Hazardous Pesticides in the European Parliament

October 2007

Eight Fruit Samples
28 Toxic Pesticides
Four Legal Violations

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Contents

Executive Summary

- On 13 July 2007, Milieudefensie (Friends of the Earth Netherlands) purchased eight fruit items from the GB Express supermarket in the European Parliament building, Brussels. These food samples, which included strawberries, apricots, oranges, apples, pears and three bunches of grapes, were then analyzed for the presence of pesticide residues.

- Most of the food items tested were produced in the European Union (EU). The strawberries were grown in Belgium, the oranges were from Spain, two bunches of grapes were from Italy and both the apple and the pear were from France. One bunch of grapes was grown in Egypt. The origin of the apricots was unspecified.

- In total the eight food samples were found to be contaminated with 28 different pesticide residues, averaging almost five residues per fruit. These chemicals included ten known carcinogens, three neurotoxins, three reproductive or developmental toxins and eight suspected endocrine disruptors. Two of contaminants are classified by the World Health Organization (WHO) as being 'Highly Hazardous'. None of the food items was uncontaminated.

- Three of the eight food samples analyzed (apricot, grapes, orange) contained pesticide residues in excess of EC Maximum Residue Limits (MRLs) – thus rendering their sale illegal. The apricot contained excessive levels of a suspected endocrine disruptor, one bunch grapes showed illegal amounts of a known carcinogen, and the oranges were contaminated with elevated concentrations of two different pesticides, both linked with cancer and reproductive or developmental toxicity.

- With 14 different pesticide residues, the strawberries contained by far the highest diversity of agrochemical contaminants. The oranges showed illegally high levels of imazalil – a known carcinogen – substantially in excess (40% above) of the established 'Acceptable Daily Intake' (ADI) for a five year old toddler, who would also receive 70% of the 'Acute Reference Dose' (ARfD) by eating just one orange.

- While the investigation revealed substantial levels of pesticide contamination, the findings reflect previous analyses of the EU food chain. Of the 60,450 food samples included within the European Commission's 2006 pesticides monitoring report, 40% were shown to contain pesticide residues, with an additional 3% containing levels in excess of EC MRLs. In total some 324 different pesticides were identified within the EU food chain, with some items containing as many as 8 different contaminants. Even baby foods showed significant levels of pesticide residues.

- Six of the pesticide residues detected in our analysis are listed among those most often found in coordinated food monitoring programs in the European Union, Norway, Iceland and Liechtenstein. Of these chemicals, four are known carcinogens, three are suspected endocrine disruptors, two are reproductive or developmental toxins and one is neurotoxic.

- GB Express supermarket in the European Parliament building is part of the GB Express supermarket chain, which belongs to Carrefour Belgium, the largest Belgian trader with 560 supermarkets throughout Belgium. Carrefour Belgium is part of the Carrefour Group, Europe's biggest distributer, operating over 12,500 stores worldwide, either company-operated or franchises. Within this figure, Carrefour's European portfolio includes 638 hypermarkets, 4450 hard discount stores, 2,508 supermarkets and 3,154 convenience stores.

- The presence of high levels of pesticide residues in food grown in the EU is a direct result of reliance on pesticides in EU agriculture. Every year over 200,000 tons of pesticides are released into the European environment; mostly in food production. Many of these chemicals and in particular insecticides, harm not only the pest species they are intended to control, but have the potential to cause substantial damage to human health. Over the past decade the EU's consumption of insecticides has more than doubled. All of the EU's 10 most used insecticides are classified as hazardous.

- Evidence relating to the negative health impacts of pesticide exposure is mounting rapidly. Findings reported at the European Respiratory Society annual meeting of 2007 show that adults in contact with pesticides face a higher risk of developing respiratory problems. An EU study on Parkinson's disease found low level exposure may increase the chances of developing the condition. Scientists in Canada have found evidence linking pesticides with cancer, including leukaemia and non-Hodgkin's lymphoma.

- While EU food safety regulations set Maximum Residue Levels (MRLs), these standards fail to take any account of the long-term impacts of pesticide residues, or known combinational effects associated with multiple simultaneous exposure. Furthermore, EU MRLs are consistently out of synch with recognized 'Acceptable Daily Intake' (ADI) and 'Acute Reference Dose' (ARfD) levels, thus posing a considerable risk to the EU public and in particular to children.

- In the plenary session of October 2007, Members of the European Parliament (MEPs) have the opportunity to influence the creation of legislation relating to the authorisation, sale and use of pesticides in the EU. The evidence presented in this report provides a compelling case for immediate action. MEPs have a responsibility to provide greater protection for human health by supporting measures aimed at removing pesticide residues from the European food chain.

Introduction

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Every year the 27 Member States of the European Union spend over €850 billion on healthcare; a figure which accounts for some eight percent of their combined gross domestic product (GDP). This substantial annual investment provides a tangible demonstration of the extent to which the people of Europe prioritise their long-term health. At the same time, a survey requested by the European Commission showed that our citizens' top concern associated with food risk and safety is pesticide residues in fruit and vegetables (Eurobarometer, 2006).

Yet despite the substantial economic resources that citizens willingly commit towards ensuring their physical well-being, their efforts at achieving long-term health are being fundamentally undermined by what they eat.

The 28 pesticide residues detected in this analysis of eight fruit items purchased inside the European Parliament building represent the tip of an iceberg: for in total the wider EU food chain is known to be contaminated with at least 324 different agrochemicals. Within this figure, some of Europe's most common food contaminants have known neurotoxic, immunotoxic, or endocrine disrupting properties. Worse still, the extent of pesticide contamination is now so great that roughly half of all fruits and vegetables purchased in the EU contain pesticide residues; with one in thirty items exceeding Maximum Residue Levels. These statistics guarantee routine pesticide exposure for EU citizens (EC, 2006).

While the long term health implications of Europe's pesticide problem are hard to forecast, identifying the root cause of contamination is simple. The EU now applies over 200,000 tons of pesticides every year – mostly to agricultural produce destined for human consumption. In part these chemicals are retained by crops growing in the field and thus eventually enter our bodies.

The evidence presented in this report provides a compelling case for near-term action on pesticide use reduction. In shaping the future of EU pesticides legislation at the forthcoming plenary meeting of the European Parliament in October, MEPs have a genuine responsibility to provide greater protection for human health by supporting measures aimed at removing pesticide residues from the European food chain.

While many of the proposals already scheduled for Parliamentary consideration have substantial potential to reduce the contamination of food produced in the EU, the authors of this report would like to draw specific attention to case of Denmark.

In 1985 Danish politicians, alarmed by the growing presence of pesticide contaminants in their national food and water resources, instigated a national 'Pesticide Action Plan' aimed at achieving substantial pesticide use reduction. They set concrete targets for pesticide use reduction, introduced forward-thinking market incentives, and supported a comprehensive advisory service to work with farmers in using pesticides more effectively. Denmark's farmers now use just half as much pesticide as they did 20 years ago, Danish vegetables are now six times less contaminated than their equivalent imports, water quality has doubled and agricultural producers have experienced no significant economic impact.

The achievements of these politicians, together with the successes of the policies they worked to instigate, provide a powerful proof of principle that near-term pesticide use reduction can be achieved where key decision-makers choose to take action. Members of the European Parliament have a once-in-a-generation opportunity to enhance the safety of the EU food products. The long-term health of the people of Europe is in their hands.

Analysis of fruit samples from the European Parliament building

On 13 July 2007, Milieudefensie (Friends of the Earth Netherlands) purchased eight fruit items from the GB Express supermarket in the European Parliament building[1]; a retail outlet popular among Members of the European Parliament and their advisors. These samples, which included strawberries, apricots, oranges, apples, pears and three bunches of grapes, were then analyzed for the presence of pesticide residues by a renowned Dutch laboratory.[2]

The investigation found all eight food items to be contaminated. In total 28 different pesticide residues were detected and on average each food sample contained almost five different pesticide contaminants. One sample of strawberries contained no fewer than 14 different pesticides residues. Three food items (apricot, grapes, orange) contained pesticide residues in excess of Maximum Residue Limits (MRLs). Thus, three of the fruit samples in the survey were sold illegal.

The pesticides identified included ten known carcinogens, three neurotoxins, three reproductive or developmental toxins and eight suspected endocrine disruptors. Two of the contaminants are described as 'Highly Hazardous' by the World Health Organization (WHO), while six others fall under the WHO classification of 'Moderately Hazardous'. Six of the pesticide residues detected are among the 18 found most often in food monitoring programs in the EU. None of the chemicals detected has no known or suspected links with negative impacts on human health. See Annex III on page 18 for a complete overview of the human health impacts of the 28 found pesticides.

Having determined the concentration of pesticide residues found within the eight food samples included within this study, the authors calculated figures relating to 'Acceptable Daily Intake' (ADI) and 'Acute Reference Dose' (ARfD) for a five year old toddler. These data were then used to further assess the likely negative health impacts associated with eating the fruit items.

None of the fruit samples exceeded ARfD levels. The oranges showed illegally high levels of imazalil – a known carcinogen – substantially in excess (40% above) of the established 'Acceptable Daily Intake' for a five year old toddler, while receiving 70% of the 'Acute Reference Dose' by eating just one orange.

In this report the health standards were calculated for an average five year old toddler using Dutch consumption data and demographic statistics. The calculations of the toxicological data are based on the edible part of the fruits. See Annex I on page 15 for more details. See Annex II on page 16 for details about measurement method and data.

'Acceptable Daily Intake' or ADI is a measure of the amount of a specific substance that can be ingested (orally) over a lifetime without an 'appreciable health risk'.

'Acute Reference Dose' or ARfD is intended to provide an estimate of the maximum quantity of a given chemical which can be ingested over a short period of time, usually during one meal or one day, without appreciable health risks.

ADIs and ARfD's are expressed by body mass, usually in milligrams (of the substance) per kilograms of body mass per day.

'Maximum Residue Limit' or MRL is the maximum concentration of a pesticide residue (expressed as mg/kg), permitted in or on food commodities and animal feeds. MRLs are primarily a check that Good Agricultural Practice is being followed and to assist international trade in produce treated with pesticides. MRLs are not safety limits and exposure to residues in excess of an MRLs does not automatically imply a hazard to health. In this analysis, the MRL database from the Belgium government were used (Fytoweb, 2007).

[1] European Parliament; Rue Wiertz ASP (Spinelli Building) -2F; B-1047 Bruxelles. The supermarket belongs to the GB Express supermarket chain, which is part of Carrefour Belgium, the largest Belgian trader with 560 supermarkets throughout Belgium.

[2] All chemical analysis was conducted by TNO Analytical Research Department, Zeist, Netherlands, a scientific institute with ISO-1725 accreditation

Oranges – the highest concentration of pesticide residues, two MRL exceedances

With a sum total concentration of 18.4 mg/kg of residues, the Spanish oranges contained the highest combined level of pesticide contaminants. The six pesticides detected included three known carcinogens, one neurotoxin, two reproductive or developmental toxins and two suspected endocrine disruptors. Four of the EU's most common 18 pesticide contaminants were shown to be present.

Two of the pesticide contaminants present in the oranges were detected at levels in excess of MRL limits. The first, imazalil is a systemic fungicide which diffuses throughout the entire fruit, not just the peel and can cause irritation of the skin and eyes. As reported in the open scientific literature this chemical has been linked with negative effects on reproduction and is known to be carcinogenic. Given the substantial concentration at which imazalil was detected in the orange (5.2 mg/kg), eating just one orange would lead to an exceedance the ADI for a five year old toddler by 40%. Thiabendazole, a known carcinogen and reproductive or developmental toxin was also found at a level 20% above the MRL.

The orange also contained chlorpyrifos, an insecticide which has recently attracted increased scrutiny from toxicologists worldwide. This chemical is among the most persistent organophosphates known to mankind. Exposure in children or the foetus could affect the developing nervous system. Memory and coordination problems, attention-deficit hyperactivity disorder (ADHD), and possible cognitive effects are known from laboratory tests on animals. For these reasons the US Environmental Protection Agency has virtually eliminated all uses of chlorpyrifos that leads to exposure of children and adjusted the health standard tenfold with respect to the 'Children's Safety Factor' (EPA, 2001). The same pesticide was also examined by the Dutch Health Council who in 2004 reported that researchers had detected the substance in the blood of the umbilical cord, feeding the developing foetus (Gezondheidsraad, 2004). After exposure, the concentration of chlorpyrifos was five times higher in breast milk than in the maternal blood stream.

Another pesticide present was dicofol, an organochlorine belonging to the same chemical class as DDT. Because of its high acute toxicity in the aquatic environment, its reprotoxic properties in birds, its possible endocrine disrupting characteristics, and above all its persistence and possible bioaccumulation in the natural environment, the World Wide Fund For Nature (WWF) has proposed the inclusion of dicofol within The Stockholm Convention list of persistent organic pollutants (POPs) (WWF, 2005).

Oranges (Spain): pesticide toxicity analysis (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
chlorpyrifos	Moderately Hazardous		☠	?	suspected	✔
dicofol	Slightly Hazardous	possible		?	suspected	
imazalil*	Moderately Hazardous	☠		☠	?	✔
2-phenylphenol		☠		known	?	✔
pyriproxyfen				?	?	
thiabendazole*		☠		☠	?	✔

* = in excess of MRL

Strawberries – a poisonous blend of pesticides

With 14 different pesticide residues, the Belgian strawberries contained by far the highest diversity of contaminants. Among the pesticides, iprodione, a common food contaminant within the EU food chain, was found at the highest concentration (0.84 mg/kg). This fungicide is a known carcinogen and a suspected endocrine disruptor. Kresoxim-methyl, mepanipyrim, penconazole, thiacloprid and vinclozolin were also present, bringing the total number of known carcinogens to five. In addition the strawberries contained three other suspected endocrine disruptors, as well as two pesticides classified by the WHO as being 'Moderately Hazardous'.

Strawberries (Belgium): pesticide toxicity analysis (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
boscalid (nicobifen)		possible		?	?	
cyhalothrin,lambda	Moderately Hazardous			?	suspected	
cyprodinil				?	?	
fenhexamid				?	?	
fludioxonil				?	?	
hexythiazox		possible		?	?	
iprodione		☠		?	suspected	✔
kresoxim-methyl		☠		?	?	
mepanipyrim		☠		?	?	
penconazole		?		?	?	
pyraclostrobin				?	?	
pyrimethanil		possible		?	suspected	
thiacloprid	Moderately Hazardous	☠		?	?	
vinclozolin		☠		☠	suspected	

Grapes – one MRL exceedance

Three grape samples were analyzed as part of the investigation: two from Italy and a third from Egypt. On average three pesticide residues were detected in each sample. One of the grape samples had a MRL exceedance associated with the pesticide spirodiclofen. This chemical hasn't got admittance in Belgium for the use on grapes and thus its MRL is set to 0.02 mg/kg – which corresponds to the lowest concentration at which it can be detected (LOD). Yet one of the Italian grapes purchased contained spirodiclofen at 0.08 mg/kg, thus making it illegal to put them on the supermarket shelf.

In total nine separate incidents of pesticide contamination were detected, which included two known carcinogens, as well as two suspected endocrine disruptors.

Of all the pesticides found, the fungicide carbendazim is perhaps the most widespread within the EU food chain. It is marked by the EC as carcinogenic, harmful for reproduction and a great hazard for earth worms (EC, 2007). Despite these properties, European agriculture ministers recently saw fit to extend the use of carbendazim in the EU for another three years; a decision which elicited protests from a number of key European environmental organizations. Four large British supermarket chains (Tesco, Sainsbury's, Waitrose and the Co-op) include carbendazim within their blacklists of banned pesticide residues.

Grapes (Italy & Egypt): pesticide toxicity analysis (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
carbendazim(sum)		possible		?	suspected	✔
cyhalothrin,lambda	Moderately Hazardous			?	suspected	
cyprodinil				?	?	
fludioxonil				?	?	
imidacloprid	Moderately Hazardous			?	?	
iprovalicarb		☠		?	?	
methoxyfenozide				?	?	
spirodiclofen*		☠		?	?	

* = in excess of MRL

Apricots – one MRL exceedance

The apricots were from an unspecified origin. In total three pesticides were detected. The contaminant fenbuconazole, a suspected endocrine disruptor, exceeded the LOD MRL. Methidathion, a powerful neurotoxic insecticide classified by the WHO as being 'Highly Hazardous' was also present.

Apricots (origin unspecified): pesticide toxicity analysis (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
cyhalothrin,lambda	Moderately Hazardous			?	suspected	
fenbuconazole*		possible		?	suspected	
methidathion	Highly Hazardous	possible	☠	?	?	

* = in excess of MRL

Apples and pears – low concentrations, potential risks

While the apple and pear samples had relatively low overall concentrations of pesticide residues, both fruits showed three contaminants. Of all the fruits analyzed within the present study, the apple was perhaps the least contaminated. The pear contained one known carcinogen, two neurotoxins and a reproductive or developmental toxin. As will be illustrated in the discussion below, the potential health risks are still significant, even when no MRL exceedances are found.

Apples (France): pesticide toxicity analysis (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
carbendazim(sum)		possible		?	suspected	✔
methoxyfenozide				?	?	
pyraclostrobin				?	?	

Pears (France): pesticide toxicity analysis (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
azinphos-methyl	Highly Hazardous		☠	?		
chlorpyrifos	Moderately Hazardous		☠	?	suspected	✔
thiabendazole		☠		☠	?	✔

Further Discussion

Aside from providing a pertinent snapshot of pesticide contamination within the EU food chain, the analysis conducted as part of this investigation can be used to demonstrate some of the flaws in the present EU food safety protocols.

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Why MRLs don't keep consumers safe

The analysis of the Spanish oranges underlines the worrying gap between Belgium's present MRLs for pesticide residues and recognized international standards in health. In 2000, scientists from the Netherlands initiated the establishment of an Acute Reference Dose (ARfD) for imazalil, given the strong indications of its toxological effects in laboratory animals (FAO, WHO, 2002). Following their investigations, the World Health Organization eventually agreed on an ARfD of 0.05 mg per kilogram body weight per day – five years later in 2005 (FAO, WHO, 2005).

While this international benchmark has the potential to protect human health, the MRL for imazalil has yet to be brought in line with the agreed ARfD. The oranges we purchased in the supermarket of the European Parliament contained imazalil residues only marginally in excess of the MRL (4% above). Yet the fruit's pesticide content represents 140% of the Acceptable Daily Intake (ADI) for a five year old toddler.

As a thought experiment, imagine that all of the pesticide residues detected in this investigation were found at levels equal to present Belgian MRLs. The eight fruits would represent seventeen separate exceedances of ADIs and six exceedances of ARfDs. At MRL levels, the apples, for example, would contain 106% of the ARfD for carbendazim and also pyraclostrobin, while the pear would contain 436% of the ARfD for azinphos-methyl and 145% the ARfD for thiabendazole.

The examples above demonstrate the danger to the public health even where Belgian MRLs are not exceeded. A recent investigation conducted by the European Food Safety Authority (EFSA) showed the same dangers exist with proposed European temporary MRLs. From the 236 inspected pesticides, 144 could pose an acute or chronic danger to the public health (EFSA, 2007).

The EU's failure to propose more stringent MRLs in line with recognized ARfDs and ADIs poses unnecessary risks to vulnerable groups, especially children. EU legislation urgently needs to be amended such that MRL's are brought into line with ARfDs.

Combination effects

Scientists have long known that the toxic effects of a given pesticide can be substantially enhanced or altered if exposure occurs in tandem with other chemicals. Organophosphates, for example act on the enzyme acetyl-cholinesterase, inhibiting the way in which nerve cells communicate with one another. Thus two or more organophosphates acting in tandem may exert an additive or multiplicative effect. Carbamates too act to reduce the activity of acetyl-cholinesterase, further increasing the horizons for combination effects.

Exposure to two or more pesticide residues is a common occurrence. The European Commission's own data suggest that around one quarter of all food samples contain at least two pesticides (EC, 2006). In this respect, these findings may be unrepresentative: all eight fruit samples analyzed in this study contained two or more different pesticide residues, with a staggering 14 pesticides in one sample of strawberries.

Despite scientific understanding of potential combination effects and our knowledge that eating pesticide contaminated foods often leads to multiple simultaneous exposure, current EU legislation takes no account of combination effects. Thus the EU public and in particular vulnerable groups such as children, the elderly and the sick, face an elevated health risk.

Recommendations for Members of the European Parliament

In the forthcoming plenary session of October 2007, Members of the European Parliament will have the opportunity to influence the creation of a proposed Regulation and Framework Directive, relating to the authorization, sale and use of pesticides in the European Union.

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In light of the information presented in this report, MEPs should:

- support the implementation of **cut-off criteria** designed to prevent the use of the most toxic pesticides. Substances should not hold authorisation status where there is evidence that they are neurotoxic, immunotoxic, carcinogenic, mutagenic, toxic to reproduction, have endocrine disrupting properties, or that they persist and bio-accumulate in the environment;

- support the mandatory substitution of **substances for concern**. Substances suspected of having negative impacts on human health or the environment should be replaced with less hazardous or non-chemical alternatives whenever they are available;

- demand an urgent re-evaluation of EC **Maximum Residue Levels** such that EU safety standards reflect established 'Acceptable Daily Intake' (ADI) and Acute Reference Dose (ARfD) estimations and take long-term and combination effects of pesticide exposure into account.

- support measures to prevent pesticides from contaminating water bodies and courses intended for drinking water abstraction.

- support measures to ensure that pesticide authorisations are based on a comprehensive analysis of **all scientific peer-reviewed literature** regarding negative side-effects on health. Ensure that pesticide authorisations are re-evaluated on a regular basis and when new scientific evidence arises indicating possible risks to human health;

- support measures to ensure that **vulnerable groups** and in particular children, receive the highest possible level of health protection from the effects of hazardous pesticides;

- support the establishment of concrete targets for the **reduction of pesticide use** as well as mandatory deadlines for the application of the principles of **Integrated Pest Management**. Provide support to farmers in converting to low pesticide farming methods;

- support the proposal that pesticide authorisations should require products to be used in accordance with the principles of **Integrated Pest Management**;

- support the establishment of '**pesticide passports**' to ensure traceability of pesticide applications within the food chain;

- call for greater transparency in the pesticide authorization process by demanding free access to scientific studies, as data protection should not apply to information relevant to human health and the environment.

Disclaimer

The information in this report has been edited with the utmost care. The pesticide residue analysis has been conducted by TNO Analytical Research Department, Zeist, Netherlands, a scientific institute with ISO-1725 accreditation. The allowed Maximum Residue Limits (MRLs) are obtained from the Fytoweb database of the Belgium government (Fytoweb, 2007). The tabled pesticide toxicity data was collected from Pesticide Action Network North America's database (PAN, 2007). The most prominent resources used are listed in the Sources chapter. The European and Belgian pesticide legalislation is complex. Therefore, the organisations affiliated with this report cannot be held responsible for any misinformation from these sources and the content in, or effects caused by this report. For further information, please contact Milieudefensie, Amsterdam, The Netherlands.

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Annex 1 – Statistics used for calculation of health risks

Note that the Short Term Consumption (STC) data is used to calculate the ADI to reflect how easily these ADI's are exceeded when consuming a larger portion. The toxicological data reckons with the removal of the orange peels by including a scientifically verified Processing factor of 0.1. This results in 90% less concentration in its edible part due to the removal of the peel.

Product	Group	Weight (kg)	Edible portion (kg)	STC (Short Term Consumption) (kg / pers / day)	Processing factor	Homogeneity factor
Grape	child	17.1	0.1	0.20	1	5
Orange	child	17.1	0.16	0.165	0.1	7
Strawberry	child	17.1	0.012	0.208	1	1
Apricot	child	17.1	0.039	0.02	1	7
Apple	child	17.1	0.112	0.26	1	7
Pear	child	17.1	0.17	0.213	1	7

Annex II – Measurement data

All chemical analysis was conducted by TNO Analytical Research Department, Zeist, Netherlands, a scientific institute with ISO-1725 accreditation. Large samples of one to two kilo of each fruit were blended and subsequently analyzed using the GC-MS and LC-MS/MS multi-residue method.

Product	Active substance	Concentration (mg/kg)	MRL BE (mg/kg)	> MRL	ARfD (mg/kg body/day)	%ARfD toddler	ADI (mg/kg body/day)	%ADI toddler	Total pesticides
Apple (France)	**carbendazim(sum)**	0.04	0.2		0.02	21%	0.02	21%	1
	methoxyfenozide	0.01	2		0.2	1%	0.1	1%	1
	pyraclostrobin	0.03	0.3		0.03	11%	0.03	11%	1
Apple Total									**3**
Apricot (Unknown origin)	**cyhalothrin,lambda**	0.07	0.2		0.0075	8%	0.005	11%	1
	fenbuconazole*	0.03	0.02	1			0.003	8%	1
	methidathion	0.01	0.02		0.01	1%	0.001	8%	1
Apricot Total									**3**
Grape (Egypt)	**carbendazim(sum)**	0.02	0.3		0.02	6%	0.02	6%	1
	cyhalothrin,lambda	0.02	0.2		0.0075	16%	0.005	23%	1
	cyprodinil	0.12	2				0.03	23%	1
	fludioxonil	0.04	2				0.4	1%	1
Grape Subtotal									4
Grape (Italy)	**cyprodinil**	0.02	2				0.03	4%	1
	iprovalicarb	0.07	2				0.015	27%	1
	spirodiclofen*	0.08	0.02	1	0.1	5%	0.014	33%	1
Grape Subtotal									3
Grape (Italy)	**imidacloprid**	0.03	0.05		0.4	0%	0.06	3%	1
	methoxyfenozide	0.01	1		0.2	0%	0.1	1%	1
Grape Subtotal									2
Grape Total									**9**
Orange (Spain)	**chlorpyrifos**	0.13	0.3		0.1	1%	0.01	9%	1
	dicofol	0.02	2				0.002	7%	1
	imazalil*	5.2	5	1	0.05	70%	0.025	140%	1
	phenylphenol,2-	7	12				0.4	12%	1
	pyriproxyfen	0.02	0.6				0.1	0%	1
	thiabendazole*	6	5	1	0.3	14%	0.1	41%	1
Orange Total									**6**

Product	Active substance	Concentration (mg/kg)	MRL BE (mg/kg)	> MRL	ARfD (mg/kg body/day)	%ARfD toddler	ADI (mg/kg body/day)	%ADI toddler	Total pesticides
Pear (France)	**azinphos-methyl**	0.05	0.5		0.01	44%	0.005	87%	1
	chlorpyrifos	0.02	0.5		0.1	2%	0.01	17%	1
	thiabendazole	0.23	5		0.3	7%	0.1	20%	1
Pear Total									**3**
Strawberrie (Belgium)	**boscalid**	1.1	3		0.22	6%	0.04	33%	1
	cyhalothrin,lambda	0.02	0.5		0.0075	3%	0.005	5%	1
	cyprodinil	0.41	3				0.03	17%	1
	fenhexamid	0.52	5				0.2	3%	1
	fludioxonil	0.35	3				0.4	1%	1
	hexythiazox	0.02	0.05		2.4	0%	0.03	1%	1
	iprodione	0.84	15				0.06	17%	1
	kresoxim-methyl	0.17	1				0.4	1%	1
	mepanipyrim	0.11	2		0.3	0%	0.02	7%	1
	penconazole	0.06	0.5				0.03	2%	1
	pyraclostrobin	0.22	0.5		0.03	9%	0.03	9%	1
	pyrimethanil	0.83	2				0.17	6%	1
	thiacloprid	0.31	0.5		0.03	13%	0.01	38%	1
	vinclozolin	0.06	5		0.06	1%	0.005	15%	1
Strawberrie Total									**14**
Grand Total									**38**

* = in excess of MRL

Annex III – Pesticide toxicity analysis

The 28 found pesticides and their Human Health Impacts (PAN, 2007)

Pesticide	WHO Hazardous Chemical	Carcinogen	Neurotoxin	Reproductive or Developmental Toxin	Endocrine Disruptor	Common EU Food Contaminant
azinphos-methyl	Highly Hazardous		☠	?		
boscalid (nicobifen)		possible		?	?	
carbendazim(sum)		possible		?	suspected	✔
chlorpyrifos	Moderately Hazardous		☠	?	suspected	✔
cyhalothrin,lambda	Moderately Hazardous			?	suspected	
cyprodinil				?	?	
dicofol	Slightly Hazardous	possible		?	suspected	
fenbuconazole*		possible		?	suspected	
fenhexamid				?	?	
fludioxonil				?	?	
hexythiazox		possible		?	?	
imazalil*	Moderately Hazardous	☠		☠	?	✔
imidacloprid	Moderately Hazardous			?	?	
iprodione		☠		?	suspected	✔
iprovalicarb		☠		?	?	
kresoxim-methyl		☠		?	?	
mepanipyrim		☠		?	?	
methidathion	Highly Hazardous	possible	☠	?	?	
methoxyfenozide				?	?	
penconazole		?		?	?	
2-phenylphenol		☠		known	?	✔
pyraclostrobin				?	?	
pyrimethanil		possible		?	suspected	
pyriproxyfen				?	?	
spirodiclofen*		☠		?	?	
thiabendazole*		☠		☠	?	✔
thiacloprid	Moderately Hazardous	☠		?	?	
vinclozolin		☠		☠	suspected	

* = in excess of MRL