveness of a CJ process in producing credible outputs capable of improving the policy process. Results suggest that CJ can be a method for involving citizens with a deeply and highly technical and scientific topic and evidence (Brennan et al, 2012a). The methodology, although widely used across the US, Europe, Australia and New Zealand, is still quite new in Italy (Carson, 2006).

The CJ was able to explore, through several group activities and cross examination of experts, personal opinions of the participants and capture their position. Conclusions from the juror's discussion suggested that the consumers want to be aware when they are actually buying GM products and clear labelling must be provided. Moreover, the price of GM products must not be a barrier to purchase. In addition, according to the participants, if these products were found to be necessary, the Public Authority should ensure that the price would be at least 30-40% lower than the price of conventional products. Jurors ruled that they do not want any economic benefits to reward 'a few' producers, and request a system of laws to protect the public and to ensure equitable distribution of the possible economic benefits associated with the sale of GM derived food; at least 5% of the profits of companies that patent such products should be used for humanitarian purposes.

However, this observation cannot be extrapolated to all EU Member States, which may have very different socio-historical contexts associated with governance structures and implementation, and highlights the need to conduct such exercises in all areas where a particular set of policies need to be implemented. The attitudes of jury members towards GM animals applied to food production and pharmaceuticals were broadly in line with the conclusions of the public perception analysis (Frewer et al., 2013a; Frewer et al., 2012b).

The vogue for public engagement has been criticized (Rowe and Frewer, 2005), in part due to frequent lack of goal orientation regarding how public engagement might inform policy impact, and absence of processes or mechanisms to assess the impact on policy development. This is despite such exercises being frequently commissioned with the stated aim of informing policy (Powell and Colin, 2008). The result is that there has been a lack of evaluation of both the process and policy impact of public engagement exercises (Rowe and Frewer, 2005). The main goal of the citizens' juries was to demonstrate 'best practice' in public engagement in future policy regarding innovation in the area of GM animals (Frewer et al., 2013a).

With the right support and information through a specific process driven by expert witnesses and facilitators, a group of members of the general public were able to address complex evidence and produce their elaborated policy recommendations. The community must be made aware and participate in the current debate on GM product development, and be informed of any unresolved issues. Moreover, the legislator must take into account in decision making on GM application animal welfare and ethical concerns, as well as human health and environmental risk assessment.

The Citizens' Jury could become a useful tool to engage the public to draw up recommendations for the development of policy scenarios and policy implementation in the food sector. Further methodological and empirical results may be obtained after the joint analysis of the two PEGASUS Citizens' Jury events, i.e. Parma (Italy) and Newcastle (UK), to perform an integrated analysis of the policy recommendations developed; this might result in new insights about the efficacy of the CJ method as a technique for public engagement.

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## APPENDIX 1

**Table A1.** Recommendations for drugs derived from polyclonal antibodies from GM rabbits

| | |
|---|---|
| 1. | Drugs derived from polyclonal antibodies from GM rabbits must be screened by the European Medicines Agency and be authorized only after analysis of data on their effects. Experts should be independent and not guided by religious motivation and include ethical considerations in the analysis. |
| 2. | A national body should participate in the assessment of drugs derived from polyclonal antibodies from GM rabbits and also in the later stages of supervision of marketing and reporting of any effects. |
| 3. | When on sale, drugs derived from polyclonal antibodies from GM rabbits should bear clear labelling concerning the techniques used to obtain them (i.e. their origin from GM animals). |
| 4. | Regarding the acquisition of drugs derived from polyclonal antibodies from GM rabbits, the Public Authority must provide strict laws and controls on their application, which regulate the use of animals and the animal suffering associated with genetic manipulation or manufacture of the drug. |
| 5. | Citizens should be free to choose drugs derived from polyclonal antibodies from GM rabbits if they wish, and be informed clearly about the benefits compared to conventional drugs. |
| 6. | The price must not represent a barrier to purchase; the national healthcare system must offset any differences in price compared to conventional products and must make it possible for anyone to purchase them. |
| 7. | The doctor that prescribes drugs derived from polyclonal antibodies from GM rabbits must clearly and adequately inform the public of possible side-effects and the possible absence of 'comprehensive' information in cases of doubt. |
| 8. | The public authority must provide for compensation in cases of serious side effects or lack of information for the patient. The authority must also provide for 'withdrawal' of the product from the market in the event of adverse health effects. |
| 9. | In general, if drugs derived from polyclonal antibodies from GM rabbits were found to be necessary, the Public Authority should fund research and development of products, and also the analysis of the positive (and negative) effects on human health. |
| 10. | The Public Authority must reduce the duration of patents to restrict the position of strength of those who developed the product. |

Source: own elaboration

**Table A2.** Policy Recommendations associated with the development and commercialisation of GM salmon

| | |
|---|---|
| 1. | These foods must be screened by the European authorities as required by current legislation. Ethical aspects should be included. |
| 2. | The public authority should provide for the possible costs associated with human and animal health and long-term environmental impacts. |
| 3. | There must be a system of compensation for cases of serious side effects or lack of information for the consumer. The authority must also provide for the 'withdrawal' of the product from the market in the event of adverse health effects. |
| 4. | The marketing of products must be authorized only after a rigorous analysis of data on quality, which must be higher than that of conventional products. |
| 5. | Consumers must have freedom of choice, achieved by provision of clear information on products. Product labelling should state the origin of the product and the type of technique used, any side effects, and the presence of a logo that indicates the GM origin of the product. |
| 6. | All products derived from GM animals must be traceable within the European Union. |
| 7. | Moreover, to realize the freedom of choice between GM and conventional products, the price of GM products must not be a barrier to purchase. |
| 8. | In general, if these foods were found to be necessary, the Public Authority should ensure that the price of these products is at least 30-40% lower than the price of conventional products. |
| 9. | To ensure equitable distribution of the possible economic benefits associated with the sale of GM derived food, at least 5% of the profits of companies that patent such products should be used for humanitarian purposes. |
| 10. | The citizen must be made aware of the current debate, and be informed of any unresolved issues. The citizen must participate in the debate on GMOs. |
| 11. | There must be cooperation between public and private research. |
| 12. | With regard to information there should be more emphasis on informing the younger generations (school), and information should be disseminated by serious and authoritative sources of information (researchers). |

Source: own elaboration

**Table A3.** General recommendations

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|---|---|
| 1. | Necessary to establish a process for assessing the clear 'need' for the development of products derived from GM animals. |
| 2. | Jurors ruled that such techniques would be acceptable for use only if 'strictly' necessary, i.e. if the same products are not obtainable with traditional (conventional) methods. |
| 3. | More information must be provided to all citizens, consumers and users. This information must include the positive aspects (health benefits) but especially potential risks in the short and long term. More information must be produced on the role of EFSA and EMA. |
| 4. | Jurors ruled that they do not want any economic benefits to reward 'a few' producers and request a system of laws to protect the public, so there will be a real improvement in the quality of life. |
| 5. | Publicity and advertisements about these products should be regulated and should not be misleading. |
| 6. | All products derived from GM animals must be traceable within the European Union. |
| 7. | There must be severe penalties against any offenders or speculators. |
| 8. | Ongoing evaluation of GM animal derived products must be made possible. |
| 9. | The Member states must provide funds for research and development using techniques other than genetic modification. |
| 10. | The entire approval process must be based on maximum transparency and clarity. |
| 11. | Since the choices of today will affect future generations, it is necessary to consider the development of products / techniques that will not restrict the possibility for future generations to improve their quality of life. |

Source: own elaboration