

Scientific approach to biotechnology regulation

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The method of recombinant DNA is another historical cornerstone in breeding after Mendel's formulation of heredity laws. Unfortunately this achievement of science has been misused by politics. European politicians and certain pressure groups convinced public about the dangerous nature of transgenesis. This generated the public fear of GMO. Populist politicians reacted by more restrictive rules that are naturally understood by public as a consequence of certain adverse effects of GMO discovered during their use and the refusing of "Frankenstein food" escalates, etc.

Any EU document regulating GMOs and most of speeches by policymakers include the phrase "in order to guarantee high level of human and animal health protection..." despite the fact that there are no scientific reasons why transgenic crops might generate higher risk to human and animal health than any other new crop, particularly those induced by radiation. On the contrary, the latter bring more new proteins to our food compared with GM crops¹.

The practical experience documents the same: People and animals have consumed, e.g., about 800 millions of metric tonnes of RR soy beans. No side effect due to transgenesis was documented. All withdrawals of GM products from market were due to formal reasons – the approval was missing. There were no safety reasons.

Special questions concerning health risk perception by public represent genes of antibiotic resistance introduced in some transgenic crops. This question was correctly set by EFSA², but certain EU officials prefer the position of pressure groups and disregarded EFSA opinion based on science³.

Similar story accompanies the risk to ecology. If science is involved the risk should be assessed for particular crop with particular transgene used as a part of particular technology in particular region and situation. The risk of alternative technology with standard crop evaluated with equal rigorousness should be performed and decision then results from comparison of these two risks. However, existing EU legislation asks only for the risk assessment when technology with GMO is used. It quietly implies that "standard" ("conventional", "traditional") technology brings zero risk so that even small risk of GMO is above standard level. The document of French government⁴ reasoning the ban of Bt maize is classical example of this type of politics. What measures for pest control farmers will adopt after the ban are not even mentioned. This is clearly violating the precautionary principle defined by Commission⁵.

The main risk of the use of herbicide tolerating GM crops (HT crops) is seen in the increase of particular herbicide application, but without considering existing farming practice. The situation in Czech Republic is typical. There are no HT crops in the CR, nevertheless up to thousand metric tonnes of glyphosate is used per year. If all soy beans grown in the country are glyphosate tolerant the consumption is increased by 2 per cent.

¹ Rita Batista et al.: Plant mutagenesis may induce more transcriptomic changes than transgene insertion. Proceedings of the National Academy of Sciences, Vol. 105, No. 9, Mar. 4, 2008, p. 3640-3645.

² <http://www.efsa.europa.eu/en/science/gmo/statements0/npt2.html>

³ **Commission reaches impasse on GMO approvals, ENDS Europe DAILY 2537, 07/05/08**

⁴ Objet: clause de sauvegarde concernant la mise en culture des semences de maïs génétiquement modifié MON810, au titre de l'article 23 de la directive 2001/18/CE.

⁵ Communication from the Commission on the precautionary principle, COM(2000) 1, Brussels 02.02. 2000

Socio-economic effects of GM crops are not very positive. GM crops beneficial for consumers are missing, recent GM crops bring profit to growers and EU approved mostly just for import and processing, farmers pay licence fee, the technology and GM varieties are protected by patents and the development of GM crops is practically limited to multinational big companies. These adverse socio-economic features are not due to the recombinant technology, neither to the GM crops but predominantly are connected with the unscientific policy of EU.

The mammoth bureaucracy requesting pointless procedures for GM crop approval make its development from laboratory to market extremely expensive – in the range of hundred millions of USD. E.g. the proof of “substantial equivalency” is very expensive and time-consuming. Above referred measurement of Batista et al.¹ documented, that varieties derived by “standard” irradiation breeding cannot pass it. More than that: it is now well established that plants answer stress (drying, flooding, insect damage, contact with herbicide, frost, etc.) by synthesis of stress proteins⁶. Thus even common variety plant after stress cannot meet “substantial equivalency” with non stressed plant. The same is true for feeding experiments. The Greenpeace super hit – the recalculation of Monsanto’s feeding experiment by Séralini et al.⁷ - documented disutility of such testing. It is not requested for any other new variety, so that asking it only with GMO is just alibi for policymakers.

Making the development so much expensive, EU legislation prevents consumers from benefits of this science achievement. First - the company must project the investment into the price of the seed and farmers cannot sell the product cheaply. Second - nobody will risk developing a GM crop with benefit to consumers as the above artificial fear of GMO will make it unsaleable. The troubles with Golden rice, the only crop of this kind, demonstrate the problem⁸. Third - large investment to the new transgenic crop makes the protection by patents necessary. This is harmful for developing countries.

Very important socio-economic factor is the public attitude. Anti-GMO groups using false demagogy implanted unbelievable nonsense into brains of citizens like “Ordinary tomato does not contain genes, while genetically modified tomatoes do” (belief of 40% Europeans) or “By eating genetically modified fruit the person’s genes could also become modified” (54%)⁹. Public fear that logically results is then interpreted as a proof and ethical necessity of anti-GMP politics. Sadly, such tactics was adopted not only by certain NGOs but also by Stavros Dimas, commissioner for the environment¹⁰.

Conclusions

The carrier of politicians in democratic systems is in hands of voters. Therefore policymakers preparing the legal rules are concerned about public attitude rather than about science. The leaders of certain global NGOs are well aware of this and through professional manipulating the public opinion bring the GMO regulation into line with their targets.

However recent situation with food safety makes big countries like China and India to look how to feed their citizens and save water. Transgenic crops are one possibility among

⁶ Wanchana S. et al. The Generation Challenge Programme comparative plant stress-responsive gene catalogue Nucleic Acids Research, 2008, Vol. 36, Database issue D943-D946.

⁷ Séralini G.E., Cellier E., de Vendomois J.S. (2007). New analysis of a rat feeding study with a genetically modified maize reveals signs of hepatorenal toxicity. Arch. Environ. Contam. Toxicol. (<http://www.springerlink.com/content/1432-0703>)

⁸ Enserink M.: Tough lessons from Golden rice. *Science* 320, 25 April 2008, 468-472.

⁹ Gaskell G., Allansdottir A., Allum N., Corchero C., Fischler C., Hampel J., Jackson J., Kronberger N., Mejlgard N., Revuelta G., Schreiner C., Stares S., Torgersen H. and Wagner W.: Europeans and Biotechnology in 2005: Patterns and Trends. Eurobarometer 64.3 - A report to the European Commission’s Directorate-General for Research, May 2006.

¹⁰ Dimas S: Co-existence of genetically modified, conventional and organic crops. Freedom of choice. Conference of GMO co-existence, Vienna, 05 April 2006.

others. They are heavily supporting the biotechnology research. Thus in near future large Asia countries will adopt GMP as large countries in Latin America already did. Africa will follow. The politics of EU will then look marginal in global scale.

When Brazil and Argentina find customers for advanced varieties of soy bean (China already approved Roundup Ready 2 Yield soybeans), EU will stay without 30 millions tonnes/year of soy beans for feed¹¹. These are facts that make us optimistic concerning science penetration into EU regulation of GMO.

¹¹ Economic impact of unapproved GMOs on EU feed imports and livestock production. Directorate General for Agriculture and Rural Development, Brussels 2007.