

## Genetically modified cotton

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**Introduction.** Many countries are now growing genetically modified cotton. In China, GM cotton could drastically reduce pesticide use. Cotton fibres used in textiles around the world come from the seed hairs of a plant known as *Gossypium hirsutum*. Cotton, which is cultivated on five continents, develops in closed, green capsules known as bolls that burst open when ripe, revealing the white, fluffy fibres.

After harvest, the fibres must be separated from the seeds. The protein- and oil-rich seeds can be processed into various side-products that are used in food and feed:

- Cottonseed oil is a high-value cooking or frying oil and is sometimes used to make margarine. The oil is also a source of vitamin E (tocopherol).
- Protein-rich cottonseed meal is mostly used as animal feed. Some, however, is used for protein preparations and cottonseed milk.
- Leftover fibres that are too short to be spun into textiles consist almost completely of cellulose and can be used as food additives. Cellulose (E 460) and methylcellulose (E 461) can be used as thickeners, stabilisers, emulsifiers, or fillers.

GM cotton has become widespread, covering a total of 15 million hectares in 2007, or 43 percent of the world's cotton. But the production of GM cotton has not yet been approved in the EU. Several lines of GM cotton have been approved in the EU, but only for use as food and feed. Most GM cotton is grown in India and the US, but it can also be found in China, Argentina, South Africa, Australia, Mexico, and Columbia. More than half (68%) of China's cotton production is genetically modified to produce a substance (Bt toxin) that protects it against insect pests. A few types of caterpillars are especially problematic because they bore into cotton bolls reducing yield and compromising quality. Cotton used to be protected from insects by repeated pesticide applications. Bt cotton has now enabled Chinese farmers to dramatically reduce pesticide use. According to new research, the farmers of central and southern India who grow genetically modified cotton crops are big, big profits and have a higher standard of living than those who grow conventional cotton. Similar benefits have been seen globally — a 2010 review of 168 farmer surveys from 12 nations found positive overall benefits from planting GM crops. The study, published in the journal *Proceedings of the National Academy of the Sciences*, based on data collected in 533 farms between 2002 and 2008. Analysis of the data collected showed that the yield of plots where grown genetically modified cotton increased by 24% compared to normal. This led to an increase in income of farmers by 50%, and in 2006-2008, families who grow Bt-cotton on average spend 18% more money for their daily needs than families who grew conventional cotton, which indicates an increase in living standards.

**Conclusions.** Despite alarmist claims of professional wrestlers from GMOs, so-called Bt-cotton is cotton genes bacterium *Bacillus thuringiensis*, protecting plants from pests, was a great help for many farmers of the world.

### References:

1. Carpenter, J. *Nature Biotechnol.* 28, 319–321 (2010).
2. [http://www.gmocompass.org/eng/grocery\\_shopping/crops/161.genetically\\_modified\\_cotton.html](http://www.gmocompass.org/eng/grocery_shopping/crops/161.genetically_modified_cotton.html)