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Uninformed and disinformed society and the GMO market

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The EU has a complicated regulatory framework, and this is slowing down the approval process of new genetically modified (GM) crops. Currently, labeling of GM organisms (GMOs) is mandatory in all Member States. However, the USA, in which GMO labeling is not mandatory, continues to lead the production of biotech crops, biopharmaceuticals, biomaterials, and bioenergy.

GMO labeling and freedom of information in the EU and the USA

In Europe 'GM food is still the Achilles heel of biotechnology' and 61% Europeans did not support GM food [1]. When asked which issues associated with food they were most worried about, Europeans indicated: pesticide residues, the presence of antibiotics or hormones in meat, and pollutants such dioxins and mercury, as well as GMOs, in food products [2]. By contrast, research concerning actual purchasing decisions of Europeans during everyday shopping revealed that, when given the choice between GM and non-GM products, customers did buy labeled GM products despite stating otherwise in questionnaires. Price turned out to be of utmost importance, regardless of whether the food was labeled GM [3]. At the same time, across the Atlantic, the American Medical Association, the American Association for the Advancement of Science, and the American Phytopathological Society are of the opinion that foods containing GMOs should not be labeled. The position presented by the researchers was, surprisingly, supported by the American public. For the first time, US citizens had a chance to decide whether food products containing GMOs should be labeled, in California on November 6, 2012, when Proposition 37, aimed at enforcing labeling of genetically engineered foods, was struck down. On the second occasion of such a decision, November 5, 2013, voters from Washington DC decided that foods produced through genetic engineering do not need mandatory labeling.

Labeling is an important tool, and knowing the ingredients of a product helps to balance diet or provide information necessary for avoiding risks involving the consumption of the product (e.g., allergy sufferers, religious persons). However, in the case of GM foods, labeling concerns a method of manufacture – the product and ingredients remain essentially unchanged. Meanwhile, the concept of freedom of information (and subsequently freedom of choice) has been cleverly exploited for marketing purposes, resulting in senseless labeling of animal-derived products such as eggs, meat, or milk as GMO-free foods in many Member States of the EU. Customers are also encouraged to buy salt that has been produced without genetic engineering techniques (see http://www.amazon.com/Salt-Himalayan-Chemicals-Non-gmoOrganic/dp/B007V8A34M) This product is also recommended as organic, hallal, and kosher (*sic*!). The effectiveness of such campaigns reveals how the general public is uninformed or disinformed in the case of GMOs.

How policy decisions are made

GMOs (including GM food and feed) must receive authorization before entering the market both in the EU as well as in the USA. However, the authorization process is handled differently in these two areas, therefore creating a disparate framework for placing GMOs on the market.

In the EU, the authorization process includes extensive and case-by-case safety assessment by the European Food Safety Authority (EFSA). EFSA submits its opinion to the European Commission (EC), which prepares a draft of a decision. In the next stage the Standing Committee on the Food Chain and Animal Health approves or rejects the draft with a qualified majority. In the event of approval, the proposal is adopted by the EC and the authorization should be valid throughout the EU. Despite the stated priority of the European Commission for a science-based policy geared towards a knowledge-based bioeconomy, social pressures have influenced the current EU legal framework in relation to the growth and use of GM crops and crop products. Europeans demand to vote on the lawfulness of transgenic organisms and do not want to leave this issue in the hands of the experts. Indeed, some EU governments vote against the scientific expertise provided by EFSA, for political reasons. As a consequence of concerns from the public, nine of 28 Member States (Austria, France, Germany, Hungary, Luxembourg, Greece, Bulgaria, Poland, and Italy) imposed moratoria or bans on commercial cultivation of GM plants. The decisions of these individual states were based on common public opinion rather than on a science-based GMO food-safety assessment. None of the many long-term and expensive research projects conducted within the EU revealed higher risks from GM food and feed, confirming their substantial equivalence with conventional products [4,5].

In the USA three Federal agencies regulate different aspects of GMOs: the US Department of Agriculture (USDA) Animal and Plant Health Inspection Service, which issues

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permits for commercial release and field trials; the FDA, which is responsible for ensuring the safety of domestic and imported foods; and the Environmental Protection Agency (EPA), which regulates pesticides used in or on foods and feed. Depending on characteristics of a product, it may be subject to the jurisdiction of one or more of these agencies. In the USA, unlike the EU, proving substantial equivalence allows the growth and marketing of GMOs under conventional food-safety regulations. Moreover, the average time required for approval of a GM product (approximately 25 months) is 1.5–2 years shorter than in the EU.

Regulation of GMO labeling in the EU and USA

Currently, in the EU, labeling of transgenic food is both product- and process-oriented, and aims at labeling goods that make use of GMOs at any stage of production [6,7]. Therefore, in accordance with EU regulation, labeling is required for products including:

(i) GMOs for food use (e.g., papaya, rice); currently authorized GM plants are not intended for direct consumption;
(ii) foodstuffs containing or consisting of GMOs (e.g., biscuits with flour from GM soybean, chocolate with lecithin from GM soy);
(iii) GMO derivatives, regardless of whether or not GMOs are detectable in the end-product (e.g., oil from GM rapeseed, sugar from GM sugar beet).

What might seem surprising, in the context of this strict regulation, is that numerous products are exempt from labeling obligations. In particular, enzymes produced by genetically modified microorganisms and that are used as processing aids. For example, cheese produced using chymosin enzyme derived from GM microorganisms does not require labeling. Moreover, the EU has adopted non-science-based regulations that fix a threshold of 0.9% for the adventitious or technically unavoidable presence of GMO, below which GM products do not require labeling. American authorities have adopted a completely different approach, based on the concept of substantial equivalence. Therefore, the FDA currently requires labeling only if the GM food has different nutritional properties or allergenicity [8].

Consequences of how policy decisions are made

As a consequence of public opposition and unfriendly legislation, several major biotech companies have reduced their personnel in the EU and moved research and applied activities from the EU to other regions. This has led to decreased employment and a decline in research in this sector (http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Agricultural%20Biotechnology%20Annual_Paris_ EU-27_8-3-2012.pdf). In other words, it means job losses for specialists and significant transfer of European know-how outside the EU, and even a brain drain as agricultural scientists leave for other jobs in more friendly areas. Moreover, the current situation hampers the commercialization of safe and innovative GMOs, resulting in competitive disadvantages for European farmers. While Europeans continue their endless disputes about GM foods (level of acceptance varies greatly among stakeholders), thus slowing down both production and R&D, the USA continues to be the global leader in the production of genetically engineered plants, having 70.1 million hectares of commercial GM crops and an average adoption rate of approximately 90% for all transgenic strains [9].

Concluding remarks and future perspectives

Each year the EU imports about 30 million tons of grain, soybeans, and maize, most of which are transgenic. Food additives are mainly derived from GM plants, and the feed market is dominated by GM soy. This basic information should be widely provided to consumers. The current view of the situation in the EU can be summarized by the paradoxical conclusion that GMO is safe to eat, but only when produced outside the Member States [10].

What then is the point of imposing further regulations, which only provide the illusion of freedom of information and freedom of choice? Most likely, the major important consequence of maintaining such a policy would be trade disruption, causing great economic losses both for exporters (such as the USA) and the importers (in this case, the EU). Instead, it is worth considering legal amendments that enable science-based approaches to policy in the EU:

(i) reduction of time for authorization of GMOs in the case of sufficient scientific data;
(ii) redefining the principle of coexistence, to provide a practical choice of crop production, instead of favoring the growing of conventional and organic crops;
(iii) establishing new threshold levels for labeling to avoid giving a price premium to non-GMO products;
(iv) labeling guidelines based on a principle to inform rather than serving as a warning.

It is worth emphasizing that the EU depends heavily on imported food and feed. Failure to introduce legal amendments will eventually increase the probability that unauthorized GMOs will be present on the European market, likely causing trade problems and escalating economic costs.

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