

Agri-Biotechnologies in the Italian System

Flavio BOCCIA*

Jel classification: Q120, Q180

Introduction

The issue of modern biotechnologies and the use of Genetically Modified Organisms (GMOs) is one of the most relevant currently interesting the agri-industrial sector and, in Italy, it is particularly felt by public opinion.

Modern biotechnologies break the limits posed by the species' differences making the concept of species obsolete; they push even further, surpassing the limits existing between the vegetable and animal kingdoms: it must measure the degree of the effects, advantageous or disadvantageous, of this transgress. In reality, the produced break manifested itself with all its explosive force even in Italy, where the positions of farmers, trade associations, industry, consumers and other interested parties are quite in contrast and in continuous evolution and where the agricultural system is mainly oriented towards typical productions of elevated quality and the territory is extremely parcelled out and (considering its conformation) with scarce possibility of distancing traditional and biological

Abstract

The issue of modern biotechnologies and the use of Genetically Modified Organisms (GMOs) is one of the most relevant currently interesting the agri-industrial sector and, in Italy, it is particularly felt by the public opinion. The engaged path, which brought to an ample and complex normative picture comprising regulation and incentive of eco-compatible productions and the regulation of quality brands based on origin designation, is in total opposition with all that GM products represent. Therefore, there is the need for GMO research to develop freely, since there is the permanent necessity, even on behalf of public administrators, to have adequate scientific parameters to operate rational choices to defend agricultural operators and consumers' interests. Today, the priority is to protect GMO-Free supply chains on which all main typical regional productions are based and, in these cases, the imperative is "zero tolerance": on the contrary there is the possibility to compromise a source of relevant interest for the rural economy of the majority of the Italian territory. In Italy the position of farmers, trade associations, industry, consumers and other interested parties are quite in contrast and in continuous evolution. In order to shed light on this intricate matter, part one of this paper will illustrate an overall picture of current norms, on a Community and national level, in terms of agri-biotechnologies, also emphasizing main problems that originated in this context; in part two emphasis will go on the role of research in Italy on genetically modified organisms and to issues relative to current experimentations; lastly, with the aid of available data, there will be completed the overall Italian picture, considering the positions of the various forces acting in the complicated issue of biotechnologies, as well as the role and importance that information could take up in this area.

Résumé

Les biotechnologies modernes et l'utilisation des organismes génétiquement modifiés constituent l'un des sujets les plus intéressants dans le secteur agro-industriel, très ressenti par l'opinion publique italienne. Toutefois, les règlements et les encouragements en faveur des productions éco-compatibles s'opposent aux produits génétiquement modifiés. Voilà pourquoi, il faut encourager la recherche portant sur ces OGM vu la nécessité exprimée par les administrateurs publics d'avoir des paramètres scientifiques pour défendre les agriculteurs et les intérêts des consommateurs. Aujourd'hui, il est prioritaire de protéger les filières sans OGM qui sont à la base des productions régionales typiques et dans ces cas la tolérance est égale à zéro. Par contre, on peut envisager un certain intérêt pour l'économie rurale italienne. En Italie, la position des agriculteurs, des associations commerciales, de l'industrie et des consommateurs est parfois en contraste et en évolution continue.

Afin d'éclairer ce sujet, la première partie de ce travail illustre les directives à l'échelle communautaire et nationale dans le domaine des agro-biotechnologies en soulignant les problèmes principaux du secteur ; la deuxième partie examine le rôle de la recherche en Italie sur les organismes génétiquement modifiés et sur l'expérimentation ; pour conclure, grâce aux données disponibles, on présente la situation italienne en considérant les forces en œuvre dans le cadre compliqué des biotechnologies tout comme le rôle et l'importance de l'information dans ce secteur.

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1. Community normative on the GMO subject

In Europe the legislation on GMOs is evolving rapidly, reflecting the developments achieved on a technical and scientific level and responding to the scepticisms or the op-

position of consumers and citizens towards non-manipulat-

* "Parthenope" University of Naples, Italy

ed foods with conventional techniques.

Basically, the normative relative to the process defines criteria and modalities to carry out experimentations (Fonte, 2004), in laboratory and open field, with GMOs and to commercialise products that contain them. In this case:

- Directive EC 2001/18, that established the criteria relative to simplified procedures for deliberate emission of genetically modified plants in the environment, that replaces the previous Directive EEC 90/220;

- Directive EC 98/81, regarding the confined use of genetically modified micro-organisms, which replaced the previous EEC 90/219;

- the EU Decisions specific for each product authorized for commercialisation (with immediate validity on all European territory).

An important fact is also that a GM product, authorized for commercialisation in accordance to the above mentioned laws, enters the market only following additional compatibility verifications with other sector norms, to which the product belongs.

The normative relative to the product concerns all possible uses that it could have. Food products made of GMOs are regulated mainly by the following acts:

- Regulation 258/97/EC “Novel foods”, concerning new food products and ingredients that have to be put on the market. In order for these products and ingredients to be put on the market, it is necessary that they do not present any risk for consumers' health, that they do not induce consumers in error and that they do not differ from other food products and ingredients destined to their substitution, to the point that their normal consumption could determine nutritional disadvantages;

- Regulation 1139/98/EC relative to “Labelling of certain GM products”, containing or obtained from GM organisms: particularly soybean and corn seeds;

- Regulations 49 and 50/2000/EC, concerning labelling and limit value for certain GM products (including those with food additives). The goal is to harmonize, on a Community level, the labelling conditions of food products containing genetically modified additives and flavours, so that all consumers receive information on their presence avoiding that intra Community trades face new obstacles that could be caused by the adoption of different legislations in the subject;

- Regulation 178/2002/EC on food safety, with which all necessary measures adopted to guarantee greater safety in foods and animal nutrition to European consumers;

- Regulations 1829 and 1830/2003/EC on the new threshold values, the “unique identification codes” and the farmer's obligations.

These regulations define criteria for the commercialisation of food products of new introduction including labelling principles and modalities for products containing GMOs or by-products; they anticipate threshold values over which it is necessary to give specific product information

through appropriate labelling systems; lastly, they presume analytical and monitoring systems not always available.

As regards GMO-label: all food and animal feed in which the presence of authorized genetically modified material is over 0.9% will have to be labelled; the obligation is expected also for those products that derive from GMOs but that during the refining process, have lost their traces; the Parliament excluded from the labelling obligation the products of animal origin, like meat, milk, eggs, even if deriving from livestock fed with GM feed; for thirteen varieties of GMOs not yet authorized there is the introduction of a threshold tolerance of 0.5% for three years; thresholds do not include seeds for which they will be fixed at a slightly lower level in a separate EU Directive (limits from 0.3% to 0.7% are being considered); “Unique codes of identification” are expected to be assigned to each authorized GMO in the EU; producers will indicate the presence of GMOs along all supply chain passages and they will keep the declarations for five years.

All Community normative in the subject of biotechnologies is implemented on the notorious “precaution principle” which justifies resorting to temporary measures to avoid a potential risk demonstrated by available scientific and technical data. In other words, it concerns cases in which scientific evidence is insufficient, not conclusive or doubtful and preliminary evaluation indicates that there are reasonable motivations to think that the potentially dangerous effects for the community and the environment could result unacceptable and incompatible with the selected protection level. This principle not only represents a distinctive element of Community policy, but also the main reason of debate in international relations with the American normative, that is based on the presumption of substantial equivalence, according to which, since genetic engineering products are identical (or similar) to products obtained through traditional development techniques, the risks related to the first have to be necessarily identical (or similar) to those related to the second. The debate is still open and difficult to resolve (Josling, Sheldon, 2002), especially because international commerce rules do not dictate any specific discipline for the marketing of biotechnological products, but they can only perceive certain violations or limitations of commercial obligations engaged within the World Trade Organization (WTO).

1.1. The particular situation of Italy

The goal, that is being pursued in Italy for a long time now, is that of privileging the valorization of an agriculture based on typical and high quality products, that do not stale on stereotyped range of productions. This choice is not a sufficient reason to bring to question tout court, genetic engineering instruments, since these can be used by researchers for objectives that are close to the interests of the above mentioned agriculture.

Italy does not have a passive role enacting norms relative to the use of modern biotechnologies, in the sense that its

action does not limit itself to implement only what is decided on a Community level: an example is given by DPR (Presidential Decree) 128 of 1999, that prevents the use of GMOs in food destined to infants. In particular, for what concerns seeds destined to farmers and not directly for food purposes (including GM ones), which are subject to the main controversies, the regulation relative to their production and commercialisation is represented by Law 1096/71 on seed activity, by Decree of the President of the Italian Republic 1065 of 1973, and by Law 195/76, MiPAF (Ministry for Agricultural and Forest Politics) ministerial memorandum 36559 of 1998 (Protocol Register Tests for GM Products) and the Legislative Decree 212/2001 that applied Directive 98/95, which includes specific modalities for experimentation, production and commercialisation of genetically modified varieties.

Lastly, one must specify that the suspension in force in the EU (with Italy among the main actors) since 1998 on importation and cultivation of new agricultural products based on biotechnologies, is going through a critical phase (Sorrentino and Aguglia, 2003) and it will be even more (following the already approved labelling dispositions) at the time in which completely new guidelines on the coexistence of various cultivation methods (conventional, organic and GMO) will be approved. With these last ones, substantially the European Commission specifies the level of competence reserved to the member states, each of which will become responsible for the management on the territory of the previously stated problem of the coexistence. As regards Italy, its principal objective is that the choice is conceived for homogeneous agricultural areas, in such a way to avoid the risk of diffused contaminations: there is a great probability that the Italian agricultural producers will choose in wide majority not to use biotech products, preferring, instead, traditional productions and of quality. However, within July 2005, as the other members of the EU, Italy had the assignment to set the rules (as the distances to be respected among the GM fields and the traditional ones) that they will have to be received in the regional plans. From that moment the Regions had one year to formulate the local plans that will prohibit to cultivate GMOs, giving the opportunity to the farmers to choose the different types of seeds present on the market. The strongest application of a lot of Italian Regions is always to forbid the GM cultivations in the regional territories, but in lack of such eventuality, in order to preserve the agricultural biodiversity, the national normative on the coexistence will have at least to assure the normal development of the GMO-free cultivations.

2. Research on GMOs and experimentalations: the role of Italy

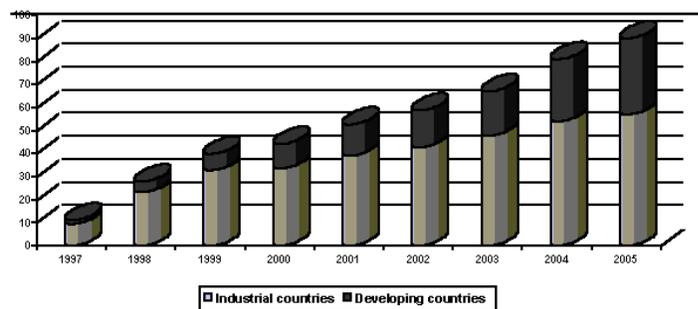
In Italy the CNR (Centro Nazionale Ricerche-National Research Centre) played a strategic role in the development of biotechnological research in Italy. After a pioneering

phase delegated to researchers' free initiative, having international connections with advanced foreign colleagues, all technologies of DNA modifying techniques were introduced in Italy.

Basically, the activity of CNR in the biotechnological research has materialized in a few "Finalized Projects". A FP is a group of coordinated activities to achieve objectives of relevant social-economic interests for the country, through the involvement of all the national scientific systems' components (CNR research bodies, universities, enterprises, other public and private entities). Also of importance was the FP "Biotechnologies and Bio-instrumentation" (Btbi), activated in 1988: this FP, due to tendencies emerged in the past from classic feasibility studies, was mainly devoted to biotechnologies applied to the biological and medical sector, and to a smaller extent to chemistry. However, the project excluded Btbi research dedicated to sectors that didn't prove to be sufficiently mature, with very few exceptions deriving from the application of general process technologies to the agri-industrial and environmental sectors. The last FP's global budget can be estimated at about 50 million euros, distributed over a greater than ten year period.

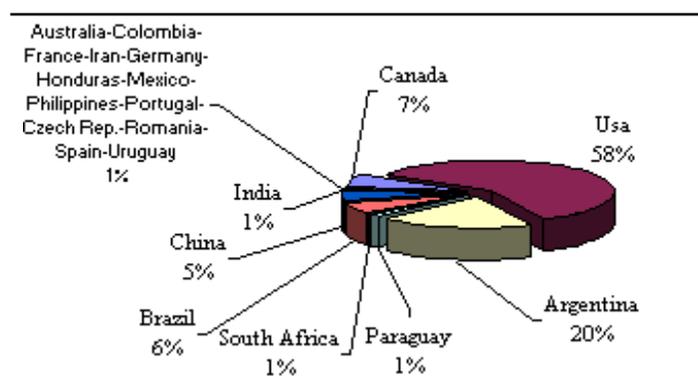
Of course, biotechnologies also represent a growing market (graph 1) that, in 2005, should reach a revenue of 142 billion euros. The study of International Service for the Acquisition of Agri-biotech Applications (ISAAA, 2005) re-

Graph 1. Cultivated areas with GMOs in the world: trend 1997-2005



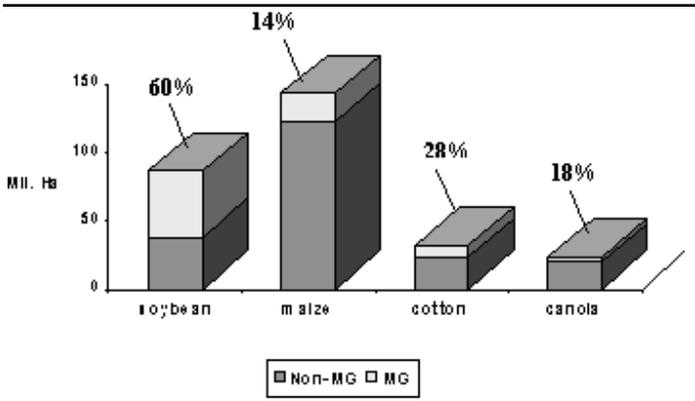
Source: International Service for the Acquisition of Agri-biotech Applications - ISAAA (2005).

Graph 2. Biotech countries (% over 90 mil ha) - 2005



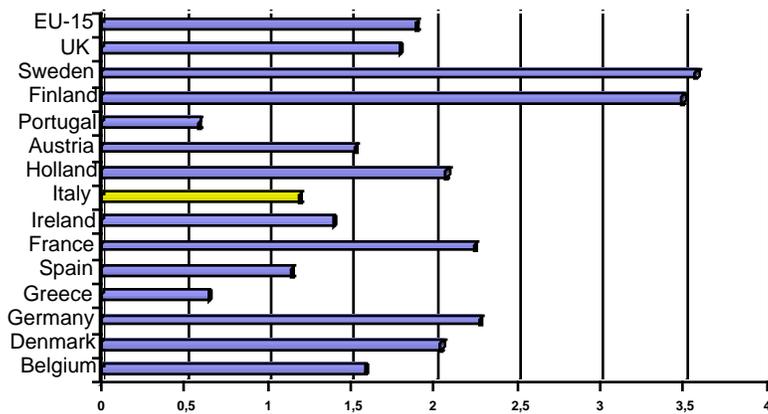
Source: International Service for the Acquisition of Agri-biotech Applications - ISAAA (2005).

Graph 3. The mean MG cultures - 2005



Source: International Service for the Acquisition of Agri-biotech Applications - ISAAA (2005).

Graph 4. Behaviour towards purchasing GM foods (%) in EU - 2002



Source: ICE (2005)

ported that approximately 8.5 million farmers in 21 countries planted biotech crops in 2005 (see also graphs 2 and 3). Notably, 90 percent of these farmers were in developing countries. In fact, the absolute growth in the biotech crop area has been higher in developing countries (6 million hectares) than in industrial countries (3 million hectares). United States and United Kingdom ahead of all, followed by Germany, France, Holland, Ireland and Japan are investing greatly in biotechnological research, strategically positioning themselves to maximise their profits from production and commercialisation of biotechnological products. Currently, Italy is in net and unequivocal delay: not only for dimensions of the industrial structure (about 250 biotech companies with 5000 employees) and revenue (about 2.7 billion euros in 2000) but mainly for the scarce institutional support to research in the biotechnological field. That is why research and development expenditure is, in Italy, far from that of rival countries, such as the United Kingdom, Germany, France and the Scandinavian countries (graph 4).

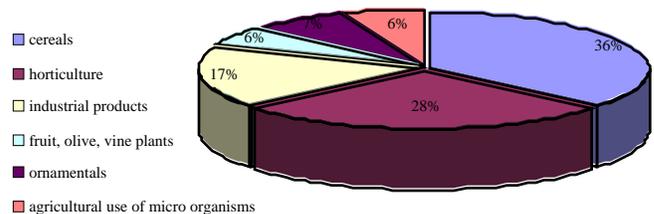
¹ In Italy, the locations where GMO experimentations are conducted are indicated by the Ministry of Health.

Until today, throughout the European Union over 1800 authorizations have been granted to the experimental cultivation of genetically modified varieties (these varieties are subject to experimentation only and not commercialisation). The record for experimentation goes to France, followed by Italy¹ (graph 5); a cautious behaviour has been taken by countries such as Germany, Ireland and Austria (which are the countries with less notifications). Despite the high number of experimentations, cultivation authorizations for commercialisation (in the EU) are scarce (certain varieties of soybean, beet, corn, chicory and tobacco). The most experimented varieties are: soybean, corn, colza, rice, cotton, tomato, chicory, tobacco, beet, potato, olive, vine, kiwi, strawberry, cherry, melon, chrysanthemum, sunflowers. The main changes concern: resistance to herbicides (especially glyphosate) and insects (especially *Pyralis farinalis*), male sterility (the well known Terminator seeds of Monsanto), inhibition of spoilage (particularly in tomatoes). The number of genes used in these modifications is not higher than ten. In particular, the resistance to herbicides and insects is the most exploited modification in the agri-economic field; in fact, 90% of transgenic plants have these characteristics. Beyond these considerations, one should try to understand which actual risks for human health could derive from the consumption of transgenic foods.

3. The position of interested parties in the subject of agri-biotechnologies in Italy

The issue of the introduction of modern biotechnologies in the agri-industrial sector has triggered a series of reactions by all categories involved, which led to often contrasting positions (even within theoretically close groups, at least for the pursued objectives), in terms of the various themes in question: from the risk evaluation to the traceability system, from the issue of coexistence of the various cultivations to the question of labelling, from

Graph 5. Authorized experimentations in Italy 1994-2002



Source: GD Research-EU (2003).

the discussion on threshold limit to the undisputable consumers' protection. Thanks to the help of official documents from the various parties involved, the vision, on the GMOs issue, of various trade associations, industry and consumers is given. Also, particular attention was given to the role of the media and to the information system in general in terms of biotech, as well as the contribution they can provide to help solve a complicated and felt issue like the one discussed here.

3.1. The position of trade associations

3.1.1. The freedom of choice of Confagricoltura

The position of "Confagricoltura" (that gathers certain category federations and represents agricultural companies in all the main national and international institutional offices) on the difficult issue of biotechnologies, was based especially on the consideration of scientific opinions and orientations. In fact, if one emphasizes that a certain GMO can be harmful to human health or the environment, according to the confederation it is necessary to adopt all countermeasures to avoid those effects, while guaranteeing accurate and constant monitoring of the situation, which means that in the absence of such evidence, delays to the introduction of novelties in the agricultural production field, could represent the loss of interesting opportunities for operators, even economically speaking, as well as environmental advantages for the environment and consumers. In other words, according to Confagricoltura, the acceptance or rejection of genetically modified organisms in agriculture cannot derive from a preconception or a moral judgement. Once the field is cleared from every possible risk to food and environmental safety, there should not be any hesitation to take on decisions that move towards their adoption.

With this in mind, it is also important to say that a similar behaviour guarantees the respect of everyone's behaviour and ideas, as long as it can be combined with a logic of maximum diffusion and information transparency. In concrete, according to Confagricoltura, if we move towards the introduction of GMOs in the agricultural field, consumers must be able to choose, easily and with necessary awareness, to opt for a GMO or a GMO-free supply chain product. It is the notorious subject of labelling that even the European normative recognized as an essential element to buy consumer's trust towards GMOs. The usual and scientific approach would allow to avoid contradictions determined by certain political choices made in the past few years at various decisional levels. In Europe, while there is the "single market" principle for the trade of agricultural products, farmers of certain countries are allowed to forbid the use of transgenic varieties: a prohibition that translates in a potential competitive disadvantage. A similar and paradoxical situation is the one that compares Italian agriculture and farmers with the realities of the non EU member countries, in which, the use of GM segments is fully authorized: these countries' agricultures (especially those of the USA

and Latin America) are strongly competitive.

3.1.2. A similar vision: the Cia and the need for monitoring

On the subject of biotechnologies, the position of the "Confederazione Italiana Agricoltori" (Cia) stresses the importance of a strong coordination between research streams that gradually become effective in the various EU member states, through a European institution that assures synergies and information exchange and experiences among the different project realities. Also, it would be important that farmers would be involved in research and applied experimentation processes, since they are the most suitable subjects to identify objectives, and at the same time respecting, with coherence, the conservation and protection needs for the planet's genetic resources.

The Cia thinks these are actions that should be adopted in the short period considering that it is realistic to imagine an imminent European take-off in the commercialisation of transgenic products with the coming into force of the reference normative. The commitment of single national authorities will have to concentrate in the following months in perfecting warranty measures that can concretely guarantee consumer's freedom of choice through a separation of agri-industrial GMO supply chain from conventional ones. Adequate analysis and monitoring systems will be necessary for products admitted to commercialisation to avoid that the various supply chain phases could have meeting points. At the same time, probable risk phenomena deriving from the cultivation and commercialisation of new products will have to be monitored in the long term. As known, as far GMOs go, a group of monitoring tools able to guarantee a transparent system, based on consumer's information and on the everyday knowledge and managing of international commercial flows by competent authorities, has not been created yet. This is due not only to an imperfect normative on an European level, but also to an inadequacy of monitoring systems for which the authorities of member countries are competent.

3.1.3. A different viewpoint: the opposition of Coldiretti

"Coldiretti", the organization made by different regional and provincial federations, has recently declared its opposition to transgenic cultivations with profit goal, for a series of reasons. The possibility of producing certain large consumption plants, like tomatoes, directly in laboratory, would transform farmers in wage earners of the big foreign companies and the main Italian profit, food quality and differentiation, would be swept away. Another problem is that transgenic fields could contaminate the natural ones, a pre-occupation shared by numerous operators of organic agriculture. Until transgenic cultivations are kept strictly segregated from the natural ones, the problem does not exist. However, if the transgenic should be cultivated with a commercial goal, it would be difficult to avoid cross pollination,

or the accidental crossing between natural and modified species, with unknown consequences. The opposition is welding with that of other countries' associations, like the French Confédération Paysanne and the American National Family Farm Coalition, to organize a global opposition. The transgenic cultivations are regarded as an economic and environmental threat, also because they ignore the multifunctionality of agriculture. Cultivation cannot be considered solely under the productive aspect, but also in view of the role that it plays in maintaining the territory and within a region's economy.

Coldiretti strongly supports a mandatory insurance regime for those who deliberately put GM seeds, endangering the environment, to compensate damages caused towards farmers who choose the organic production method and that see their harvest contaminated: this position is based on the proposal of a Community compensation fund of the food supply chain, to finance with withdrawals on transactions of genetically modified merchandise or with insurance premiums paid by those who choose biotechnological cultivations. This protection measure will be necessary when the principle of coexistence between organic and GM crops is introduced, to which Coldiretti opposes the risks emphasized by the relation of the EU Centro Comune di Ricerche of the municipality of Ispra in Lombardy about the impossibility of coexistence owing to contamination problems.

According to research conducted by Inipa-Ager (the Coldiretti institute for agricultural training), in 2005 consumption of organic products is 5 billion euros, about 3.3% of total food consumptions. This is why, according to Coldiretti, against the rapid growth of the organics, it is necessary to adopt all protective measures towards consumers and farmers to avoid putting on the market products that recall organic productions without presenting necessary guarantees.

3.2. The position of the Italian industry

3.2.1. The caution of Federalimentare

The Italian food industry thinks that the issue of applying biotechnologies in agriculture should be evaluated with scientific rigour and attention, on the basis of clear and uniform rules on an international and Community level, considering potential advantages that could derive. "Federalimentare", which gathers a great number of associations from the agri-industrial sector, is favourable to a correct and useful information to consumers, through a clear and realistic labelling and through the diffusion of scientific acquisitions, by institutions in charge, on the real nature and on the characteristics of genetically modified products. The lack of information leaves the field open to commercial speculations and political exploitations and it creates disorientation in consumers. To ensure correct labelling, it is indispensable that the competent Community institutions define the missing normative elements for the entire agri-

industrial supply chain; in the meantime, while waiting for the definition of this normative picture, and for the consolidation of the necessary widespread consent of the scientific community and considering consumer's sensibility, the industry is using all possible caution to avoid the use of ingredients containing GMOs. The necessary step after the fixation of a threshold is to anticipate a monitoring activity aimed at verifying the exactness of what is contained in the labels. The food industry states its willingness to operate in great information transparency and consequently it expresses strong perplexities on the use of declarations on the labels such as "GMO-free", since, until there will not be a precise and complete regulation along the entire agri-industrial supply chain, this information could result misleading to consumers. For the same reason, even the diffusion of discriminating lists, since they cannot be based on certain and objective criteria, can disorient consumer's choices. Lastly, the food industry considers essential to protect all subjects present on the market (producers, distributors, consumers, etc.) that the interested parties give proposal contribution (in the competent offices), so that the monitoring institutions in charge of granting authorizations acquire full responsibility and authority in managing the issue.

3.2.2. Assobiotec: the promotion of genetic engineering

The position of "Assobiotec" is very precise. Assobiotec represents Italian biotechnological companies and it favours the full development of biotechnologies acting in various directions: collaborating with national institutions in defining financial and fiscal policies suitable to favour the introduction and the diffusion of innovation; interacting with institutions, nationally and on an European level, in the regulation of biotechnological activities (research and development, production, commercialisation and use of products, intellectual property); promoting research programs of strategic interest for the bioindustry; favouring the participation of Italian companies to biotechnological research and development activities financed by the EU within the technological research and development programs; reinforcing the collaboration among research institutions and small-medium companies in every sector of the biotechnological innovation field. Particularly, for the agri-industrial sector, in order to increment global food resources, Assobiotec promotes a kind of agriculture that pursues new biotechnology developments that offer additional protection to farmers, as well as improvements in harvest and a more efficient use of natural resources. According to the association, the scarce familiarity with this kind of information has probably contributed to strongly influence the comprehension and the acceptance of biotechnologies: with negative consequences, particularly in Italy, on development prospects of a scientific and technologic sector extremely promising and able to offer consistent benefits to society, food, health, economy, environment. According to Assobiotec, agri-biotechnologies represent a resource of

exceptional importance to improve quality and food nutritional value and the most serious option to guarantee a sustainable environmental future; also, they would allow to increment cultivations' productivity and guarantee food at lower costs. All this would be based on ample safety guarantees due to the rigid discipline of scientific research, besides norms and regulations that do not have equals in the agricultural and food fields.

3.2.3. Large Distribution and the bent towards a GMO-free supply chain

In terms of agri-biotechnologies, the Large Distribution (LD) does not really have an official position and certain considerations can be made only thanks to the main initiatives that, in recent years, were taken in this matter by the main chains. In 1999, an European consortium of distribution chains decided to ban its transgenic products. This consortium, led by the English Sainsbury, was joined by various European distribution chains: Marks & Spencer (UK), Carrefour (France), Delhaize Le Lion (Belgium), Migros (Switzerland), Superquinn (Eire) and the Italian Esselunga. The consortium assures the exclusion of GMOs from private labels, or products sold with one's own label. In Italy, the initiative of Esselunga was followed by Coop, which communicated it was studying a plan to exclude biotechnological products. According to Esselunga's initiative, over 700 suppliers have to indicate which products are free from GM ingredients and additives. Coop, instead, with reference to private label, is working on an agreement plan that will involve the entire supply chain to which suppliers refer to. In the case of cookies sold with the Coop label, the exclusion agreement of biotechnological products will involve suppliers of ingredients or additives used by the processing industry that produces cookies.

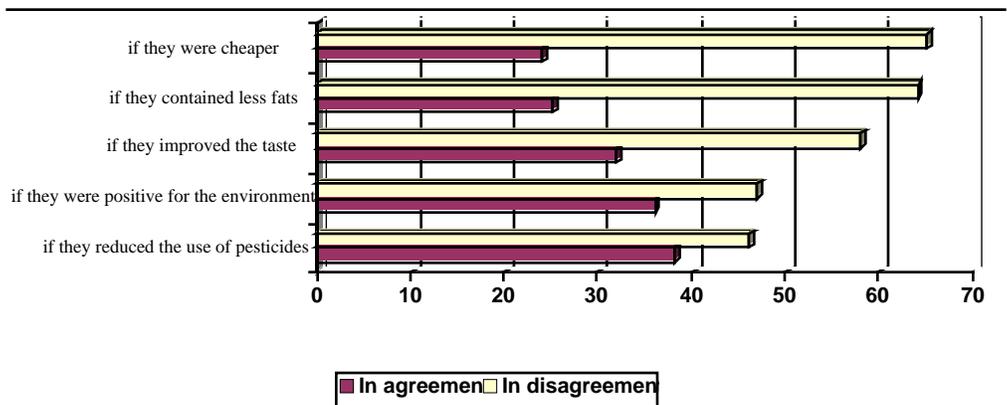
Later on, various farmer's representatives signed, in October 1999, a commitment protocol with the large distribution (Coop Italia) to acquire the non genetically modified product "at the source", in order to guarantee consumers from the absence of genetic manipulation in all food chain production phases with the goal of satisfying consumer's requests, careful of quality and product origin and to search for a food that represents not only nutrition but also satisfaction. The LD's initiatives are aimed at guaranteeing a 100% "GMO-free" supply chain, in coherence with normative measures: in this context the fixation, in July 2003, of the new GMO labelling normative was of great importance.

3.3. The position of consumers

In Italy, in the past decades, the "primary" sector was solicited to produce more, to meet the requirements and satisfy the country's food needs. The technological innovation permitted to satisfy this general need; but now the situation has changed. Consumers are particularly careful of food quality and safety and of the productive processes' impact on the environment and perceive the use of biotechnologies in the agri-industrial system as a threat to all this (see graph 6). New consumer's demands become an input to diversify the agricultural offer. From research conducted in the past years at retail outlets of the main national distribution chains, the majority of consumers does not wish to purchase products that reveal the presence of GMO ingredients on their labels.

The use of genetically modified organisms in agriculture represents an option to evaluate carefully. The lack of certainties, that currently distinguish these productions, induced the main trade associations in the national agricultural sector to apply the precaution principle, through a "safe sowing" and "safe breeding" program. This program aims at guaranteeing product transparency at the time of sale: to do so, it is necessary to let its traceability along the supply chain available from the time of seed and/or feed choice to give to reared animals. Consumers have a lot of information that allows them to make purchasing choices in accordance with their preferences: firstly, products with more than 1% GM ingredients report that information; secondly, the use of GMOs is prohibited for feed destined to toddlers and children up to 3 years old; besides, organic P-

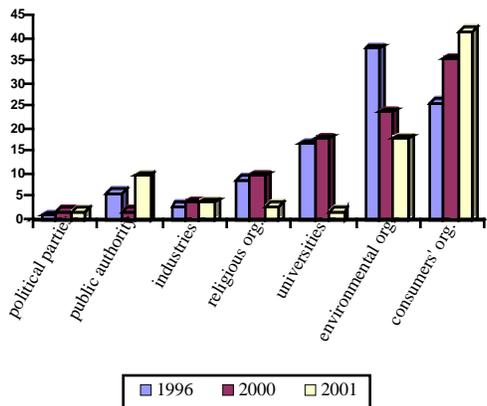
Graph 6. Behaviour towards purchasing GM foods (%) in EU - 2002



Source: International Service for the Acquisition of Agri-biotech Applications (ISAAA) (2003).

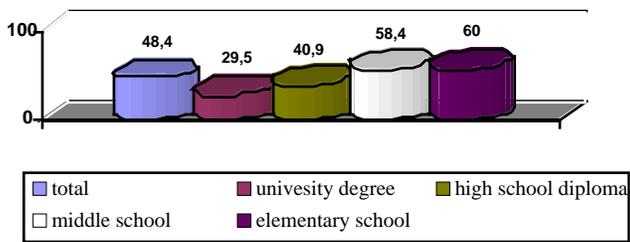
DO (Protected Designation of Origin) and PGI (Protected Geographic Identification) products are manufactured without GMOs; lastly, consumers know that products that come from the USA and Canada (for example breakfast cereals and margarine-based products) have greater probability of containing GM ingredients. Regarding the issue of using

Graph 7. Most reliable information sources in EU (%)



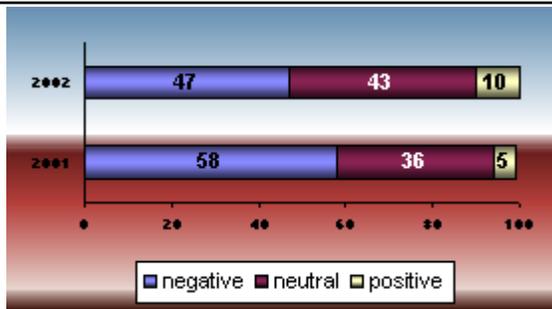
Source: our elaborations on International Service for the Acquisition of Agri-biotech Applications (ISAAA) (2003)

Graph 8. Percentage of citizens not informed, by education qualifications (Italy - 2002)



Source: our elaborations on data from Osservatorio di Pavia Media Research (2003)

Graph 9. Weight of television information in Italy (% - 2002)



Source: our elaborations on data from Osservatorio di Pavia Media Research (2003)

biotechnologies in agriculture, the role played by associations to protect consumer's rights remains essential and determinant.

3.4 The importance of public perception and the role of the media

Recent researches show how the Italian and European public discriminates between biotechnological research progress and its products: in particular, it distinguishes be-

tween the applications in the medical and in the agri-industrial sector. On one side, a high level of trust is put in science, especially when research is carried out within neutral environments (like universities) and determines benefits for human beings' health; on the other side, the opposition towards products considered transgenic food susceptible of negative consequences for consumers.

The most credible source for what concerns information on biotechnologies is represented by consumers' organizations (42.3%) that have continued to increment their consensus in recent years (25.3% in 1996 and 35.8% in 2000). We shall not ignore universities and institutes for scientific research (19.6%) which surpassed for the first time, environmental organizations (18.4%); followed by public authorities (10%), industries (4.3%) and religious organizations (2.8%) (graph 7).

Among the most relevant communication elements relative to the use of biotechnologies in the agri-industrial sector, there is confirmation and strengthening of the tendency towards dealing with this issue not only in emergency cases. The GMO issue appears to constitute an independent attention pole on behalf of the media; in fact, confirming this, entertainment programs offer more and more space for debates on biotechnologies, considering the importance of the issue to bring to the publics' attention (graph 8). This represents an important sign of the autonomy degree recognized to the agri-biotechnological issue, and in the meantime, it attributes greater sensibility to the way information is given through communication means. An important consideration emerges from what is said: the level of treatment of GMOs in agriculture is still too vague and insufficient, conditioned by prejudicial behaviours, characterized by the opponents' deligitimization forms or extreme positions on the ideological view. The discussion on GMOs in TV shows emphasizes an important evaluation problem: basically, in the various programs often GMOs are not proposed as a new opportunity of modern technology to evaluate objectively, as much as a problem related to the food safety issue, therefore, to contrast only. This presentation induces audience to position biotechnologies in a negative category.

This is why the choice of guests, called to express their opinion in various TV shows, is very important. For instance, too often the subject is twisted due to the absence of reliable researchers; therefore the audience often lacks the tools to judge the subject's competence who intervene in the debates, nor the goodness of the notions that are given to them. In this way, often, there is the doubt that scientists, called to participate in different programs, are involved in the huge biotech multinationals' interests (suggestion lifted from the environmentalist front), or the opposite (the pro-GMOs front), according to which adverse scientists are selected based on political preferences against the use of biotechnologies in agriculture: a reciprocal mistrust situation, that cannot favour correct information for audiences. An additional contradictory element was seen in the tendency to present common people's opinions: this practice is

often exploited to show time after time, according to program goals and needs, or great disinformation or the strong knowledge of economical implications of environmental and health risks deriving from the use of biotechnologies. The natural consequence of all this is to generate more confusion among public opinion (graph 9).

On behalf of the press, judgements expressed were less neutral and favourable, increasing the negative evaluation component and the weight of alarming potential risks. Also, in this last period, the weight of politicians in press and TV communication increased slightly and at the same time, the attention towards consumer's protection has greatly increased, especially in reference to the making of European norms.

Conclusions

Obviously GM products currently represent a powerful competition tool on the international market (and the contrasts between the USA and the EU on the issue is symptomatic). Also, they marginalize qualified territory genetic resources, as it occurred with hybrids. The issue of productive surpluses and motivated preoccupations concerning the environmental deterioration and the risks for production's healthiness, correlated to the diffusion of super intensive agriculture, push Europe towards the promotion of an eco-sustainable development model, that comprises the valorisation of local agricultural quality productions. Especially today, when consumers tend to privilege typicality, healthiness and, in general, food products' naturalness (and the strong increase in organic productions confirms it), we can say that the development in the use of genetically modified organisms goes surely in the opposite direction.

This path, which brought to an ample and complex normative picture comprising regulation and incentive of eco-compatible productions and the regulation of quality brands based on designation of origin, is in total opposition with all that GM products represent. Therefore, there is the need for GMO research to develop freely, since there is the permanent necessity, even on behalf of public administrators, to have adequate scientific parameters to operate rational choices to defend agricultural operators and consumers' interests. Today, the priority is to protect GMO-free supply chains on which all the main typical regional productions are based and, in these cases, the imperative is "zero tolerance". These considerations derive from economic evaluations and they interpret consumer's orientation.

On the basis of what has been said so far, we can state that the Italian situation appears to be quite complex. It is necessary that contrasts find a meeting point, so that the issue in question can be dealt with directly, specifically and responsively, mainly for the consumers, the farmers and the country's territorial tradition's necessities, and secondly to the industries, the research world and that of the various political forces.

All of this coupled with an elevated level of knowledge, to which the present information system can contribute:

however, with different modalities and goals from the ones that characterized it until now. This in order to obtain one common directive line to follow hoping that there will not be further controversial episodes, as the ones that occurred in our own country.

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