

Keeping the shelves full of affordable food

Modern plant breeding technologies allow for increased food production. In the case of GM crops, this is achieved with traits ranging from herbicide tolerance and insect pest resistance (widely available), disease resistance and drought tolerance (such as GM potato resistant to late blight or drought-tolerant GM maize). Soon the first improved nutrition crops and pharmaceutical uses will also be available.

Innovation in plant breeding is essential to feed a growing world population and help reduce poverty by improving food security, whilst at the same time limiting the impact of agriculture on the environment. GM technology enables breeders to insert in a very targeted way new traits that bring significant benefits to farmers (agronomic solutions) and consumer (health and nutrition, cooking qualities) alike.

Tastier foods with a longer shelf life

There are also some GM foods that are considered to have better taste and offer longer shelf life. A recent example is the GM purple tomato, which is perceived to be tastier than normal varieties^{iv}.

Fast Facts

- Trillions of GMO meals have been consumed worldwide^v.
- Golden Rice is genetically modified^{vi}. No other rice contains significant amounts of beta carotene so conventional breeding could simply not be used.
- World prices of maize, soya beans and rapeseed would probably be respectively +5.8%, +9.6%, and +3.8% higher than current levels if there were no GM crops^{vii}.

What others say:

“The next generation of GM offers the most wonderful opportunities to improve human health.”

Owen Patterson, UK Environment Secretary

“Forty gram of golden rice per day can save eyesight and the lives of more than 2 million people every year.”

Pr. Marc Van Montagu, 2013 World Food Prize Laureate

“The use of Bt maize can have positive health effects. It can lead to less contamination of food and feedstuffs by neuro toxic or carcinogenic mycotoxins.”

Swiss national research programme NFP 59

Want to know more?

- Visit Growing Voices website: www.growingvoices.eu
- Take a look at CropLife International's infographics: www.croplife.org/view_document.aspx?docId=3509
- Read International Rice Research Institute (IRRI) – Golden Rice Blog: www.irri.org/golden-rice



- i IRRI Golden Rice: www.irri.org/golden-rice
- ii Daily Monitor, 'The story behind conventional banana breeding to fight pests and diseases', December 12 2012 by Lominda Afedraru www.monitor.co.ug/Magazines/Farming/Behind-conventional-banana-breeding-to-fight-pests-and-diseases/-/689860/1641826/-/15e9ypfz/-/index.html
- iii Medical molecular farming: production of antibodies, biopharmaceuticals and edible vaccines in plants, In Trends in Plant Science, Vol 6, No 5, pp 219-226, May 2001 www.cell.com/trends/plant-science/abstract/S1360-1385%2801%2901922-7
- iv 'Genetically modified purple tomato 'tastier than normal varieties'', *The Telegraph*, 23 May 2013 www.telegraph.co.uk/science/science-news/10076492/Genetically-modified-purple-tomato-tastier-than-normal-varieties.html
- v George Freeman MP quoted in FT www.ft.com/intl/cms/s/0/bcdb19c0-87e5-11e2-8e3c-00144feabdc0.html#axzz2UZPUyKsx
- vi IRRI www.irri.org/blogs/item/golden-rice-using-agricultural-biotechnology-for-nutrition
- vii The Production and Price Impact of Biotech Corn, Canola, and Soybean Crops, by Graham Brookes, PG Economics www.agbioforum.org/v13n1/v13n1a03-brookes.htm

GREENBIOTECHNOLOGY FACTSHEET

CONSUMER BENEFITS

What can genetically modified crops give you today?



EuropaBio

Genetically modified (GM) crops are as safe or in some cases even **safer than their conventional counterparts** with reduced levels of mycotoxins.

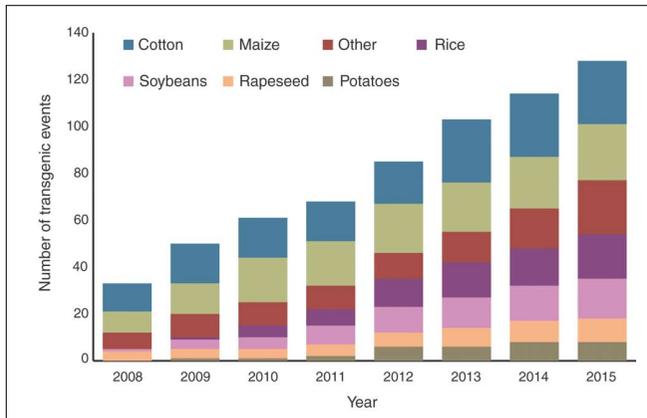
New GM products with direct consumer benefits are starting to enter the market, delivering, for example, **healthier oils or more nutritious rice**.

GM crops available today primarily address farmers' needs, enabling them to grow more food or fiber on less land. Their efficiency gains have **positive effects on consumer prices and help preserve our planet**.

Sometimes even safer than conventional crops

All biotech crops on the market are guaranteed by public authorities to be at least as safe as conventional crops, both for human and animal consumption, and also for the environment. And some are actually safer than their conventional counterparts. For instance, insect resistant GM maize varieties regularly contain reduced levels of mycotoxins. These toxic and cancerogenous substances come from naturally occurring fungi (molds) which enter into the maize crops through holes left by insect pests. Insect resistant GM maize can efficiently defend itself against these pests by producing the same *Bacillus thuringiensis* (Bt) proteins which are also widely used in organic agriculture. This results in fewer holes and less mycotoxins, which is beneficial for the farmers – who can sell better quality; the animals – which are fed with the GM maize; and for the consumers – who are consuming the meat.

Current numbers and estimations of future numbers of GM crops worldwide



Source: Nature Biotechnology (2010) 28, 23-25
www.nature.com/nbt/journal/v28/n1/full/nbt0110-23b.html

Healthier oils

Health-conscious consumers know about the importance of cooking oils when it comes to “bad” cholesterol and the risk for heart disease. New traits have been introduced into soybeans and oilseed rape plants to make them a source of healthier oils.

Some new soybean varieties deliver a trans fat free, reduced saturated fat soybean oil with increased stability for frying and baking applications. Similarly, oilseed rape plants have been genetically modified to produce omega-3 fatty acids and thus improve nutrition.



Fight blindness in Asia

Vitamin A deficiency is prevalent among the world poor whose diets are based mainly on rice. The 400 million poor people in rice-consuming societies have a marked incidence of blindness and susceptibility to disease, leading to an increased incidence of premature death of small children.

Public scientists, in a purely humanitarian project, have created the vitamin A enriched Golden Rice¹. This could be delivered to the needy much more efficiently than vitamin A supplements. After years of unnecessary delays, golden rice is now close to commercial approval in the Philippines.



Golden Rice – www.goldenrice.org

Securing staple food production

Bananas are a staple food in many countries and provide many necessary nutrients for a healthy diet. Nonetheless, given the shortfalls in production due to diseases and pests, researchers started crossing different banana varieties and developed a genetically modified banana that can resist pests. Farmers in various parts of Uganda are now testing this variety. Research is also being undertaken to develop varieties resistant to banana bacterial wilt that was discovered in 2002 and can wipe out entire plantationⁱⁱ. Scientists are also working on GM solutions to boost the production of other African crops, such as millet and cassava.

Gluten free wheat for coeliac sufferers

Coeliac disease is a digestive disorder triggered by the consumption of gluten, a protein which is found in a broad variety of bakery products, cookies, pasta, and many other foods containing wheat, barley or rye. Individuals with coeliac disease who consume gluten over a long period of time suffer damage to their intestines.

Currently, there is no cure for coeliac disease and the only treatment is to adopt a gluten-free diet. However, using genetic methods to remove the gluten proteins could greatly improve the quality of lives of people with coeliac disease by providing them with a digestible product similar to wheat grains while preserving wheat’s baking qualities.

Protect your health from infectious diseases

Some of the most exciting advances in GM plants are for non-food sources, such as biopharmaceuticals. As vaccines and cures can be expensive and hard to distribute, researchers are developing edible vaccines in transgenic tomatoes and potatoes. These vaccines have the advantage of being easy to administer, preserve and dispense, and could be used to immunize individuals against a variety of infectious diseases such as choleraⁱⁱⁱ.