EUROPABIO™

The European Association for Bioindustries

BASICS OF BIOTECH FACTSHEET

6 Questions on the Basics of Biotech

Introduction

The aim of this short guide is to explain GM crops as simply and factually as possible. The reason for publishing it now is because there is so much information on offer that it is difficult for non-specialists to find the basic facts on 'how' and 'why' GM crops are developed and cultivated.

Recent consumer surveys[1] show that many EU citizens still find it hard to get the accurate, clear information that they are looking for. Findings also show that this is exactly what consumers feel they need in order to make up their minds about GM foods. This guide is intended to help fill in the blanks.

1. What is a GMO?

Advances in molecular biology in the 1970s made it possible to identify the specific gene responsible for a trait, and to isolate and transfer it from any type of organism to plant cells. Instead of making tens of thousands of genetic changes, with GM you insert a gene with a known single beneficial trait into the plant. You know what the protein specified by the gene does, so it is a more targeted change with less unintentional disruption to the plant's other genes. Many plant breeders have embraced GM because it offered this precision and a quicker way of obtaining a desired trait in a plant.

2. Is GM "unnatural"?

No: genetic modification might sound strange but in fact throughout farming history all plant breeding, from the seeds people use to grow tomatoes to the global production of wheat, has involved genetic changes.

Since the start of crop cultivation, thousands of years ago, farmers have looked for desirable traits, such as plants that are shorter and less easily destroyed by the wind, to incorporate them into the following generation of plants. Originally they created new varieties by cross-breeding. This shuffled the plant's genes, leading to random variation, and the better individuals were selected while the less interesting ones were discarded. By contrast, GM involves defining the desired characteristic in advance and then carefully selecting the gene that confers it.

3. Why GM?

GM is being used by researchers to produce plants that can:

- Increase crop yields, especially where this can maximize the plant's use of inputs such as fertilizer
- Better protect the quality of crops after they are harvested by identifying natural genetic defenses against insect damage and fungal contamination in foodstuffs
- Make crops more tolerant to stress such as frost, drought, salt and heat
- Improve the nutritional value of food in very specific ways
- Make plants resistant to insects as an alternative to chemical pesticides by using genes that are available in, for example, soil micro-organisms
- Reduce the environmental impact of livestock farming, by introducing changes in clover and grass so that cattle eating them produce less methane (a greenhouse gas)
- Produce alternative resources for industrial use by using plants (and therefore sunlight as the source of energy) to produce starches, fuels and pharmaceuticals – things that they could never be conventionally bred to produce.

[1] *GMO Compass survey April 2009:*
http://www.gmo compass.org/eng/news/stories/415.an_overview_european_consumer_polls_attitudes_gmos.html

4. What are the effects on the environment?

After more than 10 years of commercial GM crop cultivation on millions of hectares worldwide, no scientific evidence for harm caused to the environment has been identified [2]. On the other hand, important environmental gains are associated with the adoption of GM technology, such as reduction in pesticide use and carbon dioxide emissions [3].

The European Food Safety Authority (EFSA) also carries out stringent environmental risk assessments whereby researchers assess any potential effect on the environment such as the plant cross-breeding with wild plant varieties and the potential for weediness or damage to non-target insects.

Only one GM crop, an insect-resistant maize, has ever been commercially grown in Europe. Conversely, elsewhere in the world, a wide variety of GM crops were grown in 2008 in 25 countries by 13.3 million farmers without any credible adverse effects on either health or the environment [4].

5. Is it safe to eat GM food?

Yes: as a recent study by the Joint Research Centre[5] has shown, nobody has ever provided convincing evidence that there is any danger in eating officially approved GM foods. In fact, the use of more precise technology and the intense regulatory and scientific scrutiny arguably makes GM food products even safer than conventional plants and foods.

European regulatory authorities, through EFSA, follow guidelines to assess the safety of new GM foods on a case-by-case basis. The GM version of food is compared to one made from conventional crops and checked to see whether there is a nutritional difference between the two or a heightened risk of allergy or toxicity. All food that contains more than 0.9% GM content in Europe must be labeled. Globally, however, more than two trillion meals made from genetically modified crops have been eaten and there has not been a single confirmed instance of an untoward health effect.

6. Could GM solve world hunger?

No, not by itself, but it can certainly help. GM is a plant breeding technique, not a social or economic system. Applied properly, it will have an enormous positive impact on world food production by increasing agricultural productivity. In March 2009, the United Nations announced that the world's population would reach the seven billion mark early in 2012, and top nine billion by 2050 [6]. We are already failing to feed a significant proportion of the world's population and tonight, some 850-900 million people will go to bed hungry. But over the next 25-50 years somehow, with the additional challenges brought by climate change, we will need to double food production on decreasing amounts of available arable land. GM offers important and effective contributions, by increasing food productivity and thereby helping to stabilise food prices.

2 *Sanvido et al. 2006 "Ecological impacts of GM crops", Report prepared on behalf of the Swiss Expert Committee for Biosafety http://www.art.admin.ch/dms_files/03017_de.pdf*

3 *GM crops: global socio-economic and environmental impacts 2006 Brookes G, Barfoot P (2008). PG Economics Ltd, UK*

4 *ISAAA report 2008 on Global Status of Commercialized Biotech/GM Crops*

5 *http://ec.europa.eu/dgs/jrc/downloads/jrc_20080910_gmo_study_en.pdf*

6 *http://www.unep.org/pdf/A_Global_Green_New_Deal_Policy_Brief.pdf*

EuropaBio's mission is to promote an innovative and dynamic biotechnology-based industry in Europe.

For further information, please contact:

EuropaBio Avenue de l'Armée, 6 - B-1040 Brussels
Tel: +32 2 735 03 13 - Fax: +32 2 735 49 60 - greenbiotech@europabio.org
www.europabio.org

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