

The Dirty Dozen 2013

- Which foods in New Zealand are more likely to have pesticide residues?
- What's wrong with pesticide residues in food?
- How can pesticide residues in food be reduced?

Which foods have the most pesticide residues? Grapes, celery, a range of fruit, pak or bok choi, spring onions, cucumber and bread are all ranked in the top dozen of foods available in New Zealand which are more likely to contain pesticide residues. Close contenders behind this 'dirty dozen' are apples, spinach, olive oil, muesli and tomatoes.

Compared to the last dirty dozen in 2009, there are a number of foods included which have not been analysed before and a number excluded simply because we rely on data produced by the Ministry of Primary Industries¹. Lemons, olive oil, pak choi, spring onion, tamarillos and walnuts are among foods that have not been analysed before. Plums, mandarins, raspberries and lettuce were in the last dirty dozen, but because they have not been analysed since before 2009, we just don't know what the residues are like now. Generally we can say that fruit is more likely to contain pesticide residues along with salad vegetables and bread.

Should we be concerned about pesticide residues in food? Every mouthful of non-organic food we eat is also a cocktail of pesticides. Many of these pesticides have not been adequately tested to see what effects they may produce, particularly long term ones. The little testing that is carried out does not reflect actual human exposure to a multitude of chemicals, nor does it usually test the most vulnerable – the foetus and young child.

We do not know enough about the effects of these chemicals in our food. However, there are various serious long term effects associated with particular pesticides that are found in our food, including endocrine or hormonal disruption, cancer, immune system suppression, nervous system damage, genetic damage and birth defects. We also know that various pesticides used to grow food have damaging effects on wildlife and the ecosystem.

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Food in New Zealand more likely to contain pesticide residues ranked according to number of pesticides detected in total samples and percentage with pesticides

Food	% with residues	no. of pesticides	sample size
1. Grapes	98.2	35	56
2. Celery	100	19	51
3. Bok/pak choi	95.7	21	47
4. Nectarines	100.0	15	36
5. Oranges	98.2	16	56
6. Strawberries	100	14	8
7. Spring onion	97.9	15	48
8. Lemons	92	20	50
9. Wheat: bread/all products	87.3	23	150
10. Cucumber	82.1	27	56
11. Pears	100	9	8
12. Broccoli	92.9	10	57

¹ Data obtained from NZ government surveys: 2009 New Zealand Total Diet Survey, NZ Food Residue Surveillance Programmes 2009-2012, all available at www.nzfsa.govt.nz. Results from several years were combined to produce sample sizes that were more robust for analysis. Note that wheat samples included bread, biscuits, bran flake cereal, cake, noodles, fish fingers, battered fish, meat pies, muffins, pasta, pizza, sausages, cereal wheat biscuits.

If you buy organic food, at least the foods listed here, then you will be significantly reducing the pesticide load on your body. This is particularly so for infants and children, as they take in more food in proportion to their body weight than adults do, and they also tend to eat more of the types of food that are more heavily sprayed, such as fruit. Indeed, an American study has found that if children eat mostly organic food, then the average amount of organophosphate residues as measured in their urine is nine times lower than those children eating conventional food². Other studies have since reasserted the finding that dietary intake of pesticides represents the major source of organophosphate exposure in children³.

In 2007 more than 200 scientists from five continents called for a precautionary approach to toxic chemicals, to protect foetuses and children from chemical exposures that may cause serious disease later in life, and which may also afflict their children and grandchildren.⁴ The present policy of many governments of assuming a chemical is safe until overwhelming evidence of harm is proved, favours manufacturers and users more than children with their unique vulnerability. Exposure may result in an array of health problems, including diabetes, attention deficit disorders, prostate cancer, fertility problems, thyroid disorders and even obesity. If the foetus is exposed to even a minute amount of an endocrine disruptor at a particular time, then growth of critical organs and functions can be skewed, and it can set the child up for chronic illnesses, such as cancer, later in life. Reducing the exposure of the foetus to organophosphate pesticides, in particular, could reduce the risk of attention deficit hyperactivity disorder.

The organophosphate insecticide chlorpyrifos is a potent developmental neurotoxin at low levels of exposure, linked in several studies with reduced IQ and delayed cognitive and psychomotor development, as well as being an endocrine disruptor with anti-androgenic and estrogenic qualities, causing breast cancer cells to grow. Children exposed in the womb to this pesticide have been found to have cognitive impairment at least 11 years after birth, according to a study published in 2012.⁵ This insecticide is very persistent in the environment and has been found in Arctic ice, fog, air, seawater, fish and vegetation, as well as placental blood and breastmilk⁶. Chlorpyrifos is used on a range of fruit and vegetables and grain in New Zealand and has been found especially in bread and other wheat products, processed foods such as muesli, and grapes, raisins, sultanas and olive oil among others.

Also of particular concern is a group of fungicides called dithiocarbamates, of which mancozeb is common. These are used on a wide range of fruit and vegetables, and have been found in grapes, celery, pears, strawberries, apples, avocados, tomatoes, brassica, potatoes and even in infant foods. The 2009 Total Diet Survey (TDS) remarks that the estimated exposure to these fungicides has more than doubled since the previous TDS in 2003/2004. The fungicides have a metabolite or breakdown product, ethylene thiourea, which is known to cause cancer, endocrine disruption, thyroid damage and birth defects. This metabolite unfortunately increases on exposure to heat and in storage.

Usually, washing, peeling and cooking reduce the amount of pesticide residues, however some persist. If you think organic food is too expensive, remember that non-organic food does not include the cost of biodiversity loss and other environmental degradation. With organic food you pay the real cost for real food, and you give the grower a fairer return. By having organic food you support a system which better protects our children and the environment.

By *Alison White*, *Safe Food Campaign*, www.safefood.org.nz November 13.

² Curl, CL, Fenske RA, Elgethun K (2003): Organophosphorus pesticide exposure of urban and suburban preschool children with organic and conventional diets, *Environ Health Perspect*, October 13.

³ Lu C, Barr DB, Pearson MA, Waller LA.(2008): Dietary intake and its contribution to longitudinal organophosphorus pesticide exposure in urban/suburban children. *Environ Health Perspect* 116(4):537-42.

⁴ Grandjean P et al (2007): The Faroese Statement: Human Health Effects of Developmental Exposure to Chemicals in Our Environment, *Basic & Clinical Pharmacology & Toxicology*, 102, 73–75.

⁵ Rauh VA, Perera FP, et al (2012): Brain anomalies in children exposed prenatally to a common organophosphate pesticide. *PNAS* 109(20):7871-6.

⁶ Watts, M (2013): PAN AP Monograph on chlorpyrifos <http://www.panap.net/sites/default/files/monograph-chlorpyrifos.pdf>