

# What does it Mean to Be Well-Informed? Rhetorics, Perceptions and Attitudes on the Problem of Transgenic Food Labelling

*¿Qué significa estar bien informado? Retóricas, percepciones y actitudes ante el problema del etiquetado de los alimentos transgénicos*

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## Key words

Food

- Biotechnology
- Science
- Knowledge
- Consumption
- Social Discourses
- Information

## Palabras clave

Alimentación

- Biotecnología
- Ciencia
- Conocimiento
- Consumo
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- Información

## Abstract

In this research, we develop a case study, focused on Spain and the European Union, on the controversy over the labelling of transgenic foods. This paper firstly compares the social discourses that conceive labelling essentially as being a problem or a solution. Secondly, an analysis is provided of the main legislative responses, together with the specific issues that remain controversial in this field. Thirdly, the limits of the cognitive deficit model and the problem of establishing what information is relevant or irrelevant are discussed. The research concludes by showing the presence of the rhetorics of safety and risk, and proposes an outline of social positions around the consumption of transgenic foods, their differential labelling, and the endeavour of science in our societies.

## Resumen

En este trabajo realizo un estudio de caso de la controversia sobre el etiquetado de los alimentos transgénicos, centrándome en España y la Unión Europea. Inicialmente, comparo los discursos sociales que conciben el etiquetado fundamentalmente como un problema o como una solución. Después, analizo las principales respuestas legislativas y los aspectos concretos que en este ámbito siguen siendo polémicos. A continuación, expongo los límites del modelo del déficit cognitivo y el problema de establecer qué información es relevante o irrelevante. El trabajo concluye mostrando la presencia de las retóricas de la seguridad y el riesgo, y proponiendo un esquema de posiciones sociales ante el consumo de transgénicos, su etiquetado diferencial y el quehacer científico en nuestras sociedades.

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## INTRODUCTION<sup>1</sup>

Information societies are societies that have established, and result from, technologies that produce, transform and disseminate information. This historical development has given rise to a new social order, a higher stage of evolution closely related to post-Fordist, post-industrial and even post-modern societies. The almost relentless tide of information has brought about a large-scale, perhaps irretrievable transformation, which has occurred at an unprecedented pace. We are told that this is the information age, the time of a new society formed by, and focused on electronics, information technology and telecommunications (Bell, 1976; Masuda, 1984; Castells, 1999; Mattelart, 2002).

Beyond any sort of determinism, society drives, uses and selectively legitimises some but not other technological innovations, while it is also affected and reconfigured by them. Since the beginning of the industrial revolution, physical work has been gradually replaced with, amplified and reorganised by crucial technological innovations such as the steam engine and the electric motor. It is clear, however, that nowadays countless social processes are being displaced, extended and reinvented by computers, the network of networks, and information and communications technology (ICT).

Nevertheless, our societies have not become completely free from *risk* (Beck, 1998), *ambivalence* (Bauman, 2005) and *uncertainty* (Wynne, 1992a). We know, in fact, that information is inclusive and exclusive, that it makes us strong and vulnerable at the same time, and that it is not good to have too little or too much information. The intensive and

extensive flow of information means that we worry about nearly everything: access to information, its control and appropriation, sources, content, uses and abuses. The gradual shift from an industrial society (focused on production of goods) to an information-based one (focused on production of services), aggravates some fundamental issues. Specifically: 1) more information does not always equate to more thorough information; 2) the best information is often the most technical and complex; 3) before information is transmitted, it is generated, selected and interpreted; and 4) the amount of information any receiver is capable of taking in, retaining and managing is not infinite (Bell, 1976: 90-91).

Knowledge societies have an enormous technological capacity to generate, shape and disseminate information. And their citizens know how to make a freer and more critical use of this vast amount of information, which is more evaluative and participatory in nature. This symbolic horizon has become established as common sense nowadays, and is the cornerstone of innumerable cultural projects. Information societies consequently aim to gradually become genuine knowledge societies (Lane, 1966; Drucker, 1993; Stehr, 1994; Lamo de Espinosa, 1996; UNESCO, 2005).

The social sciences have produced highly reliable studies that have addressed these profound and widespread changes. However, it is still of interest to empirically analyse these new challenges that we are facing. That is why this paper seeks to help clarify some of these collective tensions that are still present in our information and knowledge societies.

In section 2 the objectives of the paper, the object under study, the specific methodology, the theoretical framework and the empirical sources used will be detailed. In sections 3 and 4, a comparison will be made of the social discourses that conceive the labelling of transgenic products primarily as

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being a problem or a solution, respectively. Section 5 contains a synthesis of the most relevant positions in the controversy and states the necessary central place of cognitive expert systems. In sections 6 and 7, details will be provided of the main legislative responses and specific aspects that remain controversial in this area. In section 8, the limits of the cognitive deficits model will be shown, together with the problem of establishing what information is relevant or irrelevant. Section 9 concludes by showing the major role played by the rhetorics of safety and risk, proposing an outline of social positions regarding the consumption of transgenic products, their differential labelling and the endeavour of science in our societies.

## OBJECTIVES AND METHODOLOGY

The overall objective of this research is to build bridges between two current themes in two distinct sociological disciplines. It seeks to analytically relate the contentious issues in the sociology of scientific knowledge to issues of interest in the sociology of food and consumption. Therefore, some of the most important discursive discrepancies in the field of food consumption will be examined, as it is an area where possessing useful, well-founded information seems relevant.

There are three specific objectives that underpin this study. Firstly, to present a high-voltage case from a discursive viewpoint in order to link it with the role of expert knowledge in our societies. Secondly, to show how the various social actors involved here address the management of information in the food sector and, particularly, the labelling aspect. Thirdly, to examine how these groups discursively face significant cognitive and regulatory questions: Which are the best, conventional, transgenic or organic foods? Should their business profitability, the benefits for human health or their environmental sustainability be prioritised? Or, even in

broader terms, how should the relationship between the free trade of goods, food safety, nature protection and the right of citizens to information be addressed?

The object of study will be the major discourse discrepancies on the differential labelling of foods of the so-called genetically modified organisms (GMOs). The analysis will focus on the Spanish case, and by extension on the European one, but to illustrate some interesting contrasts specific references will be made to cases such as that of the United States. The empirical sources analysed cover the period 1994-2014, that is, from the date on which the world's first GMOs were marketed until 2014.

The study is qualitative and the methodologies used are the case study and discourse analysis. It is a case study because this particular controversy and the various actors involved are analysed in order to later reflect on the potential role played by experts in our societies (Yin, 1994; Coller, 2005). It also involves discourse analysis because it is not intended to judge these competing positions, but rather to make explicit the relationships of knowledge and power which, intentionally or not, might shape the production of these discourses (Foucault, 1999; Lizcano, 1996; Conde, 2009).

The theoretical framework is the result of a review of academic publications primarily in the areas of: 1) the sociology of scientific knowledge, and 2) the sociology of food and consumption.

The empirical sources examined (in the areas and periods indicated above) were as follows: 1) publications in biotechnology and popular science materials; 2) documents related to the major biotechnology companies (Monsanto, Aventis, Syngenta, DuPont and BASF); 3) documents from bodies that explicitly or tacitly support biotechnology (SEBIOT, ASEBIO, and the Antama Foundation); 4) newsletters from environmental groups (Greenpeace, Friends of the Earth and *Eco-logistas en Acción*); 5) documents from far-

mers' associations (ASAJA and COAG); 6) consumer association documents (OCU, CECU and CEACCU); 7) surveys on the public perception of science and technology (Eurobarometer); 8) documents from competent agencies, associations and ministries (AESA, FIAB and MAPA); and 9) news on this subject contained in the Spanish press (*El País*, *El Mundo*, *ABC* and *La Vanguardia*). What follows is a comparison of the social discourses that conceive the labelling of these products primarily as being a problem or a solution, respectively.

## THE DISCOURSE OF LABELLING AS A PROBLEM

I will therefore begin by analysing the discourse that perceives the labelling of genetically modified foods essentially as a *problem*. This is the main discourse — although not the only one — adopted by the biotechnology industry. Fundamentally, any parties in favour of these foods often take positions against their labelling. Their easy identification by the public is assumed to be a setback for their faster consolidation in the market. However, unlike the Spanish and European contexts, the American case of the Flavr Savr tomatoes (CGN-89564-2) is perhaps the only exception to this tacit but dominant rule.

These tomatoes were designed to slow down the ripening process and prolong the post-harvest storage, distribution and sales periods. The enzyme that was deactivated (by using a so-called antisense gene) is polygalacturonase. They were developed by the Californian company Calgene, which was later acquired by Monsanto. They were approved for sale on 18 May, 1994 by the US FDA, and sold under the MacGregor brand. Interestingly, these were the first transgenic foods in the world to have been approved for sale and human consumption.

This case is of interest here because initially the company was reported for not labelling

them as genetically modified tomatoes. However, although the company won the court case, they finally decided to label their tomatoes voluntarily. According to the executives of Calgene, the superior quality of their genetically modified tomatoes should be capable of being clearly ascertained by all consumers (Kramer and Redenbaugh, 1994).

Except for the above case, these companies believe that the disadvantages outweigh the benefits of GMO labelling. They regard labelling as (technically) complex, (financially) costly, and (cognitively and legally) fraudulent. The infrastructure of the food system presents many difficulties in terms of separating genetically modified foods from other products. The process would be further complicated if the ingredients used for the manufacture of an end product came from various sources. To sum up, it would be very complicated to segregate transgenic products in all processes of planting, harvesting, storage, processing, transport, distribution and retail (Schiavone *et al.*, 2006).

The respective final cost would therefore be much higher than the paper, ink and adhesive labels. Prices of food would become severely and unnecessarily expensive. This would result in costly food segregation systems, and constant testing to ensure identification. This could potentially harm agricultural and livestock farmers, transport companies, traders and consumers (Boyer, 2002).

Another similar argument used by these groups is that such labelling would be superfluous and counterproductive. And that it would be cognitively, socially and legally deceptive. The labelling would be unnecessary because science has not fully demonstrated that there are significant differences between modified and unmodified foods. The problem, then, would be that the public might perceive labelling as an implicit warning about the risks involved in these foods and get carried away by unfounded fears about

the possible adverse effects associated with their cultivation and consumption (Mulet, 2014).

Labelling would contribute to confusion, misunderstandings and, ultimately, disinformation. Safety levels would not be one hundred percent, but would be very high, and risks would not be zero, but would be very limited and controlled. As noted by the Spanish Society of Biotechnology (SEBIOT):

The new foods, including genetically-modified foods, are safe to the maximum safety levels that current knowledge allows. After several years of consumption of various transgenic foods by several million people, mainly in the US, no adverse effects on human health have been identified. Before they are marketed any new food products undergo extensive studies to demonstrate that there are no risks to consumer health and that they do not pose a risk of environmental pollution, and do not threaten the diversity of species. It has also been ensured that their labelling is not misleading, does not differ from other foods or the food ingredients which they replace, and their consumption does not involve nutritional disadvantages (SEBIOT, 2003: 21).

The rise of organic farming, by contrast, is perceived here as a big farce generated by the advertising and marketing industry (Mulet, 2014). This is why, after questioning many celebrities, it is stated that the supposedly higher quality of organic agriculture has never been scientifically proven (Otero, 2013). As noted by SEBIOT:

Currently there is no scientific data showing that organic foods [also called ecological or biological foods] are better than conventional foods from the nutritional point of view. Their main advantage is their environmental friendliness and their main problem is that crops have lower yields than traditional methods, as well as greater post-harvest losses, so organic foods are more expensive than non-organic foods, that is, those obtained without

excluding modern technology. The apparent opposition between organic and non-organic food is a product of marketing, since there is no compelling reason for both types of food not to co-exist in the market (SEBIOT, 2003: 10).

For biotechnology companies, this co-existence is not problematic. Labelling of GMOs might wrongly lead to consumers to believe that these products are dangerous to human health or to the environment. Thus, the labelling requirement would not be justified on the basis of rational or empirical questions, but by the marketing of the organic industry and a regrettable cognitive deficit on the part of the public. Hence the conclusion that this problem would not exist if the Spanish and European citizenship were not guided by these fears and prejudices and had an optimum level of *education, information and knowledge* (Noomene and Gil, 2006).

## THE DISCOURSE OF LABELLING AS A SOLUTION

I shall now address the discourse of the social groups that see the labelling of the new foods as being essentially a solution. For them, labelling is (technically) viable, (cognitively) explanatory and essential (from a health, environmental and political perspective). This practice is demanded by environmental movements, organic food stores and certain associations of farmers and consumers. The understanding seems to be that there is not yet sufficient scientific knowledge about the human and environmental safety of GMOs. The political management of the problem is deemed to be ambiguous and insufficient, and to violate the rights of citizens to be able to identify and segregate this type of food (Gorelick, 1998).

Therefore there might be good reasons to justify a strict labelling of GMOs. In fact, this may be required for scientific reasons, as the

natural barriers that separate species have been transgressed. But also for religious, ethical or health reasons, because there are people with certain beliefs, vegetarian people or some who are allergic to some foods. The opposition of Spanish and European consumers to GMOs might be caused both by techno-scientific and socio-cultural issues (Cáceres, 2004: 29-30).

This opposition has certainly been more active and explicit among some organised groups, and more diffuse and anonymous among consumers. The former have created and disseminated this critical discourse, and the latter have received and reproduced such discourse. As noted by Gema Trigueros, of the Organisation of Consumers and Users in Spain (*Organización de Consumidores y Usuarios de España* (OCU)): "In the surveys we have conducted, 95% of consumers has asked for it [labelling], because they want to exercise their right to choose" (Espino, 2004). An analysis of major surveys revealed that most of the Spanish and European population are still against the consumption of genetically modified foods and for their labelling (Muñoz *et al.*, 2005; Eurobarometer 341, 2010).

Social mistrust also comes from the fact that GMO-producing companies refuse to label their own food. It is feared, then, that these companies are interested in keeping certain information from the public. That refusal is interpreted as an intention to deceive the public, to deprive them of information. The criticism would be directly and easily summarised as "If they are so proud of them, why not label them?" (Morris, 1998: 55).

Some reverse sales or boomerang effect strategies have emerged which consist in indicating that certain products are organic and are free from GMOs. This business strategy, in fact, has already have been adopted by several supermarket chains in Spain, France and the United Kingdom (Sánchez, 2011). There are even some Spanish regions

and municipalities that have declared themselves as GMO-free zones (known as "ZLT" in their abbreviated form in Spanish) (Binimelis, 2006).

Environmentalist groups, however, claim that consumers can almost never be entirely sure whether the products they buy are really free of GMOs. This is not due to anything attributable to the consumer (such as indifference or cognitive inability), but due to the fact that many companies and establishments do not provide this information. Certain guidelines and lists are sometimes disseminated that classify products, brands and supermarkets according to the statements formally made by their executives, or resorting to other means to ensure that their food might be genetically modified, in part or in full (Greenpeace, 2014).

The major goal for these opposition groups is to guarantee the right of consumers to know and choose. The rejection of producers to labelling can be interpreted as hindering this right. The demand, therefore, is to have labelling that is accurate, mandatory, easily understood by consumers and applicable to all genetically modified products and their derivatives. The labelling of these foods, due to the high level of uncertainty associated to their properties and implications by these groups is regarded as a critical practice (Rodrigo, 2004).

Moreover these critical social movements demand that the rights of citizens are guaranteed so that they can decide: what food they want to consume, what agricultural technologies they want to promote, and what kind of society and world they want to live in.

If we believe in democracy, it is imperative we have the right to choose which technologies are best for our communities, rather than having unaccountable institutions like Monsanto decide for us. Rather than technologies designed for the continued enrichment of a few, we can ground our technology in the hope of a greater harmony bet-

ween our human communities and the natural world. Our health, our food and the future of life on Earth truly lie in the balance (Tokar, 1998: 13).

## **SOCIETY, KNOWLEDGE AND UNCERTAINTY**

“We are what we eat” is an expression attributed to Hippocrates, although perhaps we owe it to Feuerbach. Aside from the authorship, choosing what we eat now is to choose who we are today and will be tomorrow. Every culture defines what foods are good or bad, tasty or repugnant, suitable or unsuitable according to various nutritional, symbolic, material and spiritual circumstances (Harris, 1993; Grace, 2002).

However, it is worth inquiring whether the public knows what they eat. That is, if people really know the effects caused by the products that they eat (Martínez and Martí, 2005; CEACCU, 2008). It is true that we are what we eat, but also that we are largely ignorant of what we feed ourselves with as far as the new biotechnologies are concerned. In this respect, life choices multiply and food decisions become more complex, ambivalent and controversial. It is therefore of interest to examine what it means to eat well and be well fed, also in social terms (Díaz Méndez, 2008; Herrera and Lizcano, 2012).

The underlying tensions between different stakeholders are tenacious and difficult to resolve: 1) biotechnology companies seeking to maximise their profits defend free trade of their goods and complain about the prejudices of environmentalists, consumers and policy makers; 2) farmers' associations hesitate about what foods might be more profitable, conventional, organic or genetically modified; 3) environmentalists and consumer groups defend the right to choose freely and responsibly and to be well-informed; and 4) governmental and supra-governmental regulatory institutions seek a balance between the rights of businesses, citizens and the en-

vironment (Fernández and Corripio, 2003: 24-25).

The debate focuses on whether it is the labelling or non labelling of GMOs that deceives the public. The social positions are diverse and contain various qualifications, but the main ones are whether to defend the free movement of capital and goods, or to demand justice, caution and responsibility. The pro-GM movement (led by biotechnological companies) argues that it is not appropriate to label these foods, because science has not yet unequivocally demonstrated that there are any adverse effects associated with them. The anti-GM movement (led by major environmental groups and consumer associations) responds that if such evidence already existed, what regulators should do is not impose labelling but a complete ban on the sale of GMOs.

There is a material, symbolic, commercial and interpretive battle underway. Social groups redefine the legitimate use of notions such as health and disease, safety and risk, knowledge and uncertainty. It is here that expert cognitive systems should play a key role. However, these pronouncements are sometimes perceived by businesses, farmers, consumers and regulators as too partial, tentative and controversial.

## **SPANISH AND EUROPEAN UNION LEGISLATION**

After describing the discourses for and against labelling, the legislative response to this problem since the late 1990s will now be reviewed, including the flexibility of this policy, its features and changes, and the cases of Spain and the European Union. It will later be shown that this legislation has not closed all the debates, perhaps because it is a cause and an effect of these cultural and techno-scientific clashes, as well as being a party to them.

It is well-known that this issue is producing an underlying tension between the US

government and the European Union. The opposition to the labelling position is usually led by the US government and supported by those of Canada, Mexico, Argentina and Costa Rica. Meanwhile, the position that is most favourable to labelling is being spearheaded by the European Union and supported by Japan, Malaysia and Australia.

In Europe, the labelling of transgenic products was initially governed by a regulation concerning novel foods and novel food ingredients (Regulation 258/97). The next provisions approved in the EU specifically addressed the compulsory indication of the labelling of certain foodstuffs produced from GMOs (Regulation 1139/98).

Further amendments and extensions to the regulations were approved later (Regulations 49/2000 and 50/2000). Subsequently, another directive was approved on the deliberate release of GMOs into the environment (Directive 2001/18).

The European regulation that ensued specifically regulated the trans-boundary movement of GMOs (Regulation 1946/2003). Regulations on the traceability and labelling of GMOs, as well as feed products produced from GMOs were also subsequently approved (Regulations 1829/2003 and 1830/2003). Specifically, at the end of the manufacturing process of these products there should be a check for the presence of a minimum standard for recombinant DNA in order to make the labelling mandatory. The labelling is compulsory only when there is a percentage of genetically modified ingredients that exceeds 0.9%.

In Spain, regulations were established about the limited use, deliberate release and marketing of GMOs (BOE [Spanish Official Gazette] 100, Law 9/2003). Later a regulation about the development and implementation of this Law was established (BOE 27, Royal Decree 178/2004). The purpose of Spanish law requiring labelling is therefore twofold: 1) ensuring control by regulatory authorities;

and 2) ensuring the right of the consumer to information (AESAs, 2004a: 3).

In 2004 a system to assign single identifiers to GMOs was established (Regulation 65/2004). EU legislation on the production and labelling of organic products was then approved (Regulation 834/2007). It was in 2009 when the contained use of genetically modified micro-organisms was specifically regulated (Directive 2009/41/EC).

For the pro-GM group, this legislative momentum was due to the critical pressure exerted by major groups of farmers, environmentalists and consumers. For the anti-GM groups, however, it was a positive but insufficient response to the interest of biotechnology companies in marketing GMOs. Some analysts concluded that the EU legal system is aimed to: 1) generate safety in the production, distribution and consumption of transgenic products; 2) promote greater social trust in these foodstuffs; and 3) defend the rights of the consumer to knowledge and choice (Muñoz, 2004: 17).

## **SOCIO-CULTURAL AND TECHNO-SCIENTIFIC TENSIONS**

A detailed description have been provided as to how Spanish and European legislations have addressed these issues by giving a pragmatic political response to the multiple challenges they are faced with. An analysis will follow of the areas of the —still controversial— disagreement that this legislation has sought to resolve. I will then examine the explanatory models that the social sciences have articulated in order to clarify the causes that have generated suspicion in much of the Spanish and European public against the consumption of GMOs.

It is difficult to reach a consensus on what specific technologies used in the manufacture of food would require differential labelling and why. The regulatory measures mainly involve the products obtained by the use of



new genetic engineering processes. Still, it is unclear what the scientific reason is why only foods produced by the use of these new technologies should be subject to accurate and mandatory labelling.

It is also problematic to establish the specific percentage of a transgenic ingredient that should be present in an end food product to make labelling necessary. As mentioned earlier, under the current rules labelling is mandatory when there is a transgenic content of 0.9% (Regulations 1829/2003 and 1830/2003). The anti-transgenic movements demand that what is fair is that the labels should be applied to all foods that include genetically modified substances, and not only to those that contain a percentage higher than 0.9%. The pro-GM groups argue that it is unfair that, while foods exceeding 0.9% of transgenic ingredients have to be labelled, organic foods may contain up to 5% of non-organic ingredients (Regulation 834/2007).

There is also a debate as to whether products derived from animals fed with transgenic feed also require differential labelling. That is, if third generation products such as meat, milk, cheese and eggs from animals fed with GMOs should be labelled. The interpretive conflict certainly occurs again, although European legislation dictates that it is not obligatory to label the products from animals that may have been fed with GM feed or crops (Regulations 1829/2003 and 1830/2003).

It would be reasonable to assume that, in order to decide whether to demand this labelling or not, the experts should be able to provide some conclusive answers. The socio-cultural and techno-scientific conflicts are notorious in this respect and perhaps this will increase the desire for true, safe and incontrovertible answers. But in the particularly ambivalent, uncertain and controversial scenarios such as the one explored here, it is difficult to solve with any degree of certainty in what expert systems citizens should trust

to better guide their desires and behaviours (Yearley, 1993-1994; Blanco and Iranzo, 2000; Ramos, 2002; Torres, 2005b).

## **BEYOND A COGNITIVE DEFICIT MODEL**

It is perhaps surprising that the social sciences have barely shifted their theoretical models in order to understand how the public perceives, assesses and behaves in connection with scientific and technological products. The still prevailing model of cognitive deficit seems to be supported by two fundamental assumptions: 1) scientists, individually and collectively, produce the best possible knowledge; and 2) a better awareness and assessment of the public about science and technology depends on the cognitive gap between expert knowledge providers and lay addressees, that is, on whether the originally uninformed public becomes increasingly well-educated or literate.

A tacit social agreement would be reinforced as a result —unless there were abuses or defects, which confirm the proper use and good standards— where: 1) expert systems generate true knowledge; 2) knowledge disseminators, journalists and other media circulate information rigorously and impartially; and 3) a better educated public would build their ideas and assessments on the basis of this neutrally developed, communicated and understood knowledge.

“The more you know, the more you love it” is the assumption underlying most surveys on the public understanding of science and technology (Bauer, 2009). In our case, it is assumed that if the public rejects these new foods, it is mainly because they are victims of fear, misinformation or sensationalism. Hence it is also accepted that the more information the public is provided with on transgenic products, the better the image of biotechnology and the more positively evaluated their agricultural innovations will be.

Nonetheless, it is still disputed whether GMOs are qualitatively different from those obtained from products obtained by using genetic selection and breeding techniques. If experts conferred a special status on these products, a parallel distinction in the labelling would be justified. But if experts assured the public that such differentiation is unfounded, labelling would be rather nonsensical. Supposedly only the most creditworthy experts would be able to analyse and elucidate this problem and engage in communication with producers, consumers and regulators accordingly. However, the experts involved here are usually recruited by one group or another and have not made assessments with such high degree of consensus. As shown, their statements are plentiful, but perhaps they also too heterogeneous, tentative and controversial.

Some agencies also believe that the main problem for consumers is that they allow themselves to be guided by prejudices and unfounded fears. In the words of José Ignacio Arranz, former executive director of the Spanish Food Safety Agency (AESAs):

All we would ask is that the public listen without prejudice. And if they do, they will realise that we are talking about foods that are the same as all those others that have been subjected to rigorous evaluation. Then the option will be simply whether to purchase them or not, but in the same way you choose to buy chocolate ice cream or vanilla ice cream. We want to banish the fear of this type of product, because it is unfounded. GMOs are strictly analysed and controlled and are as safe as any conventional food or ingredient. It is true that we think that it takes time for public opinion to accept all this, little by little. But I am convinced that in the mid-term consumers will perceive GMOs as being perfectly normal, and we are meant to have a natural coexistence with such products (AESAs, 2004b: 12).

It is significant here that all groups involved agree that the public has a right to be well-informed, to know what to consume and

choose what they want to eat. The problem is that perhaps the rejection of GMOs does not result from citizens lacking a reasonable level of techno-scientific literacy. It should be reconsidered whether the critical opinions and attitudes of distrust towards these products originate only from single, non-problematic factors such as fear, misinformation or sensationalism.

Some researchers have warned that it may not be appropriate to explain the potential public opposition to certain techno-scientific products solely on the basis of the referred model of cognitive deficit (Millar and Wynne, 1988; Wynne, 1992b; Levidow and Tait, 1992). This underlines the contextual, tentative and disputed character of what the stakeholders involved perceive and assess as good information, good knowledge and therefore, as an educated and responsible public. Consequently, it is of great interest to develop an alternative analytical model that is more critical, diverse and dynamic, as opposed to the overly linear and rigid traditional model related to cognitive deficit (Levy-Leblond 2003; Torres, 2005a; Díaz and López, 2007; Cuevas, 2008; Cortassa 2010; Eizaguirre, 2013).

Presumably, the well-informed citizen is one who aspires to obtain accurate and well-founded beliefs (Schütz, 1974: 121-122). Being well-informed requires having good quality information available. The problem is how to know what information the public should demand or be provided with. This depends on the determination by experts as to the relevant or irrelevant nature of the available information. The issue, again, is how the public can be certain as to which information is trustworthy, thorough and balanced. How can they be sure, when the expert systems that claim to be in possession of the most useful and better substantiated information are so heterogeneous, in this case and in other similar cases (Latour, 1992; Collins and Pinch, 1996).

The purpose stated by the various groups involved here is so similar as to be almost identical. In this rhetorical sense, the intention is to inform the public, not to deceive them, to show them the truth about things. This is indicated, for example, both on Monsanto's and on Greenpeace's websites. Being well-informed, then, is conceived as an inalienable right of citizenship. Consumers have the right to know what the qualities of the food they eat, or could eat, really are. The cases under discussion entail foods about which more or less well-founded doubts exist regarding their possible human and environmental viability, and this is at the core of the controversy. However, even the experts involved do not seem to have settled on what transgenic foods are and what they do, that is, on the true identity and behaviour of GMOs (Herrera, 2005; Mendiola, 2006; Larión, 2009, 2010a and 2010b).

## RESULTS AND CONCLUSIONS

In this paper I have studied the conflicting rhetorics (discourses) surrounding GMOs and differential labelling, as well as the perceptions (images, concepts or representations) and attitudes (judgments, assessments or practices) in connection with them. Descriptions have been provided about the main discourses that mobilise the groups involved in order to persuade the public about the (in) appropriateness of such labelling. The pro-GM groups deploy a *rhetoric of hope*, urging the public to perceive these products as allies: they should not be labelled because their quality and safety has already been proven. The anti-transgenic movement, by contrast, mobilises a *rhetoric of fear*, which seeks to sway the public to think of them as enemies: they should be labelled because there is good reason to distrust them (Mulkey, 1993-1994).

The *salvific narrative* of safety and progress is thus responded by the *apocalyptic*

*narrative* of risk and caution. The myth of techno-scientific neutrality is shifted by the narratives: on production and competitiveness, or on unwanted and unknown effects. This discursive clash clearly goes beyond this specific debate and is reproduced in multiple confrontations in which the implications of the current scientific and technological frameworks play a key role (Alexander and Smith, 2000).

I have outlined the discursive tensions that exist between companies, farmers, consumers, scientists and regulators, focusing on the case of Spain and the European Union. This has allowed me to show the limitations of the cognitive deficit model, regarding the perceptions and attitudes of the public in the face of scientific and technological developments. Expert systems continue to disagree on the nature and scope of these products, and it is therefore not appropriate to consider that the overwhelming rejection of such foods by the Spanish and European public is the sole and unproblematic result of fear, misinformation or sensationalism.

This analysis finds evidence of a typical ideal controversy that is simultaneously cultural and techno-scientific in nature. In this dispute the diverse members agree on at least eight typical ideal positions. However, the value of these positions, expressed as ideal types in the Weberian sense, is not descriptive but heuristic. This outline is intended to be useful only insofar as it permits: 1) clarifying the underlying discursive complexity of this specific case; and 2) reflecting more critically about the role of expert knowledge in the field of food consumption (See Table 1).

For pro-transgenic groups, these foods are controlled, beneficial allies, and their development and consolidation must be supported. Specifically, the positions in favour of the progressive global expansion of GMOs are P. 1, 2, 3 and 4. As shown above, it is

**TABLE 1.** Outline of positions, of acceptance (+) or rejection (-), of: 1) consumption and global expansion of GMOs; 2) the differential labelling of these new foods; and 3) science understood as a systematic body of knowledge that is the result of reason and observation and is free from unlawful self-serving and/or evaluative biases.

POSITIONS:	CONSUMPTION OF GMOs:	LABELLING OF GMOs:	IDEAL OF THE SCIENTIFIC ENDEAVOUR:
1	+	+	+
2	+	+	-
3	+	-	+
4	+	-	-
5	-	+	+
6	-	+	-
7	-	-	+
8	-	-	-

usual in such cases that these positions decide against the labelling of GMOs (P. 3 and 4). Of these, the majority position among laymen and experts is the defence of such ideas, judgments and attitudes relying on the cognitive potential of the scientific method (P. 3). Supporters of the consumption of GMOs, then, with remarkable frequency reject their labelling, and do so especially on behalf of the ideal of the scientific endeavour. Monsanto would be located here, as would SEBIOT, EuropaBio, ASAJA and Antama Foundation. Holding P. 1 is less frequent, and P. 2 and 4 are completely marginal.

For the anti-GM groups, these are uncontrolled and dangerous enemies that they want to at least point to, and isolate and monitor, if not eliminate. In particular, positions against the growing global proliferation of these foods are P. 5, 6, 7 and 8. As discussed, these positions are usually in favour of the labelling of GMOs (P. 5 and 6). Of these, the dominant position that defends these perceptions and behaviours is reliant on the validity of scientific knowledge (P. 5). Those who question the use of GMOs, therefore, are very likely to require labelling, and they will do so on the basis of the highest standards of scientific knowledge. Greenpeace,

Friends of the Earth and Ecologistas en Acción, as well as OCU, CECU, CEACCU and COAG would be positioned here. P. 6 was detected less often and P. 7 and 8 are practically non-existent.

Nowadays science can be understood, in terms of its methods and results, as a disinterested and non-evaluative activity that gradually discovers complete, final and unshakable responses (P. 1, 3, 5 and 7). But it can also be conceived as an interested and evaluative activity that constructs inevitably biased, tentative and controversial responses (P. 2, 4, 6 and 8). Nevertheless, if as analysts we conclude that deep down, all positions hold that this controversy can be terminated with the help of an independent and trustworthy science, it must be established what that science consists in and how such a truly trustworthy and independent science can be achieved.

I have shown precisely how the different sides strive to persuade the public as to whether or not GMOs should be labelled. It is also questionable whether consumers relate to the abundant foodstuffs that are available today only by following cognitive criteria. In fact, there may be other factors, such

as consumer purchasing power, as well as lifestyles and ethical, political and religious beliefs, which could also condition the public's reactions to these or other foods, whether conventional, transgenic or organic (Zagata and Lostak, 2012).

It is crucial to note the important role expert knowledge plays in our societies. However, its endeavour may not be so much based on supposed formal rules to be applied, and more on education, experience, intuition and tacit knowledge (Dreyfus and Dreyfus, 2005; Collins and Evans, 2007). The social sciences in this way help to place the debate as to whether the public knows what they eat, what they need to know and how to decide which information is relevant and must be transmitted. The ambivalence that arises over the possession of accurate information and appropriate expertise in such a complex and changing world will then be understood. As will the paradoxes that expert knowledge sometimes involves, which may confuse as much as inform, conditioned as it is by infighting over the attribution of meanings about how food must be generated, identified and consumed. The background of the discourses of the leading social positions seems to be a reflection of the interests and values underlying the issue of labelling of GMOs. In this debate we should ask how today's society as a whole is affected by these structural tensions and how they are faced.

Do we live, then, under the triumphant arrival of the information and knowledge societies? The answer may be affirmative or negative depending on how we conceive of the fulfilment of the ideal previously envisaged. It is clear that information is first produced, selected and disseminated and, later, welcomed, assimilated and used to a greater or lesser extent. Thus, networks of expert knowledge/power condition the practices of the more widespread systems of communication exchange. It is precisely in these societies where the various stakeholders, both lay and expert (in this case, scientists, busi-

nesses, farmers, consumers, legislators and media) continuously fight, both materially and symbolically, in order to impose socio-cultural and techno-scientific criteria so as to settle what it means to be well-informed and have good quality knowledge in each situation.

This explains why it is said that they inform, if what they really do is persuade; and why there is talk of educating citizens, if what is intended is to discipline consumers in their consumption of one or other foods. In this discursive order, it certainly seems to matter little that food manufacturers declare something as being natural or modified, traditional or modern, organic or transgenic. One of the functions of language is certainly to inform and communicate, but it does more than this when it directs, induces, discourages and ultimately generates, represses and transforms our societies. We must not forget that the relationships of information, knowledge and communication often are and promote solid and opaque relationships characterised by asymmetry, dissent and domination (Foucault, 1999; Bourdieu, 1985; Lizcano, 1996).

It is assumed that informing is essentially tantamount to describing to others how things are in and of themselves. This involves communicating what features, causes and effects define the reality of our social and natural environment. However, to inform is also to tell the other members of the community who we are and what strategies and aspirations guide our actions, words and thoughts. Not that all information is empty rhetoric or pernicious manipulation, but rather, especially in areas such as those explored here, it does not seem wise to completely separate the techno-scientific from the sociocultural, and cognitive and instrumental elements from ideological and utopic elements (Latour, 1993; Nowotny *et al.*, 2001).

Analysing these two great types of rhetoric, namely the rhetoric of safety and the rhe-

toric of risk, is not a fruitless act, because it strengthens us against the almost ghostly rhetoric of truth about the implications of current scientific and technological systems. This should not be deemed to be a disproportionate criticism of information and knowledge societies, but as a way of ascertaining their limits, paradoxes and ambivalences. After all, collective tensions that are present in these societies is possible by the very existence of the information and knowledge societies, which for some are to be welcomed and for others are to be reoriented.

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