



Report on surveillance of infant food for pesticide residues

August, 2004

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Summary

The Food Safety Authority of Ireland has carried out a surveillance study of infant food available on the Irish market for the possible presence of pesticide residues, in order to establish levels of compliance with existing and proposed legislation in this area.

41 samples of baby food, comprising infant formula, juices, jars and boxes (cereal/meat/egg/fish/fruit/vegetable based) were analysed in this survey. Samples purchased were "ready to eat", and were analysed as such, or sold in the dry form, requiring reconstitution before use. In the case of the latter, samples were analysed in the reconstituted form in accordance with manufacturers' instructions. A total of 366 pesticides were included in the screen.

Of the 41 samples tested for 366 pesticide compounds, representing 15006 individual results, a total of 5 positive results for the presence of residues were obtained, for dieldrin, piperonylbutoxide and o-phenylphenol. The levels of dieldrin and piperonylbutoxide were below the limits set in the legislation, while the levels of o-phenylphenol detected in 3 samples were above the relevant limit. Follow-up investigations showed that presence of the residue was not as a result of the use of o-phenylphenol as a pesticide on the food crops used in the manufacture of the baby food but rather as a consequence of its presence in the food contact material (packaging) used for the products in question. The use of o-phenyl phenol in food contact material is permitted provided the level of migration into the foods is below any level that would endanger human health or cause an unacceptable change in the composition. FSAI considers that the levels of this substance and the other two pesticides found in the products concerned presented no risk to infants and young children.

The results of the study show good compliance with the existing legislation on pesticide residues in baby food or legislation that will come into force March 2005. FSAI will continue to monitor such products for pesticide residues and other chemical contaminants, in order to safeguard the health of Irish children.

Introduction

The Food Safety Authority of Ireland has carried out a surveillance study of infant food available on the Irish market for the possible presence of pesticide residues in order to establish levels of compliance with existing and future legislation.

The Food Safety Authority of Ireland (FSAI) has a statutory responsibility to ensure the safety of food consumed, distributed, produced and sold on the Irish market. In this respect, the FSAI coordinates the collation of food safety surveillance information from laboratories run by its official agents, the Health Boards, the Department of Agriculture and Food, the Department of Communications, Marine and Natural Resources, the Marine Institute and the local authorities. The FSAI also conducts targeted food safety surveillance in areas where potential safety issues have been identified and/or on food contaminants for which there are currently no testing capacities in Ireland, such as very low levels of pesticide residues in infant foods. This report provides the results of a targeted surveillance study on levels of 366 pesticide residues in foods for infants and young children.

Pesticides and Pesticide Residues

Some insects, fungi and other organisms, occurring naturally in the environment, can cause damage to plant or animal production, etc and are hence considered "pests". A pesticide is any substance or mixture of substances used to destroy, suppress or alter the life cycle of a pest. A pesticide can be a naturally-derived or synthetically-produced substance and can also be a microorganism. There are currently about 900 pesticide products registered for use in Ireland by the Pesticides Control Service of the Department of Agriculture and Food (<http://www.pcs.agriculture.gov.ie/>).

Although use of pesticides has many benefits in terms of crop and animal production, some of these pesticides and/or their metabolites or breakdown products are relatively toxic substances and could potentially have harmful effects on consumers of plant/animal products or the environment. However, before a plant protection product is approved for use, it must undergo a rigorous assessment and it will not be approved if it has unacceptably harmful effects on humans, animals or the environment. This assessment includes parent substances, metabolites and breakdown products. It is only in cases of serious abuse, where pesticide products are not applied correctly, that a risk to the consumer or others arises.

The European Union has established maximum residue levels (MRLs) for many pesticides in food commodities. The MRL is the maximum concentration of pesticide residue legally permitted in a particular food commodity and is derived from field application trials with the pesticide, performed according to good agricultural

practice (GAP). The MRL is not a health-based exposure limit for a pesticide in food, although an MRL is only established when it is shown that it is safe for consumers. The toxicological endpoints used to determine the acceptability of the MRL are the ADI (acceptable daily intake) and where relevant, for acutely toxic pesticides, the ARfD (the acute reference dose). The ADI is the amount of a pesticide or other chemical that can be consumed every day for a lifetime with reasonable confidence that no harmful effects on health will result. The ARfD is the amount of a pesticide or other chemical that can be consumed at one meal or in one day with reasonable certainty that no harmful effects on health will result. The ADIs or ARfDs apply to adults and young children alike, but in considering the implications of an MRL exceedance in a particular food commodity, account has to be taken of the fact that young children may be high consumers of particular foods such as fruit, and may therefore be at greater risk of exceeding the ADI or ARfD.

Legislation¹

MRLs are established for the majority of commonly used pesticides in various food commodities (fresh fruit and vegetables, cereals and foodstuffs of animal origin) via the legal framework of Directives 76/895/EEC, 86/362/EEC, 86/363/EEC and 90/642/EEC. A decision has been made at EU level that pesticide residues should not be present in processed food for infants and young children. Accordingly specific legislative requirements regarding the occurrence of pesticide residues in baby food have been laid down in the following EU Directives:

1. Commission Directive 91/321/EEC on infant formulae and follow-on formulae as amended²
2. Commission Directive 96/5/EC on processed cereal-based foods and baby foods for infants and young children as amended³

The national Regulations implementing these Directives are the European Communities (Infant Formulae and Follow-on Formulae) Regulations 2004, S.I. No. 242 of 2004 and the European Communities (Processed Cereal-based foods and Baby Foods for Infants and Young Children) Regulations 2000, S.I. No. 142 of 2000. Article 6 of both Directives requires that infant formulae, follow-on formulae and processed cereal-based foods and baby foods for infants and young children "shall not contain any substance in such quantity as to endanger the health of infants and young children". The Directives specifically require that these products must not

¹ Disclaimer: This document is not intended to act as a guideline to current legislation. It does not purport to be comprehensive or to be a legal interpretation or to constitute legal or other professional advice.

² Commission Directive 96/4/EC, Commission Directive 1999/50/EC and Commission Directive 2003/14/EC

³ Commission Directive 1998/36/EC, Commission Directive 1999/39/EC and Commission Directive 2003/13/EC

contain residues of individual pesticides at levels exceeding 0.01 mg/kg (0.01 parts per million, ppm). The maximum limit of 0.01 mg/kg applies to the product as sold ready for consumption (e.g. ready to eat baby food) or after reconstitution according to the instructions of the manufacturer (e.g. infant formulae, dried cereal-based foods, etc.)

In addition, more stringent restrictions will apply from March 2005 to a number of named pesticides for which there is increased concern about possible health effects in infants and young children because of their particular toxicity. These pesticides are divided into two groups:

1. Pesticides that should not be present in agricultural products intended for the production of infant formulae, follow-on formulae and processed cereal-based foods and baby foods for infants and young children (see Annex I, Table 4)
2. Pesticides to which a specific maximum residue applies (see Annex I, Table 5)

Study details

In this survey, a total of 41 samples were purchased in retail outlets in Dublin, comprising the following:

- Biscuits for infants 2 samples
- Infant formula 6 samples + 1 composite of 6
- Fruit-based infant food 11 samples
- Vegetable/meat infant food 12 samples
- Cereal-based infant food 6 samples
- Juices for infants and young children 3 samples

The 41 samples were analysed for a total of 366 pesticide residues as detailed in Table 1. All pesticides for which more stringent legislation comes into force in March 2005 were also included in the survey. The sampling phase was carried out in August, 2003, and the analytical phase from September to December, 2003. Samples were analysed by Eurofins/Labor Specht & Partner in Germany under contract to FSAI. The majority of compounds were analysed as part of an accredited Multi Residue Method, the remainder were analysed using accredited Group Specific or Single Residue Methods. The specific chromatographic method of analysis and limit of quantitation (LOQ) of each pesticide is also provided in Table 1. In excess of 90% of the 366 pesticides sought in the samples analysed could be controlled at the MRL of 0.01mg/kg.

Table 1 Pesticides included in survey⁴

Group OC (Organochlorine Pesticides), Methodology: GC/ECD

Compound	LOQ (ppm)	Compound	LOQ (ppm)
2.3.4.6-Tetrachloranisol	0.001	Heptachlor	0.001
Aclonifen	0.005	Hexachlorbenzol	0.001
Aldrin	0.001	Hexaflumuron	0.01
alpha-Chlordan	0.001	loxynil-octanoat	0.001
alpha-Endosulfan	0.001	Isobenzan	0.001
alpha-HCH	0.001	Isodrin	0.001
Benfluralin	0.001	Isopropalin	0.002
Benzoylprop-ethyl	0.005	Lindane (gamma HCH)	0.001
beta-Endosulfan	0.001	Methoxychlor	0.005
beta-HCH	0.002	Mirex	0.001
Binapacryl	0.005	Nitrapyrin	0.002
Bromoxynil-octanoat	0.002	Nitrofen	0.002
Chlorfenapyr	0.005	o,p'-DDD	0.002
Chlorfenprop-methyl	0.005	o,p'-DDE	0.002
Chlorfenson	0.005	o,p'-DDT	0.002
Chloroneb	0.01	Octachlorstyrol	0.001
Chlorthal-dimethyl	0.001	Oxychlordan	0.001
Chlorthalonil	0.005	p,p'-DDD	0.002
cis-Heptachlorepoxid	0.001	p,p'-DDE	0.001
delta-HCH	0.002	p,p'-DDT	0.001
delta-Ketoendrin	0.005	p,p'-Dicofol	0.005
Dichlobenil	0.002	Pendimethalin	0.002
Dicloran	0.001	Pentachloranilin	0.001
Dieldrin	0.001	Pentachloranisol	0.001
Dienochlor	0.005	Plifenate	0.001
Dinitramin	0.002	Polychlorterpene (Camphechlor)	0.04
Dinobuton	0.005	Profluralin	0.001
Endosulfansulfat	0.002	Quintozen	0.001
Endrin	0.002	S 421, Octachlordipropylether	0.005
epsilon-HCH	0.002	Tecnazen	0.001
Ethalfuralin	0.002	Tetradifon	0.002
Etridiazol	0.002	Tetrasul	0.005
Fenson	0.005	trans-Heptachlorepoxid	0.001
Flubenzimin	0.002	trans-Nonachlor	0.001
Fluchloralin	0.002	Triallat	0.005
Flumetralin	0.002	Trichloronat	0.002
gamma-Chlordan	0.001	Trifluralin	0.001
Genite	0.005		

⁴ grouped according to Multi Residue screen used

Group OC3 Organochlorine Pesticides, Methodology: GC/LCD

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Bifenox	0.005	Indoxacarb	0.005
Brompropylat	0.005	Iprodion	0.01
Captafol	0.005	Kresoxim-Methyl	0.005
Captan	0.005	Metribuzin	0.01
Chlorbenzilat	0.01	Nitralin	0.002
Chlorpropylat	0.01	Oxadiazon	0.005
Chlozolinat	0.005	Picolinafen	0.01
Dichlofluanid	0.005	Picoxystrobin	0.005
Diflufenican	0.005	Procymidon	0.01
Famoxadone	0.01	Propyzamid	0.01
Fipronil	0.005	Tolyfluanid	0.005
Fluorochloridon	0.005	Trifloxystrobin	0.005
Folpet	0.01	Vinclozolin	0.005

Group LC OP (Organophosphorus Pesticides), Methodology LC/MS-MS

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Cadusafos	0.001	Fensulfothion-PO-sulfon	0.001
Demeton-S-methyl	0.001	Fensulfothion-PO-sulfoxid	0.001
Demeton-S-methylsulfon	0.001	Fensulfothion-PS- sulfon	0.001
Disulfoton	0.001	Ometoat	0.001
Disulfoton-sulfon(PS)	0.001	Oxydemeton-methyl	0.001
Disulfoton-sulfoxid (PS)	0.001	Terbufos	0.001
Ethoprophos	0.001	Terbufos-sulfon	0.001
Fensulfothion	0.001	Terbufos-sulfoxid	0.001

Group PY (Pyrethroid Pesticides), Methodology GC/ECD

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Acrinathrin	0.01	Fenvalerat (RS- u. SR-Isomere)	0.005
Bifenthrin	0.01	Flucythrinate	0.01
Cyfluthrin	0.01	Halfenprox	0.01
Cypermethrin	0.01	lambda-Cyhalothrin	0.005
Cyphenothrin	0.01	Permethrin	0.01
Deltamethrin	0.01	tau-Fluvalinat	0.01
Fenfluthrin	0.005	Tefluthrin	0.005
Fenpropathrin	0.005	Transfluthrin	0.005
Fenvalerat (RR- u. SS-Isomere)	0.005		

Group OP (Organophosphorus Pesticides), Methodology: GC/FPD

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Acephat	0.01	Isocarbofos	0.01
Amidothion	0.01	Isofenphos	0.01
Azinphos-ethyl	0.02	Isoxathion	0.02
Azinphos-methyl	0.01	Jodfenphos	0.01
Bomyl	0.01	Leptophos	0.02
Bromfenvinphos	0.01	Malaoxon	0.01
Bromophos (-methyl)	0.01	Malathion	0.01
Bromophos-ethyl	0.01	Mecarbam	0.01
Cadusafos	0.01	Mephosfolan	0.01
Carbophenothion (-ethyl)	0.01	Methacrifos	0.01
Carbophenothion-methyl	0.01	Methamidophos	0.01
Chlorfenvinphos	0.01	Methidathion	0.01
Chlormephos	0.01	Mevinphos	0.01
Chlorpyrifos (-ethyl)	0.01	Monocrotophos	0.01
Chlorpyrifos-methyl	0.01	Morphothion	0.02
Chlorthion	0.01	N-Desethyl-pirimiphos-methyl	0.01
Chlorthiophos	0.01	Omethoat	0.01
Coumaphos	0.03	Oxydemeton-methyl	0.01
Crufomat	0.01	Paraoxon	0.01
Cyanofenphos	0.02	Paraoxon-methyl	0.01
Cyanophos	0.01	Parathion	0.01
Demeton-S-methyl	0.01	Parathion-methyl	0.01
Demeton-S-methyl-sulfon	0.01	Phenkapton	0.02
Diazinon	0.01	Phenthoat	0.01
Dicapthon	0.01	Phorat	0.01
Dichlofenthion	0.01	Phorat-sulfon	0.01
Dichlorvos	0.01	Phosalon	0.01
Dicrotophos	0.01	Phosfolan	0.01
Dimefox	0.01	Phosmet	0.02
Dimethoat	0.01	Phosphamidon	0.01
Dioxabenzofos (Salithion)	0.01	Pirimiphos-ethyl	0.01
Dioxathion	0.01	Pirimiphos-methyl	0.01
Disulfoton	0.01	Pirimithat	0.01
Disulfoton-PS-sulfon	0.01	Profenofos	0.01
Ditalimfos	0.01	Propetamphos	0.01
Edifenphos	0.02	Prothiophos	0.01
EPN	0.02	Prothoat	0.01
Ethion	0.01	Pyraclophos	0.02
Ethoprophos	0.01	Pyrazophos	0.02
Etrimfos	0.01	Pyridaphenthion	0.01
Famophos	0.02	Quinalphos	0.01
Fenamiphos	0.01	Quintiophos	0.01

Group OP continued (Organophosphorus Pesticides), Methodology: GC/FPD

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Fenclorphos	0.01	Sulfotep	0.01
Fenitrothion	0.01	Sulprofos	0.02
Fensulfothion	0.01	TEPP	0.01
Fensulfothion-PO-sulfon	0.03	Terbufos	0.01
Fenthion	0.01	Tetrachlorvinphos	0.01
Fenthion-PO-sulfon	0.02	Thiometon	0.01
Fenthion-PS-sulfon	0.02	Thionazin	0.01
Fonofos	0.01	Tolclofosmethyl	0.01
Formothion	0.01	Triamiphos	0.02
Fosthietan	0.01	Triazophos	0.01
Heptenophos	0.01	Trichlorfon	0.03
Iprobenfos (IBP)	0.01	Trichloronat	0.01

Group CARB (Benzimidazole-fungicides), Methodology LC/MS-MS

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Benomyl/Carbendazim	0.005	Thiabendazol	0.01

Group LC1, Methodology LC/MS-MS

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Carbofuran	0.01	Imidacloprid	0.01
Chloridazon	0.01	Lufenuron	0.01
Desmedipham	0.01	Metamitron	0.01
Ethofumesat	0.01	Methiocarb	0.01
Fenhexamid	0.01	Methomyl	0.01
Fenpyroximat	0.01	Phenmedipham	0.01
Hexythiazox	0.01	Phenmedipham	0.01

Group NPD, Methodology LC/MS-MS

Compound	LOQ (ppm)	Compound	LOQ (ppm)
Cymoxanil	0.02	Prochloraz (without metabolites)	0.01
Difenoconazol	0.02	Tebufenozid	0.05
Dimethomorph	0.05	Tebufenpyrad	0.01

Group ON/MS 3&4 (N-containing pesticides), Methodology GC/MSD

Compound	LOQ (ppm)	Compound	LOQ (ppm)
2-Phenylphenol	0.01	Triadimefon	0.01
Alachlor	0.01	Triadimenol	0.01
Bitertanol	0.01	Vinclozolin	0.01
Brompropylat	0.01	Aclonifen	0.01
Bupirimat	0.01	Azoxystrobin	0.01
Carbaryl	0.01	Bromuconazol	0.01
Carbofuran	0.01	Chlozolate	0.01
Chlorbenzilal/Chlorpropylat	0.01	Climbazol	0.01
Chlorpropham	0.01	Clodinafop-propargyl	0.01
Cyproconazol	0.01	Clomazone	0.01
Dichlobenil	0.01	Cycloat	0.01
Dichlofluanid	0.01	Cyprodinil	0.01
Diflubenzuron	0.01	Diclobutrazol	0.01
Diphenyl	0.01	Diethofencarb	0.01
Diphenylamin	0.01	Diflufenican	0.01
Diuron	0.01	Diniconazol	0.01
Ethofenprox	0.01	Epoxiconazol	0.01
Fenarimol	0.01	EPTC	0.01
Fenpropimorph	0.01	Etaconazol	0.01
Fluazifop-P-butyl	0.01	Etoxazol	0.01
Flusilazol	0.01	Fenbuconazol	0.01
Imazalil	0.01	Fludioxonil	0.01
Iprodion	0.01	Fluotrimazol	0.01
Lenacil	0.01	Fluquinconazol	0.01
Metalaxyl	0.01	Iprovalicarb	0.01
Myclobutanil	0.01	Isoproc carb	0.01
Oxadiazon	0.01	Kresoxim-methyl	0.01
Oxadixyl	0.01	Landrin	0.01
Penconazol	0.01	Metamitron	0.01
Pendimethalin	0.01	Metazachlor	0.01
Piperonylbutoxid	0.01	Metconazol	0.01
Pirimicarb	0.01	Napropamid	0.01
Procymidon	0.01	Norflurazon	0.01
Propachlor	0.01	Nuarimol	0.01
Propargit	0.01	Paclobutrazol	0.01
Propham	0.01	Prosulfocarb	0.01
Propiconazol	0.01	Pyridaben	0.01
Propoxur	0.01	Pyrifenox	0.01
Propyzamid	0.01	Pyriproxyfen	0.01
Pyrimethanil	0.01	Quinoxifen	0.01
Tebuconazol	0.01	Tebutam	0.01
Teflubenzuron	0.01	Terbacil	0.01
Tetradifon	0.01	Terbumeton	0.01
Thiabendazol	0.01	Tetraconazol	0.01
Tolyfluanid	0.01	Uniconazol	0.01

Group PHENOXY (Phenoxycarboxylic acids and other acid compounds), Methodology GC/MSD

Compound	LOQ	Compound	LOQ
1-Naphthyleessigsäure	0.01	Fluazifop	0.01
2,4,5-T	0.01	Fluroxypyr	0.01
2,4-D	0.01	Haloxypop	0.01
2,4-DB	0.01	loxynil	0.01
2-Naphtoxyessigsäure	0.01	MCPA	0.01
Bentazon	0.01	MCPB	0.01
Bromoxynil	0.01	Mecoprop	0.01
Chloramben	0.01	Picloram	0.01
Clopyralid	0.01	Quinmerac	0.01
Dicamba	0.01	Quizalofop-P	0.02
Dichlorprop	0.01	Triclopyr	0.01
Diclofop-methyl	0.01		

Group ETU (Ethylentiourea/Propylenethiourea), Methodology LC/MS-MS

Compound	LOQ	Compound	LOQ
ETU	0.01	PTU	0.01

Group CHLORMEQUAT, Methodology LC/MS-MS

Compound	LOQ
Chlormequat	0.005

Group FENTIN (Organotin compounds,) Methodology GC/MSD

Compound	LOQ	Compound	LOQ
Azocyclotin / Cyhexatin	0.02 / 0.01	Fentinacetat	0.01
Fenbutatin-oxid	0.01		

Group PCB (Polychlorinated Biphenyls, "Marker PCBs"), Methodology GC/ECD

Compound	LOQ	Compound	LOQ
PCB 101	0.005	PCB 180	0.005
PCB 118	0.005	PCB 28	0.005
PCB 138	0.005	PCB 52	0.005
PCB 153	0.005		

These are not considered pesticides but are included in the OC screen

Although the very low limits laid down for the majority of pesticides to which more stringent limits will apply from March 2005, could be achieved analytically, for a small number the methodology was not sufficiently sensitive, as shown in Table 2.

Table 2 Pesticides which could not be analysed at the level of interest

Specific maximum residue levels of pesticides or metabolites of pesticides	MRL (mg/kg)	LOQ at analysis
Cadusafos	0.006	0.010
Fipronil (sum of fipronil and fipronil-desulfinyl, expressed as fipronil)	0.004	0.005
Propineb/propylenethiourea (sum of propineb and propylenethiourea)	0.006	0.010

Pesticides which should not be present in infant food production	MRL (mg/kg) at which pesticide is deemed not to be present	LOQ at analysis
Disulfoton	0.003	0.01
Fensulfothion	0.003	0.01
Haloxfop	0.003	0.01
Terbufos	0.003	0.01

Results

The results obtained showed good compliance with the existing legislation on pesticide residues in baby food or legislation that will come into force March 2005 (see Table 3). Of the 41 samples tested for 366 pesticide compounds, representing 15006 individual results, a total of 5 positive results for the presence of residues were obtained. The residues detected were dieldrin, piperonylbutoxide and o-phenylphenol and their presence in the samples concerned was confirmed by repeat analysis. The levels of dieldrin and piperonylbutoxide were below the limits set in the legislation, while the levels of o-phenylphenol detected in 3 samples were above the relevant limit. Further details of these findings are as follows:

Dieldrin, a persistent organochlorine pesticide, was found in a pumpkin, swede and lamb baby dinner at a level of 0.001 ppm. This is below the current level of 0.003 ppm at which the compound is deemed not present. It is most likely that it was contained in the meat component of the dish, as organochlorine compounds are usually stored in fatty tissue.

Piperonylbutoxide, a synergist used to enhance the activity of pyrethrin insecticides and considered to be a pesticide under Directive 91/414, was found in an apple and strawberry pudding at levels of 0.005 ppm. This level is below the level of 0.01 ppm established in the legislation.

o-Phenylphenol was detected in three products, a mixed fruit pudding, a banana pudding and a mixed cereal product, at levels ranging from 0.022 ppm to 0.037 ppm. o-Phenylphenol is a chemical which has a number of different functions. It is used as a post harvest treatment fungicide, in which case it is regarded as a plant protection product (pesticide), but it is also used as a preservative in a variety of end-uses.

Following its detection at levels above the maximum level of 0.01 ppm established in Directive 96/5/EC on processed cereal-based foods and baby foods for infants and young children, at the request of the FSAI the manufacturers concerned carried out extensive investigations into the possible source of the chemical in the three products concerned. o-Phenylphenol is currently an approved food additive (preservative) under Regulation 95/2/EC on food additives other than colours and sweeteners but is not used for this purpose in foods for infants and young children. One possible source identified was the packaging materials used in the products, which were all dried products supplied in packages for reconstitution before use. European Union Legislation governing food contact materials is based on Directive 89/109/EEC, and SI 307 of 1991. The use of o-phenyl phenol in food contact material is permitted provided the level of migration into the foods is below any level that would endanger human health or cause an unacceptable change in the composition. o-Phenylphenol is listed in the Council of

Europe category of 'Additives approved by Partial Agreement in member states', although it has not yet been evaluated for such use by the Council of Europe.

The investigations carried out by industry showed that the packaging was the source of the residue, the specific source being an adhesive used to bond layers of the packaging together. The packaging used was of a particular type used in a small number of countries only, including Ireland, and testing showed that detectable residues of o-phenylphenol were present in a range of products contained in this packaging, in addition to the products tested by the FSAI. o-Phenylphenol was undetectable in similar products packed in alternative packaging which do not use this adhesive and was also undetectable in the raw materials used to manufacture the products giving the positive results. The manufacturers have now ceased to use the packaging in question.

These investigations showed that the presence of residues of o-phenylphenol was not due to the use of pesticides on any of the raw materials/food commodities used in the manufacture of these products. Such use of pesticides is not anticipated, since manufacturers of infant formulae, cereal-based foods and baby foods for infants and young children have to source starting materials which have been produced without the use of pesticides, in order to meet the stringent specifications laid down in Directives 91/321/EEC and 96/5/EC, as amended. Rather, the presence of residues of the compound was due to its use in the food contact material (packaging) used for the products in question.

While levels of the substance present in the products were in excess of the 0.01 ppm limit laid down had the substance been used as a pesticide, they are still very low. JECFA (the World Health Organisation Joint Expert Committee on Food Additives) has established an Acceptable Daily Intake (ADI) of 0 – 0.4 mg/kg body weight per day for o-phenylphenol when used as a food additive. Given the levels of 0.022 ppm to 0.037 ppm found in the products in question, a 10 kg baby would have to eat in excess of 100 kg of the product to exceed this ADI.

FSAI therefore concludes that the levels of this substance and the other two pesticides found in the products concerned presented no risk to infants and young children. In the case of o-phenylphenol, the industry concerned has ceased to use the packaging material that gave rise to the problem, and FSAI is satisfied that all necessary steps have been taken to ensure legal compliance with the requirements of S.I. 242 of 2004 and S.I. 142 of 2000 as they relate to levels of pesticides.

Overall, FSAI is very satisfied with the results of this survey, showing that a range of different baby food products were in compliance with the stringent legislation on pesticide residues in such products. FSAI will continue to monitor such products for pesticide residues and other chemical contaminants, in order to safeguard the health of Irish children.

Table 3 Levels of pesticide residues detected in infant food samples

Type		dilution factor (water)	OC/OP screen	LC-OP screen	Py screen	Carb screen	LC screen	NPD screen
Biscuits								
Biscuits			nd	nd	nd	nd	nd	nd
Biscuits			nd	nd	nd	nd	nd	nd
Juices (main ingredients)								
Apple and pear juice			nd	nd	nd	nd	nd	nd
Apple and blackcurrant fruit juice			nd	nd	nd	nd	nd	nd
Berry juice			nd	nd	nd	nd	nd	nd
Fruit based foods (main ingredients):								
Apple and peach			nd	nd	nd	nd	nd	nd
Apple and mango			nd	nd	nd	nd	nd	nd
Mixed fruit		4.0	nd	nd	nd	nd	nd	nd
Apple and strawberry pudding	organic		nd	nd	nd	nd	nd	nd
Banana and peach	organic		nd	nd	nd	nd	nd	nd
Apple, mango and banana			nd	nd	nd	nd	nd	nd
Raspberry and pear			nd	nd	nd	nd	nd	nd
Mixed fruits		4.0	nd	nd	nd	nd	nd	nd
Banana		4.0	nd	nd	nd	nd	nd	nd
Pineapple and melon			nd	nd	nd	nd	nd	nd
Apricot and apple	organic		nd	nd	nd	nd	nd	nd
Vegetable and meat based food (main ingredients)								
Vegetable and chicken		4.0	nd	nd	nd	nd	nd	nd
Cauliflower ,broccoli and cheese		4.8	nd	nd	nd	nd	nd	nd
Carrot, parsnip with chicken			nd	nd	nd	nd	nd	nd
Vegetable and chicken		4.0	nd	nd	nd	nd	nd	nd
Vegetables and lamb	organic		nd	nd	nd	nd	nd	nd
Vegetables with turkey	organic		nd	nd	nd	nd	nd	nd
Shepherds pie with lamb		4.0	nd	nd	nd	nd	nd	nd
Pumpkin, swede and lamb			Dieldrin: 0.001	nd	nd	nd	nd	nd

Table 3 (cont.) Levels of pesticide residues detected in infant food samples

Type		dilution factor (water)	OC/OP screen	LC-OP screen	Py screen	Carb screen	LC screen	NPD screen
Lamb		4.0	nd	nd	nd	nd	nd	nd
Carrots and chicken			nd	nd	nd	nd	nd	nd
Apple and pork			nd	nd	nd	nd	nd	nd
Vegetable and lamb casserole	organic		nd	nd	nd	nd	nd	nd
Cereal based foods								
Breakfast cereal		4.0	nd	nd	nd	nd	nd	nd
Breakfast oat porridge		4.0	nd	nd	nd	nd	nd	nd
Fruit muesli			nd	nd	nd	nd	nd	nd
Mixed cereals		4.0	nd	nd	nd	nd	nd	nd
Apple and mixed cereal	organic		nd	nd	nd	nd	nd	nd
Baby rice		7(milk)	nd	nd	nd	nd	nd	nd
Milks								
Infant formula		7.7	nd	nd	nd	na	na	na
Infant formula		7.6	nd	nd	nd	na	na	na
Infant formula		7.4	nd	nd	nd	na	na	na
Soy Infant formula		7.7	nd	nd	nd	na	na	na
Infant formula		7.4	nd	nd	nd	na	na	na
Infant formula	organic	7.3	nd	nd	nd	na	na	na
Mixed milk sample: composite		composite of 6	nd	nd	nd	nd	nd	nd

Table 3 (cont.) Levels of pesticide residues detected in infant food samples

Type		dilution factor (water)	ETU	ON 3&4	Phenoxy	Chlor-mequat	Fentin
Biscuits							
Biscuits			nd	nd	nd	nd	nd
Biscuits			nd	nd	nd	nd	nd
Juices (main ingredients)							
Apple and pear juice			nd	nd	nd	nd	nd
Apple and blackcurrant fruit juice			nd	nd	nd	nd	nd
Berry juice			nd	nd	nd	nd	nd
Fruit based foods (main ingredients):							
Apple and peach			nd	nd	nd	nd	nd
Apple and mango			nd	nd	nd	nd	nd
Mixed fruit		4.0	nd	o-Phenylphenol: 0.022	nd	nd	nd
Apple and strawberry pudding	organic		nd	Piperonylbutoxide: 0.005	nd	nd	nd
Banana and peach	organic		nd	nd	nd	nd	nd
Apple, mango and banana			nd	nd	nd	nd	nd
Raspberry and pear			nd	nd	nd	nd	nd
Mixed fruits		4.0	nd	nd	nd	nd	nd
Banana		4.0	nd	o-Phenylphenol: 0.037	nd	nd	nd
Pineapple and melon			nd	nd	nd	nd	nd
Apricot and apple	organic		nd	nd	nd	nd	nd
Vegetable and meat based food (main ingredients)							
Vegetable and chicken		4.0	nd	nd	nd	nd	nd
Cauliflower, broccoli and cheese		4.8	nd	nd	nd	nd	nd
Carrot, parsnip with chicken			nd	nd	nd	nd	nd
Vegetable and chicken		4.0	nd	nd	nd	nd	nd
Vegetables and lamb	organic		nd	nd	nd	nd	nd
Vegetables with turkey	organic		nd	nd	nd	nd	nd
Shepherds pie with lamb		4.0	nd	nd	nd	nd	nd
Pumpkin, swede and lamb			nd	nd	nd	nd	nd

Table 3 (cont.) Levels of pesticide residues detected in infant food samples

Type		dilution factor (water)	ETU	ON 3&4	Phenoxy	Chlor-mequat	Fentin
Lamb		4.0	nd	nd	nd	nd	nd
Carrots and chicken			nd	nd	nd	nd	nd
Apple and pork			nd	nd	nd	nd	nd
Vegetable and lamb casserole	organic		nd	nd	nd	nd	nd
Cereal based foods							
Breakfast cereal		4.0	nd	nd	nd	nd	nd
Breakfast oat porridge		4.0	nd	nd	nd	nd	nd
Fruit muesli			nd	nd	nd	nd	nd
Mixed cereals		4.0	nd	o-Phenylphenol: 0.032	nd	nd	nd
Apple and mixed cereal	organic		nd	nd	nd	nd	nd
Baby rice		7(milk)	nd	nd	nd	nd	nd
Milks							
Infant formula		7.7	na	na	na	na	na
Infant formula		7.6	na	na	na	na	na
Infant formula		7.4	na	na	na	na	na
Soy Infant formula		7.7	na	na	na	na	na
Infant formula		7.4	na	na	na	na	na
Infant formula	organic	7.3	na	na	na	na	na
Mixed milk sample: composite		composite of 6	nd	nd	nd	nd	nd

Annex

Pesticides which shall not be present in infant formulae, follow-on formulae and processed cereal-based foods and baby foods for infants and young children or for which specific MRLs have been set.

Table 4 Pesticides which shall not be present* in infant formulae, follow-on formulae and processed cereal-based foods and baby foods for infants and young children

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- Disulfoton (sum of disulfoton, disulfoton sulfoxide and disulfoton sulfone expressed as disulfoton)
 - Fensulfothion (sum of fensulfothion, its oxygen analogue and their sulfones, expressed as fensulfothion)
 - Fentin expressed as triphenyltin cation
 - Haloxyfop (sum of haloxyfop, its salts and esters including conjugates, expressed as haloxyfop)
 - Heptachlor and trans-heptachlor epoxide, expressed as heptachlor
 - Hexachlorobenzene
 - Nitrofen
 - Omethoate
 - Terbufos (sum of terbufos, its sulfoxide and sulfone, expressed as terbufos)
 - Aldrin and dieldrin, expressed as dieldrin
 - Endrin
-

* Pesticides are considered not to be present if their residues do not exceed a level of 0.003 mg/kg. This level, which is considered to be the limit of quantification of the analytical method, will be kept under regular review in the light of technical progress.

Table 5 Pesticides to which a specific maximum residue level applies

Specific maximum residue levels of pesticides or metabolites of pesticides	MRL (mg/kg)
Cadusafos	0.006
Demeton-S-methyl/demeton-S-methyl, sulfone/oxydemeton-methyl (individually or combined, expressed as demeton-S-methyl)	0.006
Ethoprophos	0.008
Fipronil (sum of fipronil and fipronil-desulfinyl, expressed as fipronil)	0.004
Propineb/propylenethiourea (sum of propineb and propylenethiourea)	0.006
