

# **Pesticides in Your Daily Bread:**

## **A consumer guide to pesticides in bread 2014**



# Acknowledgements

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# Executive Summary

## Nearly Two-Thirds of Bread Contaminated

For the vast majority of people, bread is an essential everyday food. Yet the following guide contains an alarming statistic. Between 2000 and 2013 nearly two-thirds of all bread samples tested by the Defra Expert Committee on Pesticide Residues in Food (PRiF)<sup>1</sup> were contaminated with pesticide residues.

As for our previous report, 'Pesticides on a Plate' (published in 2013)<sup>2</sup>, our data comes from the Defra Expert Committee on Pesticide Residues in Food (PRiF)<sup>3</sup>. The PRiF committee tests fruit, vegetables and other commodities including bread and flour for pesticide residues and publishes its report online.

In this guide we will look at residues of single and multiple pesticides found in bread. We'll also take a closer look at two of the most frequently found chemicals and some of their effects on health and the environment. Finally we will ask what consumers can do to make informed choices, and what we believe governments, manufacturers and retailers should be doing about this issue.

### The results: cause for concern

Between 2000 and 2013, 2951 bread samples were tested by the PRiF committee. 2909 of these were non organic and the remaining 42 were organic bread products. Over that period 61.49% of the non-organic samples were found to contain pesticide residues, 17.12% containing more than one pesticide residue.

With a steadily increasing trend in both the number of positive tests and those testing positive for more than one pesticide, we believe there is cause for concern. Most worryingly, the number of samples testing positive for multiple residues has more than doubled in the last seven years.

You'll see in the table that while no organic samples contained multiple residues, 7% did contain a single pesticide residue. The most likely explanation for this is cross-contamination from non-organic, either during production or storage. This raises the issue of how we can prevent conventional agricultural methods undermining the integrity of organic.

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<sup>1</sup> <http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF>

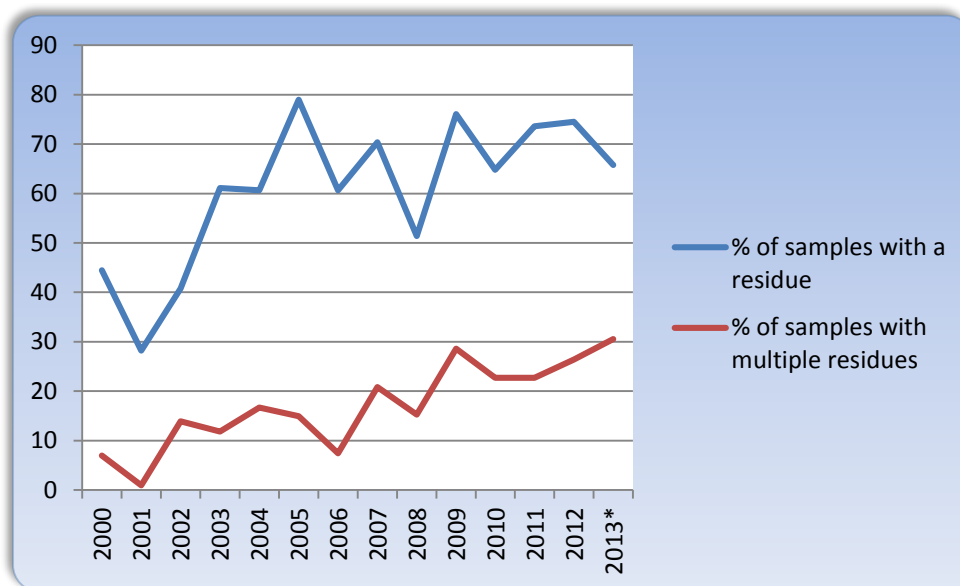
<sup>2</sup> [http://www.pan-uk.org/files/pesticides\\_on\\_a\\_plate\\_2013\\_final.pdf](http://www.pan-uk.org/files/pesticides_on_a_plate_2013_final.pdf)

<sup>3</sup> <http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF>

Year	Item	Total samples	Non-organic samples	Nonorganic samples containing residues	Nonorganic samples containing more than one residue	Organic samples	Organic Samples Containing Residues			
2013	Bread	216	216	137	63.43%	55	25.46%	0	0	na
2012	Bread	216	214	161	75.23%	57	26.64%	2	0	0%
2011	Bread	216	216	159	73.61%	49	22.69%	0	0	na
2010	Bread	216	215	140	65.12%	49	22.79%	1	0	0%
2009	Bread	217	211	165	78.20%	62	29.38%	6	2	33%
2008	Bread	216	213	111	52.11%	33	15.49%	3	0	0%
2007	Bread	216	206	152	73.79%	45	21.84%	10	1	10%
2006	Bread	216	211	131	62.09%	16	7.58%	5	0	0%
2005	Bread	214	210	169	80.48%	32	15.24%	4	0	0%
2004	Bread	216	211	131	62.09%	36	17.06%	5	0	0%
2003	Bread	144	143	88	61.54%	17	11.89%	1	0	0%
2002	Bread	216	211	88	41.71%	30	14.22%	5	0	0%
2001	Bread	216	216	61	28.24%	2	0.93%	0	0	na
2000	Bread	216	216	96	44.44%	15	6.94%	0	0	na
<b>TOTAL</b>		<b>2951</b>	<b>2909</b>	<b>1789</b>	<b>61.49%</b>	<b>498</b>	<b>17.12%</b>	<b>42</b>	<b>3</b>	<b>7%</b>

Results of PRiF residue testing on bread – data taken from PRiF quarterly reports<sup>4</sup>

Looking at the overall picture, the Government’s testing programme shows rising levels of percentages each year. <sup>5</sup>



Year by year residue occurrence in bread –data taken from PRiF quarterly reports<sup>6</sup>

<sup>4</sup> <http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF>

<sup>5</sup> [http://www.pan-uk.org/files/pesticides\\_on\\_a\\_plate\\_2013\\_final.pdf](http://www.pan-uk.org/files/pesticides_on_a_plate_2013_final.pdf)

The average figure for pesticide residues in non-organic bread over the entire period is 61.49% – much higher than the overall figure for pesticides residues in all produce combined which is approximately 40%. Disturbingly, pesticide residues in bread have risen from 28.24% in 2001 to 63.43% in 2013. That would equate to three out of every five non-organic bread products you buy. In 2005, we see a huge peak of 80% of all bread tested contained residues, which would be four in every five.

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<sup>6</sup> <http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF>

# The most frequently found chemicals

The most frequently found pesticide residues were glyphosate and chlormequat. Occasional instances of primiphos methyl, malathion and mepiquat were also recorded.

## *Glyphosate*

Glyphosate residues were the most frequently found. For many years, this chemical has been marketed as the safest herbicide and it's now the most widely used in the world. However, there are growing concerns about its potential for harm.

In June 2013 a report published jointly by GM Freeze and Friends of the Earth<sup>7</sup> showed that a high proportion of people tested positive for the presence of glyphosate in their bodies, despite living in non-rural areas and not having handled the substance. We must therefore conclude that residues of glyphosate in food are remaining inside people's bodies. A study carried out in the USA has shown the presence of glyphosate in mothers' breast milk, suggesting that – contrary to industry assurances – it can bio-accumulate in the body and be passed on to nursing infants.<sup>8</sup> It has been suggested that glyphosate can inhibit the body's ability to detoxify other chemicals present. This may result in the development of conditions such as Attention Deficit Hyperactivity Disorder in children.<sup>9</sup>

Glyphosate has been linked to cancer, birth defects and neurological disease such as Parkinson's disease. Other countries have expressed concerns about the chemical's possible effects on human health and the environment. In the Netherlands<sup>10</sup> some uses of glyphosate will be banned from 2015 onwards. Brazil is considering a ban in response to evidence linking it with kidney disease.<sup>11</sup>

Glyphosate herbicides have been shown to cause genetic damage and damage to the immune system in fish. In frogs, glyphosate herbicides caused genetic damage and abnormal development.<sup>12</sup>

Studies of glyphosate contamination of water are limited, but new results indicate that it can commonly contaminate streams in both agricultural and urban areas.<sup>13</sup>

Problems with drift of glyphosate herbicides occur frequently. Only one other herbicide causes more drift incidents in the US.<sup>14</sup>

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<sup>7</sup> [http://www.foeeurope.org/sites/default/files/publications/foee\\_4\\_human\\_contamination\\_glyphosate.pdf](http://www.foeeurope.org/sites/default/files/publications/foee_4_human_contamination_glyphosate.pdf)

<sup>8</sup> [www.momsacrossamerica.com/glyphosate\\_testing\\_results](http://www.momsacrossamerica.com/glyphosate_testing_results)

<sup>9</sup> <http://articles.mercola.com/sites/articles/archive/2013/12/05/adhd-glyphosate.aspx>

<sup>10</sup> The Dutch Lower House gave consent to a motion by Dutch Member of Parliament Esther Ouwehand, which prohibits the sale of glyphosate to private individuals <http://real-agenda.com/2014/04/14/hollands-parliament-bans-glyphosate-herbicides/>

<sup>11</sup> The Brazilian Federal Public Prosecutor in the Federal District has requested the Justice Department to suspend the use of glyphosate – the most widely used herbicide in Brazil. <http://rt.com/news/brazil-roundup-monsanto-ban-721/>

<sup>12</sup> <http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/glyphosate>

<sup>13</sup> <http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/glyphosate>

### *Chlormequat*

The second most frequently found residue is for chlormequat, a plant-growth regulator. A study commissioned by the Food and Agriculture Organisation (FAO) of the United Nations has linked it with causing developmental toxicity in rats and other animals.<sup>15</sup> However, there is a need for more research on this and it is as yet not known if the same effects would be likely in humans.

### *Malathion*

Malathion is an organophosphorous insecticide that is listed as being possibly carcinogenic, a cholinesterase inhibitor, a suspected endocrine disruptor and a potential ground water contaminant.<sup>16</sup> Malathion is a pesticide that is widely used in agriculture, residential landscaping, public recreation areas, and in public health pest control programs such as mosquito eradication. In the US, it is the most commonly used organophosphate insecticide. A cholinesterase inhibitor suppresses the action of the enzyme. Because of its essential function, chemicals that interfere with the action of cholinesterase are potent neurotoxins, causing excessive salivation and eye-watering in low doses, followed by muscle spasms and ultimately death. Endocrine disruptors are chemicals that may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife.

### **Pesticide residues found in organic bread – an explanation**

Looking at the analysis of the residue testing it can be seen that between 2000 and 2013 only three samples of organic bread products tested contained pesticide residues, 7% of the total samples tested.

If we look specifically at the results for the year 2009 it can be seen that of the six samples tested two were found to contain residues. Residues of pirimiphos-methyl and chlormequat were found in a sample of organic wholemeal pitta and residue of pirimiphos-methyl was found in a sample of organic mini pitta.

Neither of these two substances is permitted for use in organic food production. Pirimiphos-methyl is an insecticide that is used on stored grain. Chlormequat is a plant growth regulator used to stop cereal crops from growing too tall and becoming difficult to harvest.

In the 2009 report there is no explanation for how these residues got into the samples. Both samples it is claimed were from the UK, but this might just mean that they were made in the UK with grain imported from elsewhere. It is quite reasonable to conclude that the presence of pirimiphos-methyl is due to it having been kept in a store that had been used for non- organic grain and thus it was cross contaminated. It is also possible that the presence of chlormequat is a result of some kind of cross contamination or infiltration of non-organic grain or flour into that used for the final product.

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<sup>14</sup> <http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/glyphosate>

<sup>15</sup> Pesticide Residues in Food - 1997. Report. (FAO Plant Production and Protection Paper - 145)

<sup>16</sup> [http://www.pesticideinfo.org/Detail\\_Chemical.jsp?Rec\\_Id=PC32924](http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC32924)



# Conclusions and recommendations

Studies have shown that even very low doses of certain pesticides ingested regularly and in combination with the numerous other chemicals people are exposed to on a daily basis could have unforeseen effects.<sup>17</sup> Much uncertainty remains and more research is needed.

Given the situation, it seems like common sense to avoid or at least limit consumption where possible. At the very least, we believe consumers should have the right to make informed choices about their food.

Unfortunately, this is easier said than done. Although the majority of conventionally produced bread and flour contains residues, you cannot smell them, taste them or see them.

## **How to reduce your intake**

It's disturbing that residues in bread seem to be on the rise. As evidenced by the data, the only way you can avoid them with any degree of confidence is by choosing to eat organic.

## **The growing case for organic**

The figures show there is an indisputable rise in pesticide residues. This is a worrying trend at a time when the possible health effects aren't the only reason to choose organic. Recently there have been a number of press reports linking pesticides with damage to wildlife and the environment including birds and insects – such as the endangered bee population, bumble bees and other pollinators.

## ***What can consumers do?***

- Choose organic bread to reduce your exposure to pesticide residues. Either buy bread that is certified organic or discuss the benefits of using organic flour with your local baker
- Ask your local supermarket what they are doing to reduce pesticide residues. Are they improving their labelling to give better information to consumers?
- Make your own bread using certified organic flour. It tastes great and you will reduce your exposure to pesticide residues
- Contact your political representatives and ask that they call on the government to provide more support for organic production in the UK
- Support organisations such as the Pesticide Action Network UK, Garden Organic, the Soil Association, the Organic Naturally Different Campaign and the Real Bread Campaign, who are all campaigning to make real changes in the way food is produced
- Write to bread manufacturers and brands asking them to use organic flour

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<sup>17</sup>[http://e360.yale.edu/feature/scientists\\_warn\\_of\\_low\\_dose\\_risk\\_of\\_endocrine\\_blocking\\_chemical\\_exposure/2507/](http://e360.yale.edu/feature/scientists_warn_of_low_dose_risk_of_endocrine_blocking_chemical_exposure/2507/)

### ***What do we want the Government and retailers to do?***

The prevalent system of chemically intensive farming isn't the only way. We believe that:

- The UK government should give greater support and incentives to organic producers and also promote Integrated Pest Management (IPM) which focuses on minimising chemical inputs for pest and weed control.
- The PRiF should promote the findings of its testing more widely & clearly to better inform the public about residue issues. However, it is not the place of PRiF to make assumption that their findings present no risk to human health as is currently the case.
- There needs to be government funding for truly independent research into the growing body of evidence about the risk that glyphosate presents to public health.
- There must be more research into how multiple residues interact to affect human health. It is essential that the 'cocktail' effect is more thoroughly understood.
- Retailers should support organic and IPM producers throughout their global supply chains. Farmers, with the support of government and retailers, could adopt organic and other non-chemical control methods wherever possible.
- We would like to see all the major retailers publish their pesticide residue testing data so that consumers can make informed choices about what they buy.

### **Footnotes**

#### **A note on Maximum Residue Levels**

When monitoring pesticide residues in foods, the PRiF checks to see if residues exceed the Maximum Residue Level (MRL). But MRLs do not take into account repeated low-dose ingestion, nor reflect the potential effects of ingesting multiple pesticide residues. They are therefore not necessarily safe levels for consumers. What's more, research is beginning to show that ingesting 'cocktails' of chemicals may be more harmful than previously thought.