HOHENSTEIN

Whitepaper

ORGANIC COTTON: BUT WITH CONFIDENCE!

The traceability of GMO-free cotton across the entire textile supply chain

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Content

IMPRESSUM

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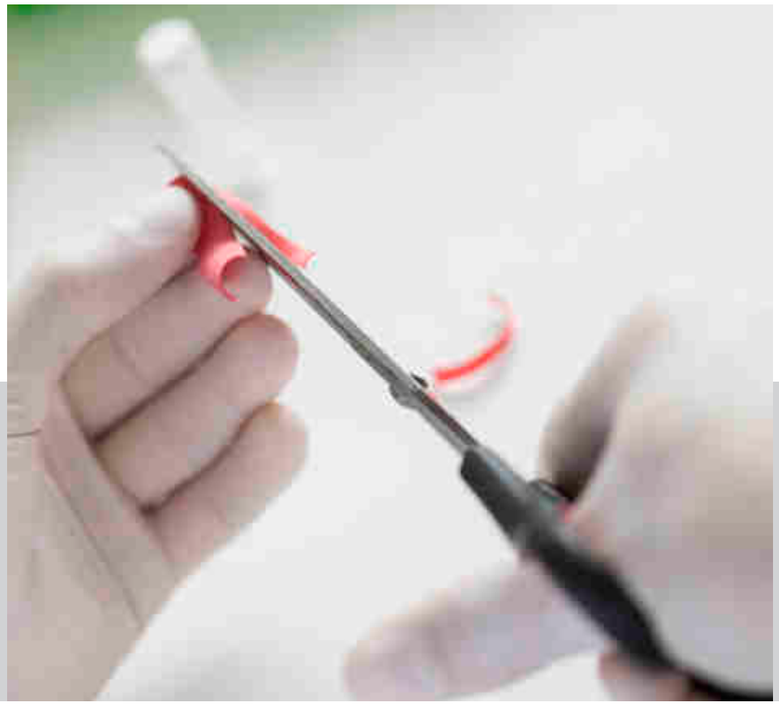
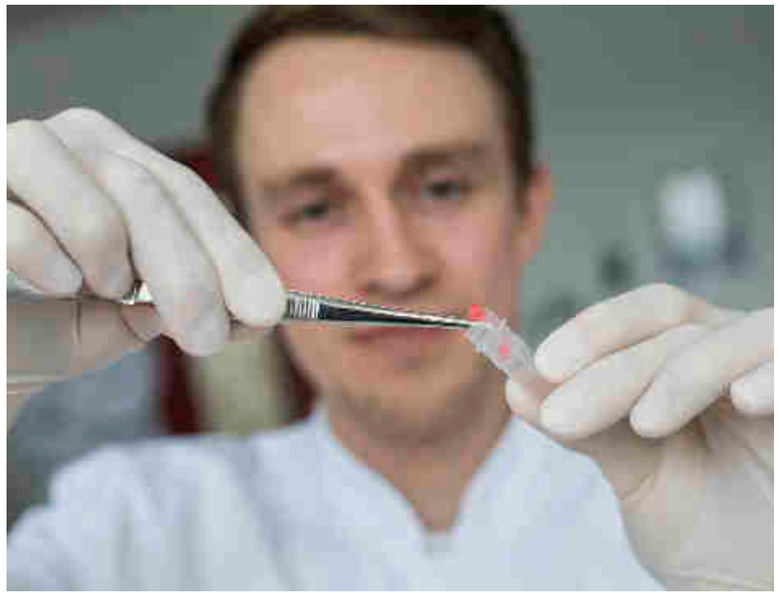


1 | Summary

The global market shares of both conventionally grown cotton and organic cotton are increasing at a similar rate. In many cases, genetically modified organisms (GMOs) are also repeatedly found in cotton textiles that are labelled as organic. Reasons for this range from contaminated seeds, to cross pollination during cultivation, through to the intermingling of GMO cotton fibres during processes.

To guarantee manufacturers, fashion labels and consumers the utmost confidence in GMO-free cotton textiles, respective screenings of raw cotton, yarns and final products are necessary. Such screenings enable complete traceability along the entire textile supply chain. Until now the relevant certifications did not involve obligatory laboratory tests, only in some cases cotton seeds are sampled.

The Hohenstein Group offers manufacturers, fashion labels, certifiers and consumer protection agencies the appropriate GMO testing of both cotton and cotton end products. The molecular biological detection systems have been specifically optimised for cotton end products. Through this testing, a definitive yes/no statement can be made about the GMO-free raw cotton or cotton textiles.



2 | What is a GMO?

A GMO (Genetically Modified Organism) is defined as a type of organism whose DNA has been specifically altered through genetic engineering. In the case of cotton, the plant is altered so that it is resistant against pesticides or insects.

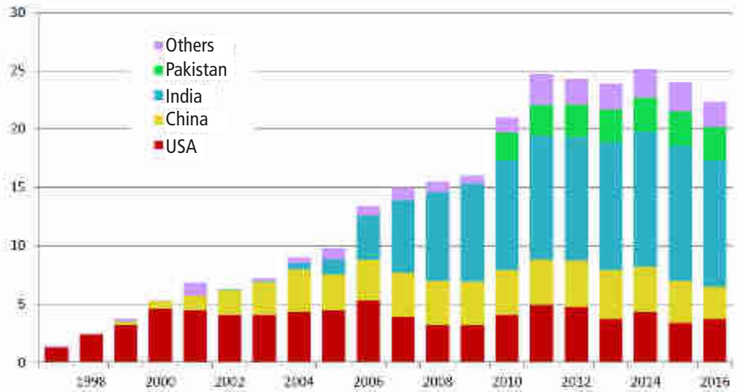
3 | Areas of tension: GMO cotton and organic quality

Conventionally farmed cotton is harvested by machines and grown with the use of chemical pesticides and fertilisers. The use of GMO cotton is thus widespread. In 2016, GMO cotton accounted for 64% of the world market (22.3 million tons), with more than 80% in 2012 - the trend continues to rise. The greatest production of GMO cotton is in India. Here, the GMO proportion is 97%.

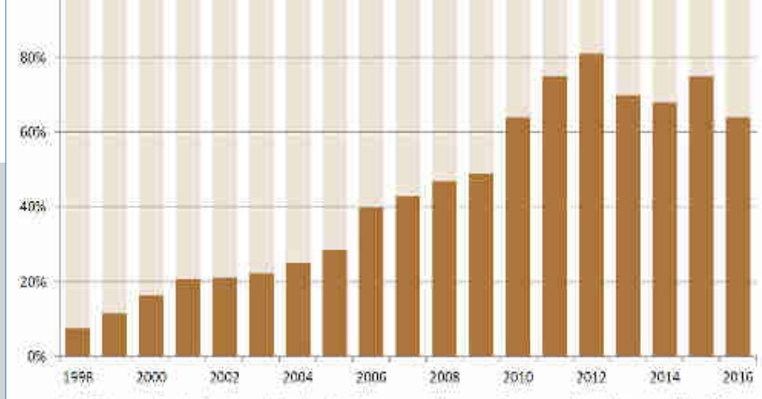
Organic cotton is also enjoying an increasing global demand with production capacities increasing year on year. For instance, in 2014/15 around 350,000 hectares of organic certified cotton was planted across the globe. In the USA, the biggest market for organic cotton, the market volume during this period accounted to over 15.7 billion dollars alone. An end to this constant growth is currently nowhere in sight, as the general consumer trend towards organic products is also reflected in the product ranges of textile manufacturers. Despite this, the global market share of organic cotton is low, at around 1%.

The cultivation of organic cotton forbids the use of genetically modified seeds as well as chemical pesticides and fertilisers. In order to be profitable, the more time and resource-intensive cultivation of organic cotton must be reflected in a higher market price.

Higher market prices are only justifiable however, if it is guaranteed that the cotton is actually organic. This relies on a complete documentation of all processes from seed to end product. As a rule, such documentation is based on certificates, which in turn are based on individual certificates from various process steps along the supply chain.



Cultivation areas for genetically modified cotton in million hectares
Source figures: FAO, ISAA, USDA



Proportion of genetically modified cotton on cotton farms worldwide
Source figures: FAO, ISAA, USDA

4 | The label dilemma: Testing is imperative!

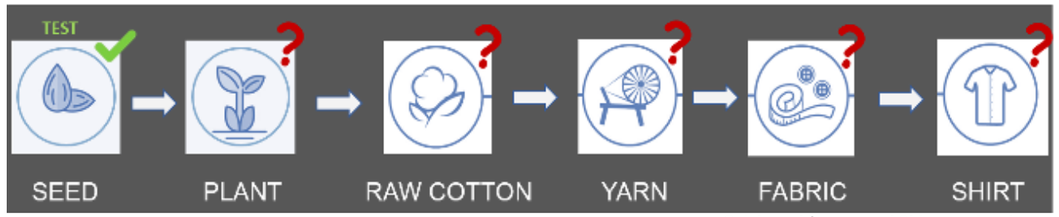
According to Greenpeace, GOTS, for example, is one of the strictest textile standards, covering the production, making-up, packaging, labelling, trading and sales of all textiles made from at least 70% certified organically grown natural fibres. Threads, material, clothes, furnishings and other products made from textile fibres can be certified. GOTS defines, amongst others, the criteria for fibre and textile production.

THEREFORE ...

- ... the organic certification of fibres must be based on recognised international or national organic cultivation standards (EU organic regulation (regulation EG Nr. 834/2007), USDA; NOP, or IFOAM Family of standards)
- ... a textile product with the GOTS label "Bio" or „kbA/kbT", must contain at least 95% certified organically grown fibres and a product with the label "produced from x% kbA/kbT fibres" at least 70%
- ... in all processing steps, a product produced from organically grown fibres must be separated from conventional fibres and clearly identified
- ... using genetically modified organisms and enzymes shall be excluded

However, it is rather problematic that the GOTS standard and other labels do not currently impose obligatory laboratory testing. Generally speaking, whether or how many GMOs are present in fibres, yarns and textiles remains unverified.

The uncertainty ultimately lies with the consumer, who, despite the apparently trustworthy labels, cannot be sure if they are actually purchasing textiles made from organic cotton. And that for a higher price than textiles produced from inorganic cotton. The textile manufacturers, fashion labels and ultimately the entire production chain right down to the cotton farmer can lose credibility (and consequently revenue), if GMO cotton is discovered in textiles and the findings are publicly discussed.



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5 | Risks across the supply chain

The causes for contamination of organic cotton by GMOs are diverse and range across the whole supply chain:

SEED PRODUCERS

- Are mixing (intentionally or unintentionally) the conventional and organic seeds

ORGANIC FARMERS

- Often have no access to GMO-free seeds
- Contamination from conventional cotton i.e. from neighbouring farm lands cannot be avoided

PROCESSORS (SPINNING MILLS)

- Must elaborately separate conventional and organic fibres
- Prefer to rely on conventional fibres as organic fibres which they receive have an inferior quality
- Risk contamination from internal processing operations

CERTIFIERS

- Cannot rely on standardised testing methods
- Cannot use a central database to trace sampling and testing
- Cannot rely on complete testing across the entire supply chain

BRANDS (MANUFACTURERS)

- Cannot guarantee complete traceability of cotton
- Cannot rely on a central certification body with multi-band standards

From the perspective of all parties, the consistent traceability of organic cotton from seed to end product as well as standardised laboratory analysis of the GMO percentage of fibres, yarns and textiles would be desirable.

6 | The solution: GMO screening of DNA

In order to provide consumers with the maximum confidence in their purchased organic cotton product, manufacturers need a complete yes/no control. In this, seeds play a rather secondary role. It depends much more on whether the cotton in the end product can be detected or not. This DNA testing is desperately needed. According to current media reports, a considerable proportion of organic cotton products on the market contain GMO cotton; a few random sample tests have confirmed this.

There are currently more and more calls for a quantitative GMO testing of textiles that should verify the exact percentage of GMO cotton from the total amount of cotton in the product. With the current technology, quantitative testing with the necessary measurement accuracy is not possible; this was only recently confirmed in a worldwide ring trial. With the demand for "100% free from genetic engineering", a quantification is, in any case, not necessary; the qualitative yes/no statement is conclusive.

Through our optimised qualitative GMO screening, the Hohenstein Group is a trustworthy partner for parties throughout the textile supply chain to reliably test cotton as well as cotton end products for genetic modifications. Our verification systems were specifically designed for textile end products. Testing can be carried out on everything from raw cotton to yarns to finished ready-made textiles. Through this testing, a definitive statement can be made about the GMO-free cotton or textiles.

THE COTTON IS TESTED IN TWO STEPS:

1. The sample is crushed and cotton fibres are mechanically and enzymatically extracted. The genetic material (DNA) is separated from the fibres and purified through a multi-stage process.

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2. If a specific target sequence (marker gene) is found in the DNA, this indicates a genetic modification. Thus, molecular biological evidence is obtained. Control reactions serve to verify unaltered cotton DNA and also to exclude false-negative results.

   Generally, the DNA is protected in the nucleus of the cotton fibre. In some cases, however, the DNA analysis fails to work on end products. For example, if the cotton has been handled roughly in the production process, the DNA may have been destroyed. In this case, you can retrace the steps of the process and test the raw materials instead.

7 | Tested and proven to be GMO-free!

Through qualitative screening, manufacturers, fashion labels and certifiers and also consumer protection organisations can confidently and reliably confirm that organic cotton products are in fact GMO-free.

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