

Results from a 5-year Monitoring Program of Organically Produced Foods

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Introduction

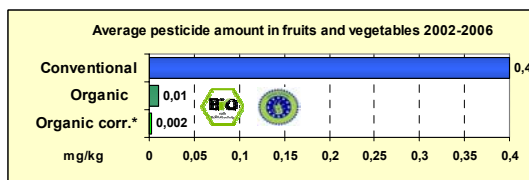
Since 2002, the Federal State of Baden-Württemberg, in southern Germany, has been conducting a special monitoring program of organically produced foods. Organic foods are systematically analyzed for residues of contaminants as well as the presence of genetically modified plants and irradiation. The project was carried out as a joint effort between the four official food control laboratories of Baden-Württemberg (Chemische and Veterinäruntersuchungsämter) in Freiburg, Karlsruhe, Sigmaringen and Stuttgart.

Analysis

A major part of the organic monitoring program was the analysis of pesticide residues at CVUA Stuttgart. From 2002 to 2006, **1958 organic foods of plant origin** were analysed employing the QuEChERS method in combination with GC-MS/MS, GC-MS, GC-TOF and LC-MS/MS to cover a broad analyte spectrum at low detection limits. Starting with a spectrum of 200 pesticides in 2002, more analytes were continually added, thus resulting in a spectrum of more than 500 pesticides analyzed routinely in the samples since 2006. Unprocessed agricultural products (fresh fruits, vegetables and mushrooms), as well as processed foods such as cereal products, dried fruits, infant foods, oils and teas were monitored. A residue level of 0.01 mg/kg was set as threshold, above which the competent authorities were informed to start investigations for tracing back the cause of contamination and finding out whether or not the product was produced according to the regulations (EC 2092/91).

Results

The average cumulative amount of all pesticides found in samples monitored in 2002-2006 (excluding bromide and post-harvest fungicides) demonstrates the significant difference in residue load between organically and conventionally grown products:



*excluding all samples labelled as "organic", but which were suspected not to be organic (due to blending with conventional products or illegal pesticide treatments)

In a special action in 2002, cereal samples were analysed for residues of the commonly used growth regulators chlormequat and mepiquat. Due to a high incidence of cross contamination in the mills, 20 % of the organic cereal samples were found to contain residues in 2002. As a result of our investigations and the subsequent measures taken, the problem was successfully addressed and all organic samples analysed in 2003 and the following years were free from chlormequat and mepiquat. Other examples for cross contamination during processing were chlorpropham in potatoes and post harvest fungicides (e.g. imazali or thiabendazole) in citrus fruits. Special investigations demonstrated that driftage or carry over of pesticides on organically cultivated fields next to conventionally cultivated fields only matters in peripheric regions of the organic fields and do not cause residues above 0.01 mg/kg in representative samples.

References

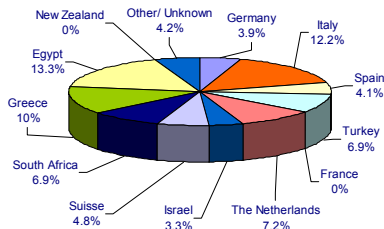
www.quechers.com
www.oekomonitoring.cvua.de/english

In total, **70 % of the organic samples had no detectable pesticide residues**, while 11 % contained multiple residues. Only **5.6 % of the surveyed samples contained assured residues above the action threshold of 0.01 mg/kg** and in 1.2 % of the samples MRL exceedances were found.

Commodity	No. of samples	No. of residue free samples (< LOD)	No. of samples with multiple residues	No. of violative samples*
Non-processed fresh fruits and vegetables				
Leafy vegetables	163	122	13	4
Solanaceae	264	178	32	18
Sprout vegetables	27	21	2	1
Root vegetables	121	83	21	9
Cultivated mushrooms	49	14	8	7
Potatoes	31	17	4	1
Berries	95	68	5	4
Grapes	161	111	26	8
Pome fruits	108	83	0	1
Stone fruits	26	19	1	2
Citrus fruits	164	112	17	15
Exotic fruits	40	29	4	2
Other commodities	57	51	1	1
Sum	1306	908 (69.5 %)	134 (10.3 %)	73 (5.6 %)
Processed goods				
Plant oils and oil seeds	45	17	12	1
Cereal products, flour, pastry, pasta	158	130	15	15
Dried fruits	111	50	31	10
Tea	31	20	5	1
Wine, grape juice, grapes for winemaking	77	63	6	5
Infant foods	133	103	0	5
Other commodities	97	78	8	0
Sum	652	461 (70.7 %)	77 (11.8 %)	37 (5.7 %)
Total sum	1958	1369 (69.9 %)	211 (10.8 %)	110 (5.6 %)

* Samples with assured residues above the action threshold of 0.01 mg/kg (including measurement uncertainty of 50%); the labelling as „organic“ was judged as misleading to the consumer

Percentage of violative samples distinguished by country of origin



Country of origin	No. of samples	No. of violative samples*
Egypt	15	2
France	71	0
Germany	913	38
Greece	40	4
Israel	60	2
Italy	320	39
New Zealand	11	0
South Africa	29	2
Spain	148	6
Suisse	21	1
The Netherlands	69	5
Turkey	72	5
Other/Unknown	189	8
Total	1958	110

Summary and Conclusion

Organic fruits and vegetables can be regarded as virtually pesticide residue free to a large extent.

The results from the past 5 years give good marks to the producers of organic foods of plant origin. About 95 % of the surveyed trade samples were rightfully labelled as organic foods. Just a small percentage of organic foods contains pesticide residues which, due to the type and quantity of the residues, can be traced back to illegal use of the pesticides, a blending with conventional foods which were treated with pesticides or in a few cases cross-contamination. Our results also clearly confirm the suitability of the 0.01 mg/kg threshold level. We thus suggest this value to be adopted in European legislation for organic products. In our opinion, the establishment of MRLs for organic foods would help to strengthen the consumers trust and acceptance of these products by clarifying their distinguished position in terms of pesticide residues.