

Pesticide Residues in Wine: Organic versus Conventional

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INTRODUCTION

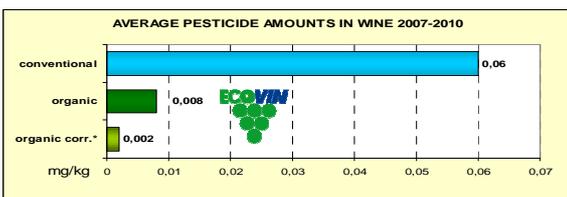
Conventionally grown wine grapes are one of the crops most extensively treated with pesticides. Therefore, CVUA Stuttgart monitored conventionally produced wines as well as organic, for comparison.

ANALYSIS

From 2007 to 2010, 29 conventional and 19 organic wine samples were analyzed for residues of more than 550 different pesticides and metabolites using the QuEChERS method [1]. Additionally, cross-contamination experiments in vineyards were performed for organic grapes.

RESULTS FOR WINE

The survey showed that the average cumulative amount of all pesticides found in the wine samples demonstrates a significant difference in residue load between conventional and organic wines:



*excluding 4 samples of questionable "organic" labelling (0.020, 0.076, 0.017 and 0.013 mg/kg total pesticide amounts)

Up to 13 different pesticides were detected per sample (conv.: Ø 4.1 pesticides per sample; organic: Ø 1.0). In total, residues of 21 different pesticides were detected in the surveyed wines (listed by frequency):

boscalid (most frequent), fenhexamid, cyprodinil, pyrimethanil, iprovalicarb, methoxyfenozide, fludioxonil, spiroxamine, dimethomorph, procymidone, iprodione, azoxystrobin, tebufenozide, metalaxyl, metrafenone, carbendazim, carbaryl, kresoxim-methyl, fenpropimorph, myclobutanil and pyraclostrobin.

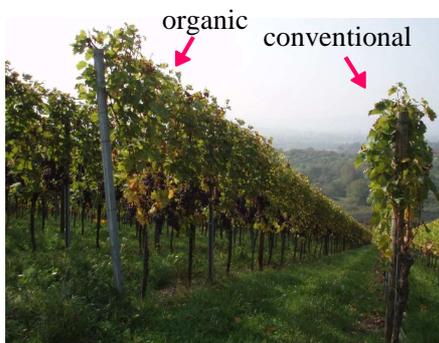
Four wines labelled as organic were suspected of not having been grown organically or of a major contamination having taken place, e.g. during wine making. Notably, these four wines were all produced in large cooperatives, where organic wine is only a small niche product. The pesticide residues detected were comparable to conventional wines both in type and amounts. Considering specific processing factors for each pesticide [2], the four wine samples contained one or more residues above 0.01 mg/kg (calculated for the fresh berries). The cause of these high pesticide levels is still being investigated.

LITERATURE

[1] CEN/TC 275 prEN 15662:2008; Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS following acetonitrile extraction/partitioning and cleanup by dispersive SPE
[2] BfR-Datensammlung zu Verarbeitungsfaktoren für Pflanzenschutzmittel-Rückstände
www.bfr.bund.de/cd/10196

CROSS-CONTAMINATION EXPERIMENTS IN VINEYARDS

In Baden-Württemberg wine is typically grown in small-scale, segmented vineyards with conventionally and organically grown grapes adjacent to each other. This may cause cross-contamination of pesticides (drift). Thus, organically grown wine grapes were sampled from four different vineyards, each taken from three different parts of the vineyard: 1st row directly adjacent to a conventional field, 3rd row and samples in the middle of the vineyard.



A slight drift effect was observed, but even in the 1st row pesticide residues detected in the organically produced grapes were mostly below 0.01 mg/kg, which is used as an action threshold for organic produce. Thus, if good agricultural practice is employed in conventional production, the neighbouring organic produce will not be compromised.

ORGANIC GRAPE VARIETY	PESTICIDE RESIDUES IN GRAPES [mg/kg]			
	PESTICIDES	ROW 1	ROW 3	ROW 5-9 (middle)
Muskat-Trollinger	pyrimethanil	0.009	0.005	0.004
	cyprodinil	0.003	n.d.	n.d.
Riesling	pyrimethanil	0.018	0.015	0.003
	fenhexamid	0.005	traces	n.d.
	boscalid	0.005	n.d.	n.d.
	cyazofamid	0.003	n.d.	n.d.
	metrafenone	0.003	traces	n.d.
	pyraclostrobin	0.004	n.d.	n.d.
Lemberger	pyraclostrobin	0.001	n.d.	n.d.
	spiroxamine	0.001	n.d.	n.d.
	boscalid	0.005	n.d.	n.d.
	folpet	0.004	traces	traces
Sangiovese	pyrimethanil	0.010	0.007	0.007
	folpet	0.012	traces	n.d.
	famoxadone	0.010	traces	n.d.

n.d.: not detectable

SUMMARY

A significant difference in residue load between conventional and organic wines was observed. Cross-contamination experiments in vineyards showed that if good agricultural practice is employed in conventional production the neighbouring organic produce will not be compromised even in small-segmented vineyards.

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