

## COMPARISON OF RESIDUES IN CONVENTIONAL AND ORGANIC PRODUCE IN NEW ZEALAND

While use of specified pesticides of natural origin is permitted for organic production, this does not include the application of any of the synthetic pesticides covered by the current survey (<http://www.nzfsa.govt.nz/organics/framework/ooap-rules.htm>). While data are not available in the open literature, it has been reported that monitoring of organic production in New Zealand generally finds no residues present on New Zealand-produced organic foods (Bourn and Prescott, 2002). Previous overseas surveys that compared the prevalence and levels of pesticide residues on organic and conventional produce have consistently found some pesticide residues on organic produce, although often at lower prevalence and/or levels than conventionally grown crops (Collins and Nassif, 1993; Baker *et al.*, 2002).

Comparison of residues on organic and conventional crops is usually hampered by the disparity in market size and the consequent disparity in sample numbers in surveys carried out. In the current survey organic produce made up approximately 12% (41 samples) of the total samples analysed (348 samples). The study of Baker *et al.* (2002), which analysed data from US monitoring programme, included results from approximately 27,000 samples, of which only 127 (0.5%) were from organic production. The study of Collins and Nassif (1993) was more balanced with 118 samples from a total of 348 (34%) from organic production.

The current survey detected pesticide residues on 22% (9/41) of organic produce and 42% (130/307) of conventionally-grown produce. Table 1 gives a more detailed breakdown of the prevalence of pesticide residues by product type. Collins and Nassif (1993) found qualitatively similar results in their survey, with 12% of organic samples containing pesticide residues and 30% of conventional samples. Baker *et al.* (2002) found that 23% of organic samples contained pesticide residues, while 73% of conventional ('no market claim') samples contained pesticide residues.

**Table 1: Prevalence of pesticide residues of conventionally-grown and organic produce available in New Zealand**

Product type	Conventionally-grown		Organic	
	Number of samples	Number of samples containing pesticide residues (%)	Number of samples	Number of samples containing pesticide residues (%)
Lettuce	41	15 (36)	8	2 (25)
Potato	43	10 (23)	6	0
Broccoli	44	3 (7)	2	0
Tomato	63	29 (46)	11	6 (55)
Banana	23	19 (83)	1	0
Grapes	68	41 (60)	4	1 (25)
Wine	24	13 (54)	9	0
<b>Total</b>	<b>306</b>	<b>130 (42)</b>	<b>41</b>	<b>9 (22)</b>

No pesticide residues were detected in organic potato, broccoli, banana or wine samples.

In many cases direct comparison of pesticide residues in conventionally-grown and organic produce is not possible, as different food/pesticide combinations were observed for organic

and conventional produce. Table 2 gives the prevalence and levels of pesticide residues for food/pesticide combination for which comparative data are available from the current survey.

The data in Table 2 offer no clear trend in the comparison of conventionally-grown and organic produce. For some food/pesticide combinations the prevalence and/or the mean level of a pesticide residue in organic produce is higher than its conventional counterpart, while for other combinations it is lower. The comparisons in Table 2 should be viewed with considerable caution due to the small number of samples represented. Some very general trends are apparent; when directly comparable data are available organic products are more likely to contain the pesticide residues than their conventional counterpart (9 of 12, 75% of comparisons), however, the mean level is more likely to be higher in the conventionally-grown product (7 of 12, 58% of comparisons). The study of Baker *et al.* (2002) presents a similar comparison, with very similar overall trends; in 62% of comparisons the prevalence of the pesticide residue was greater in the organic product, while in 71% of comparisons the conventional product contained the higher mean level of pesticide residue.

## References

Collins M, Nassif W. (1993) Pesticide residues in organically and conventionally grown fruit and vegetables in New South Wales, 1990-91. *Food Australia*; 45(9): 429-431.

Baker BP, Benbrook CM, Groth E, Lutz Benbrook K. (2002) Pesticide residues in conventional, integrated pest management (IPM)-grown and organic foods: insights from three US data sets. *Food Additives and Contaminants*; 19(5): 427-446.

Bourn D, Prescott J. (2002) A comparison of the nutritional value, sensory qualities, and food safety of organically and conventionally produced foods. *Critical Reviews in Food Science and Nutrition*; 42(1): 1-34.

**Table 2: Comparison of prevalence and mean level of pesticide residues in organic and conventionally-grown for, for selected pesticide-produce combinations**

Crop	Pesticide	Conventionally-grown			Organic		
		Number of samples	Number containing pesticide (%)	Mean pesticide level (range; mg/kg)	Number of samples	Number containing pesticide (%)	Mean pesticide level (range; mg/kg)
Lettuce	Captan	42	1 (2.4)	0.06	8	1 (12.5)	0.28
	Chlorothalonil	42	6 (14.3)	0.52 (0.01-0.99)	8	1 (12.5)	0.83
	Metalaxyl	42	1 (2.4)	0.06	8	1 (12.5)	0.02
	Procymidone	42	7 (16.7)	0.09 (0.01-0.23)	8	1 (12.5)	0.01
Tomato	Azoxystrobin	63	1 (1.6)	0.03	11	1 (9.1)	0.06
	Buprofezin	63	4 (6.3)	0.05 (0.02-0.07)	11	1 (9.1)	0.02
	Chlorothalonil	63	1 (1.6)	0.05	11	1 (9.1)	0.07
	Endosulphan, total	63	17 (27.0)	0.29 (0.01-1.77)	11	2 (18.2)	0.08 (0.03-0.14)
	Iprodione	63	8 (12.7)	0.25 (0.01-0.77)	11	3 (27.3)	0.07 (0.02-0.17)
	Permethrin	63	5 (7.9)	0.07 (0.01-0.21)	11	2 (18.2)	0.08 (0.02-0.14)
	Pirimiphos methyl	63	6 (9.5)	0.15 (0.01-0.70)	11	2 (18.2)	0.07 (0.02-0.11)
Grapes	Cyprodinil	68	7 (10.3)	0.12 (0.03-0.23)	4	1 (25.0)	0.02