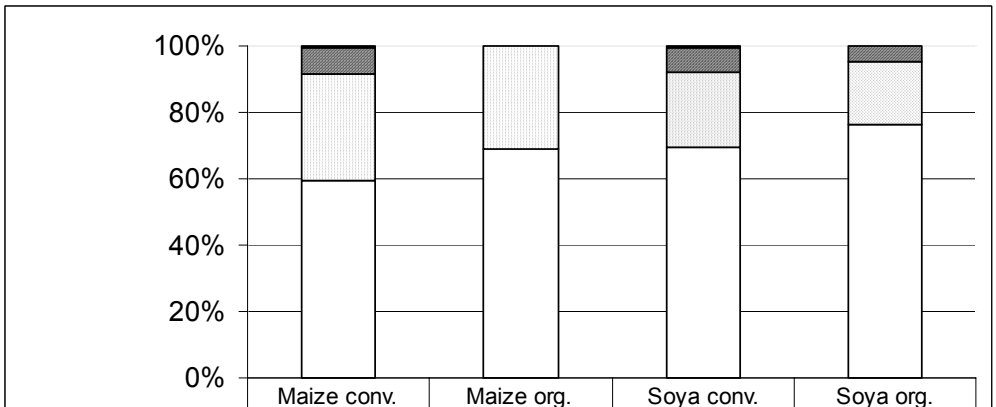
Project Report Summary

Nowack Heimgartner, Karin and Oehen, Bernadette (2003). Analysis of GMO contamination in organic products. Contamination levels and prevention strategies in seed, foods and animal feedstuffs. Commissioned by BUWAL (Bundesamt für Umwelt, Wald und Landschaft – Swiss Agency for the Environment, Forests and Landscape) and FiBL (Forschungsinstitut für biologischen Landbau – The Research Institute of Organic Agriculture). German-language report available in pdf format at http://www.fibl.org/forschung/gentechnik/documents/Endbericht_GVO_Verunreinigungen_BUWAL.pdf

In line with the private and public-law organic standards currently in force internationally, no use of genetically modified organisms (GMOs) or their derivative products is permitted in organic agriculture anywhere in the world. Despite the efforts within organic agriculture to maintain closed cycles, GMO contamination can still occur via many paths (see study by K. Nowack Heimgartner, R. Bickel, R. Pushparajah Lorenzen, E. Wyss (2002): Sicherung der gentechnikfreien Produktion. Eintrittswege gentechnisch veränderter Organismen, Gegenmassnahmen und Empfehlungen. [Safeguarding GMO-free production. Entry routes for genetically modified organisms, countermeasures and recommendations] Publ. Bundesamt für Umwelt, Wald und Landschaft (BUWAL, Swiss Agency for the Environment, Forests and Landscape). Schriftenreihe Umwelt Nr. 340 [Environment Papers No. 340]). This study investigated the present level of GMO contamination in organic foods, animal feedstuffs and seed in Switzerland. To this end, surveys of firms were conducted and data from private and public laboratories were evaluated.

As a general point, Switzerland is one of the few countries that are practically free of genetic engineering: no genetically modified crops are produced by Swiss agriculture, and no release trials have been authorized in the past few years.
There are imports of neither GMO foods nor GMO seed, while GMO content was declared in less than 1% of animal feedstuff imports in the year 2002.

GMO analysis of maize and soya products carried out by private and public laboratories in Switzerland during the period 2000 – 2002 revealed evidence of GMO contamination of foods in around one-third to one-quarter of samples. However, with a few exceptions, the Swiss declaration limit of 1% was not exceeded. In the majority of instances, contamination was in the non-quantifiable range, i.e. below 0.1%. In general, organic foods have lower contamination levels and are less frequently contaminated than conventional foods. However, the difference is only minor. This study cannot state with certainty how much of the contaminated organic food is actually marketed as organic. Many firms have internal specifications which are stricter than the statutory declaration limit, so that some contaminated organic products are simply diverted into the conventional channel.



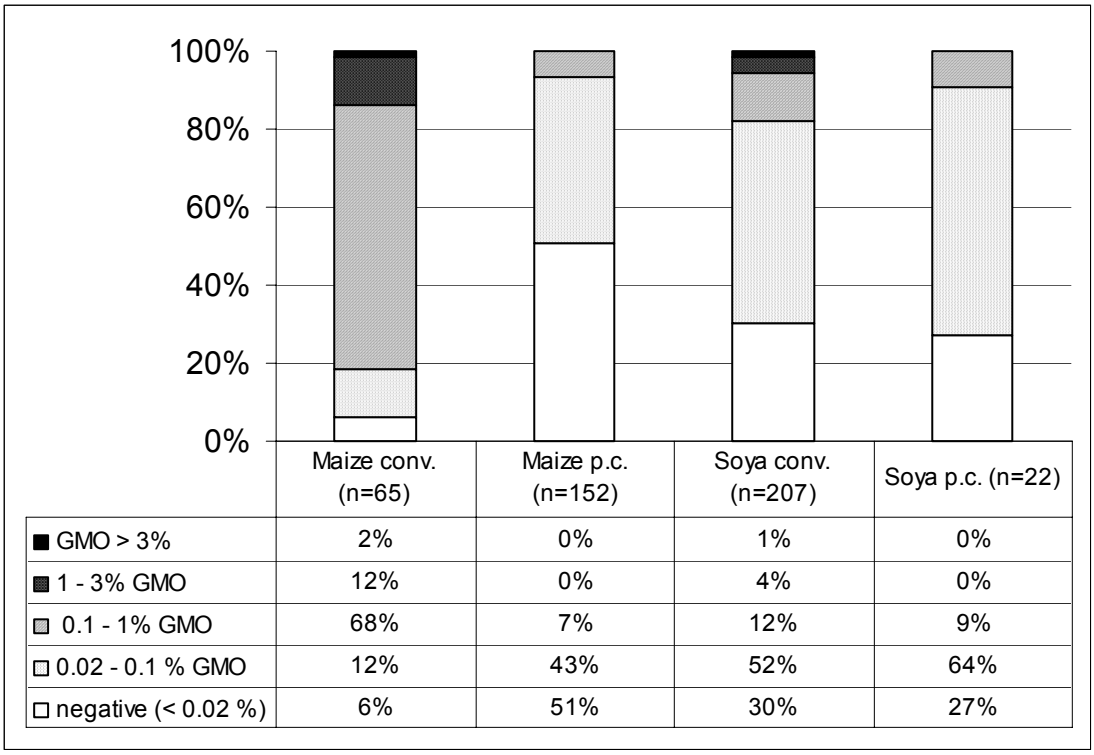
	Maize conv. (n = 333)	Maize org. (n = 55)	Soya conv. (n = 220)	Soya org. (n = 111)
■ > 1.0 % GMO	0%	0%	0%	0%
▨ 0.1 - 1.0 % GMO	8%	0%	7%	5%
□ < 0.1 % GMO	32%	31%	23%	19%
□ negative (< 0.01%)	59%	69%	70%	77%

Maize conv. = Conventional maize
Maize org = Organic maize
Soya conv. = Conventional soya
Soya org = Organic soya

Figure 1: Frequency of GMO contamination in organic and conventional foods. The data originate from tests carried out at cantonal laboratories and in private laboratories during the period from 2000 to 2002. GMO negative (not detectable) means GMO DNA < 0.01%. GMO DNA could be detected in 31% of organic and 41% of conventional maize products. GMO DNA could be detected in 24% of organic and 31% of conventional soya products.
In organic maize, no contamination levels above 0.1% were measured. In conventional maize, GMO DNA between 0.1% and 1% was detected in 8% of samples. 0.3% of samples exceeded the Swiss declaration limit of 1%.

In organic soya, GMO DNA between 0.1 and 1% was detected in 5% of samples, and below 0.1% in 19% of samples. Conventional soya was more heavily contaminated and only conventional soya exceeds the 1% limit.

Turning to the animal feedstuffs, half of the samples analysed tested positive for GMOs. In the majority of cases once again, contamination was below 0.1%, but there was a greater proportion of contamination in the 0.1 – 1% band than in the foodstuffs. Again the conventional animal feedstuffs are more frequently and more heavily contaminated than 'permitted conventional' feedstuffs.[1] Contamination levels above 1% only occurred in conventional animal feeds whereas all 'permitted conventional' feedstuffs contained less than 0.5% GMO DNA.



	Maize conv. (n=65)	Maize p.c. (n=152)	Soya conv. (n=207)	Soya p.c. (n=22)
■ GMO > 3%	2%	0%	1%	0%
▩ 1 - 3% GMO	12%	0%	4%	0%
▨ 0.1 - 1% GMO	68%	7%	12%	9%
□ 0.02 - 0.1 % GMO	12%	43%	52%	64%
□ negative (< 0.02 %)	6%	51%	30%	27%

Maize conv. = Conventional maize
Maize p.c. = 'Permitted conventional' maize
Soya conv. = Conventional soya
Soya p.c.= 'Permitted conventional' soya

Figure 2: Frequency of GMO contamination in 'permitted conventional' and conventional animal feedstuffs. The data originate from tests carried out in private laboratories and at the RAP (Swiss Federal Research Station for Animal Production) in the period from 2000 to 2002. GMO negative (not detectable) means GMO DNA < 0.02%. In 86% of the contaminated 'permitted conventional' feedstuff samples contamination was found to be below 0.1% GMO, and 14% of samples exhibited values between 0.1% and 1%. 'Permitted conventional' feedstuffs may only be used in organic production certified to Bio Suisse 'Knospe' ('Bud' logo) standards if their GMO DNA content does not exceed 0.5%. In fact none of the 'permitted conventional' feedstuffs tested proved to contain more than 0.5% GMO. There was full compliance with this particular rule.
In 'permitted conventional' feed maize, 7% of samples were found to contain GMO contamination levels of between 0.1% and 1%. In no case did this level of contamination exceed 0.5%. Values below 0.1% were registered in the remainder of samples analysed.

[1] 'Permitted conventional' feedstuffs: 'permitted conventional' feedstuffs are conventional feedstuffs which are permitted for use in organic production if they are on the BIO SUISSE/RAP/FiBL permitted feedstuffs list and contain less than 0.5% GMO DNA.

In conventional maize, GMO DNA levels between 0.1% and 1% were detected in 68% of samples with a few samples exceeding the Swiss declaration limit of 3%.
'Permitted conventional' soya feedstuffs also fared better, but the difference was less marked: most contained below 0.1% GMO, 9% contained 0.1 to 1%. The values for conventional soya were higher.

Within the scope of this study it is impossible to make precise statements on the sources of the contamination found. Since there are barely any imports of genetically modified foods into Europe at present, the risk of accidental switching or mixing of batches is minimal. The cause of contamination is therefore most likely to be contaminated seed, pollen drift, or a lack of proper separation in the country of origin.
In contrast, GMO feedstuffs have been traded and processed in the European market without declaration requirements. Switzerland alone imposed declaration regulations for animal feeds. Organic agriculture demands the same traceability and separation of material flows for animal feedstuffs as for other foods. Thus contamination is lower in 'permitted conventional' feedstuffs than in conventional. However, contamination levels in feedstuffs are higher than in foods as a result of GMO feedstuff imports into Europe, which create additional risks of contamination during transport and transfer.

Surveys of firms indicated that they had generally been able to keep contamination to a low level thanks to extensive material flow controls, physical separation systems and targeted selection of suppliers.
To a large extent, conventional food and feedstuff production has introduced the same quality assurance measures as organic production to avoid traces of GMO. As a result, organic and conventional foods now barely differ in respect of GMO contamination. The same is true of the seed trade. Soya and maize products are inspected even before they are exported to Europe, and those with a high GMO DNA content are not imported.

The seed trade is evidence of the manifest quality-consciousness of breeders and importers. The quality assurance measures already in place (certified seed) permitted a rapid response to the problem of GMO contamination: if any contamination is detected in imports, which is extremely rare, that consignment will not be sold in Switzerland. Other key measures are the selection of GMO-free propagation areas and trustworthy suppliers.

In April 2004, two new regulations come into force throughout Europe[2] which will improve transparency in the management of genetically modified foods and feedstuffs. The declaration limit will be lowered to a uniform 0.9%. At the time of writing (December 2003) the precise regulations and control regime are still under discussion. As a general principle, however, there will be less emphasis on analytical testing and more emphasis on the quality of systems to ensure traceability. From 2005, similar regulations will apply to the entire food and feedstuff trade. As at the end of December 2003, an equivalent new regulation for the seed trade is also under discussion.

The measures compiled in this report are geared towards a market situation in which genetically modified crops are produced abroad and enter Europe, and subsequently Switzerland, through known channels. Moreover, of the crops which are relevant to organic agriculture, worldwide only a few occur in genetically modified form: rape, maize, soya and cotton.

Even though these are used as raw materials in numerous processed products, so far it has been possible for organic agriculture in Europe to maintain production systems that are free of genetically modified organisms. But if other EU countries besides Spain begin to plant genetically modified crops on a large scale, it will be the acid test for quality assurance systems throughout European organic agriculture. The authorization of GM sugar beet, potatoes, rice and wheat will present an ongoing challenge to organic agriculture and organic processors in future.

Further information: http://www.fibl.org/forschung/gentechnik/index.php

[2] Regulation (EC) 1829/2003 on genetically modified food and feed, and Regulation (EC) No 1830/2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC