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Investigation into levels of Cadmium and Lead in Herbal Food Supplements Available on the Irish Market

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SUMMARY

The Food Safety Authority of Ireland (FSAI) in collaboration with the Health Service Executive Public Analyst Laboratory, Cork, has carried out a study of levels of lead and cadmium in herbal food supplements available on the Irish market. The study was undertaken as a result of surveillance activities in a number of Member States in recent years, which identified high levels of these heavy metal contaminants in certain food supplements. As a consequence of these reports, maximum levels for lead and cadmium in food supplements were established in 2008 via Commission Regulation No 1881/2006 and the amending Regulation 629/2008, which set maximum levels for certain contaminants in foodstuffs. The aim of the study was to compare the levels of these metals found in food supplements on the Irish market with the legislative requirements.

A total of 50 dietary herbal supplements, purchased at retail outlets ("off the shelf") in Dublin in 2008 were analysed in this study. The results showed that with the exception of one sample, the food supplements analysed in the study were below the maximum levels of 3 mg lead/kg and 1 mg cadmium/kg established via the legislation for the products as sold.

For lead, the levels measured in fourteen of the 50 samples (28%) were below the Limit of Detection (LOD) of 0.1 mg/g, while a further twenty three samples (46%) contained greater than 0.1 mg/kg but less than 1 mg/kg lead. Eight samples contained between 1 and 2 mg/kg lead (16%) while four samples (8%) had levels lying in the range of 2-3 mg lead/kg.

One sample, a sample of Butcher's Broom with Rosemary Oil, had lead levels in excess of the maximum level of 3 mg/kg, at a level of 4.27 mg lead/kg. However, since this sample had been placed on the market before the application date of the legislation of July 1, 2008, it was deemed to be satisfactory rather than non-compliant and no enforcement action was taken. However, future non-compliances of food supplements with the requirements of Regulation 629/2008 will be monitored and addressed under official control programmes of sampling/inspection.

None of the samples exceeded the maximum level for cadmium in food supplements, of 1 mg/kg. The levels in thirty three of the 50 samples (66%) were below the Limit of Detection (LOD) of 0.05 mg/g, while a further sixteen samples (32%) contained greater than 0.05 mg/kg but less than 0.5 mg/kg cadmium. Only one sample, organic spirulina, had a level greater than 0.5 mg/kg, at 0.6 mg cadmium/kg, but this sample was still well below the limit of 1.0 mg/kg.

Overall, the FSAI concludes that herbal food supplements on the Irish market contain low amounts of lead and cadmium, and that the levels detected do not cause concern. The FSAI considers that the contribution of herbal food supplements to dietary lead and cadmium exposure of the Irish population is likely to be very low.

INTRODUCTION

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 order to achieve this aim, the FSAI *inter alia* coordinates the collation of food safety surveillance information from laboratories run by the official agencies, the Health Service Executive, the Department of Agriculture, Fisheries and Food, the Marine Institute, the Sea Fisheries Protection Authority (SFPA) and the local authorities. The FSAI also conducts targeted food safety surveillance in areas where potential safety issues have been identified.

Surveillance activities in a number of Member States in recent years have identified high levels of the heavy metals lead, cadmium and mercury in certain food supplements. Consumption of such food supplements may contribute to human exposure to these metals, and a number of these products were therefore removed from sale in individual Member States. The results were also notified through the Rapid Alert System for Food and Feed (RASFF), leading to a heightened awareness of heavy metal contamination of food supplements. In turn this led to the establishment, in 2008, of maximum levels for lead, cadmium and mercury in food supplements. These maximum levels are as low as reasonably achievable (ALARA) based upon good manufacturing practices.

Against this background the FSAI undertook a targeted surveillance study on levels of cadmium and lead, but not mercury, in herbal food supplements available on the Irish market in 2008 in order to compare the levels found with legislative requirements introduced by Commission Regulation (EC) No. 629/2008 in July 2008. The results of this study are now reported.

EXPOSURE TO LEAD AND CADMIUM VIA FOOD, OVERVIEW OF EFFECTS ON HEALTH

1. Lead

Exposure to Lead

Consumption of food containing low levels of lead is a major source of exposure for the general population. Lead contamination of food arises as a result of environmental and industrial emissions and the now discontinued use of leaded petrol. Data from the EU Scientific Cooperation (SCOOP) Task report on heavy metals (SCOOP, 2004) showed that levels of lead in most commonly consumed foodstuffs are generally low. However lead can accumulate in fish and shellfish and in addition can be found at higher levels in the offal (liver and kidney) of food animals. Consumers with diets rich in these foods may therefore be exposed to an unacceptable level of lead. A further source of lead in the diet is food containers incorporating lead, e.g. storage in lead-soldered cans, ceramic vessels with lead glazes and leaded crystal glass. The latter is however strictly regulated under EU legislation related to food contact materials. Finally, the past use of lead as a material for water pipes in many older houses may result in unacceptably high levels of lead in water supplies. The 1998 Drinking Water Directive, in line with World Health Organization recommendations, sets a revised limit of 10 µg/l for lead in drinking water.

A scientific opinion of the European Food Safety Authority (EFSA) on the possible health risks related to the presence of lead in food provided a detailed exposure assessment to lead in the diet (EFSA, 2010). Overall, cereals, vegetables and tap water were the most important contributors to lead exposure in the general European population, given the relatively high consumption of these foodstuffs as part of a normal diet. More specifically, the following food groups were identified as the major contributors to lead exposure: cereal products, potatoes, cereal grains (except rice), cereal-based mixed dishes and leafy vegetables and tap water.

Surveillance activities in a number of Member States in recent years have shown high levels of lead in certain food supplements, particularly algae-based food supplements, and these products represent an additional, relatively small but previously unrecognised source of exposure to lead.

Health Effects of Lead

While exposure to lead at high levels (such as in occupational settings) can result in a variety of adverse health effects, the low levels of lead found in food are not likely to result in such effects in adult consumers. The most critical effect of low level lead exposure is however on intellectual development in young children. Lead crosses the placental barrier and accumulates in the foetus. Infants and young children are more vulnerable than adults to the toxic effects of lead, and they also absorb lead more readily. In April 2010, the European Food Safety Authority (EFSA) published a scientific opinion on possible health risks related to the presence of lead in food (EFSA, 2010). The EFSA Expert Panel on contaminants (CONTAM Panel) identified reduced intelligence quotient (IQ) levels in young children and high blood pressure in adults as the key health effects on which to base its assessment. Following a review of the available data, the Panel considered that the previous Provisional Tolerable Weekly Intake (PTWI) for lead of 25 µg/kg body weight (bw) set by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and endorsed by the Scientific Committee of Food was no longer appropriate. The CONTAM Panel was unable to establish a new guidance level, as they considered that there was no clear threshold below which they were confident that adverse effects would not occur. The Panel concluded that current levels of exposure to lead in food pose a low to negligible health risk for most adults but there is potential concern over possible neurodevelopmental effects in young children. In order to protect this vulnerable population, EU legislation imposes stringent limits for lead in key foodstuffs.

2. Cadmium

Exposure to Cadmium

Cadmium is present at low levels in most foods, with commodities such as cereals, fruit, vegetables, meat and fish making the largest contribution to dietary exposure, given the fact that they are also the foodstuffs consumed in largest amounts. Highest levels of cadmium are found in the offal (kidney and liver) of mammals and in mussels, oysters and scallops. Certain wild mushrooms may also contain high levels, as can rice grown in certain geological areas where the soil is rich in cadmium. Cadmium is relatively poorly absorbed into the body, but once absorbed is slowly excreted, like other metals, and accumulates in the kidney causing damage. The kidney of food animals is a major source of cadmium in the diet although lower levels are found in many foods.

Health Effects of Cadmium

The principal toxic effect of cadmium is its toxicity to the kidney, although it has also been associated with lung damage and development of lung tumours and skeletal changes in occupationally exposed populations. In March 2009 the European Food Safety Authority (EFSA) published a scientific opinion on possible health risks related to the presence of cadmium in food (EFSA, 2009). The EFSA Expert Panel on contaminants (CONTAM Panel) identified damage to the kidney as the key health effect on which to base its assessment. The CONTAM Panel established a tolerable weekly intake (TWI) for cadmium of 2.5 µg/kg bw and concluded that the mean exposure for adults across Europe is close to, or slightly exceeding, this TWI, based on the available data on cadmium levels in food. They noted that subgroups such as vegetarians, children, smokers and people living in highly contaminated areas may exceed the TWI by about 2-fold. Although the CONTAM Panel considered that the risk for adverse effects on kidney function at an individual level at dietary exposures across Europe is very low, they concluded that the current exposure to cadmium at the population level should be reduced. Against this background, the European Commission is currently reviewing the legislative limits for cadmium in foodstuffs, with a view to lowering the maximum limits in the foodstuffs that contribute most to intake, in order to protect vulnerable groups (e.g. children, vegetarians) who may exceed the new TWI. The FAO/ WHO Joint Expert committee on food additives (JECFA) also recently adopted an opinion on the safety of cadmium (JECFA 2010). Whilst the committee used similar health effects as the basis of the assessment, JECFA established a provisional tolerable monthly intake (PTMI) for cadmium of 25ug/kg bw, which is approximately 2.5 times higher than the level adopted by EFSA. JECFA concluded that exposure to cadmium through the diet for all age groups, including consumers with high exposure and subgroups with special dietary habits (e.g. vegetarians), would be below the PTMI.

LEGISLATION ON LEAD AND CADMIUM IN FOOD

Maximum levels for heavy metals in foodstuffs have been set by Commission Regulation No 1881/2006, the framework EU legislation which sets maximum levels for chemical contaminants in foodstuffs. These Regulations establish maximum levels (MLs) for cadmium and lead in a range of foodstuffs, including food supplements, the MLs for which were introduced via Commission Regulation No 629/2008 and applied from 1st July 2008. It should be noted however that the new MLs, including those for food supplements, did not apply to foodstuffs placed on the market before this date. These Regulations are transposed into national legislation by the European Communities (Certain Contaminants in Foodstuffs) Regulations of 2010, Statutory Instrument No. 219 of 2010. The currently applicable levels for lead in foodstuffs are shown in Table 1, while those for cadmium are shown in Table 2.

Table 1*

Maximum levels for lead in certain foodstuffs established by Commission Regulations No 1881/2006 and No 629/2008

Foodstuffs		Maximum levels (mg/kg wet weight)
3.1	**Lead**	
3.1.1	Raw milk (6), heat-treated milk and milk for the manufacture of milk-based products	0.02
3.1.2	Infant formulae and follow-on formulae (4) (8)	0.02
3.1.3	Meat (excluding offal) of bovine animals, sheep, pig and poultry (6)	0.1
3.1.4	Edible offal of bovine animals, sheep, pig and poultry (6)	0.5
3.1.5	Muscle meat of fish (24) (25)	0.3
3.1.6	Crustaceans, excluding brown meat of crab and excluding head and thorax meat of lobster and similar large crustaceans (*Nephropidae* and *Palinuridae*) (26)	0.5
3.1.7	Bivalve molluscs (26)	1.5
3.1.8	Cephalopods (without viscera) (26)	1.0
3.1.9	Cereals, legumes and pulses	0.2
3.1.10	Vegetables, excluding brassica vegetables, leaf vegetables, fresh herbs and fungi (27). For potatoes the maximum level applies to peeled potatoes	0.1
3.1.11	Brassica vegetables, leaf vegetables and the following fungi (27): *Agaricus bisporus* (common mushroom), *Pleurotus ostreatus* (Oyster mushroom), *Lentinula edodes* (Shiitake mushroom)	0.3
3.1.12	Fruit, excluding berries and small fruit (27):	0.1
3.1.13	Berries and small fruit (27):	0.2
3.1.14	Fats and oils, including milk fat	0.1
3.1.15	Fruit juices, concentrated fruit juices as reconstituted and fruit nectars (14):	0.05
3.1.16	Wine (including sparkling wine, excluding liqueur wine), cider, perry and fruit wine (11)	0.2 (28)
3.1.17	Aromatized wine, aromatized wine-based drinks and aromatized wine-product cocktails (13)	0.2 (28)
3.1.18	Food supplements (**)	3.0

*Table 1 is reproduced from Commission Regulations (EC) No. 1881/2006 and No 629/2008. The references ( ) in the table refer to footnotes in this Regulation and persons intending to use the MLs should refer to the Regulation for further details.

** The maximum level applies to the food supplements as sold.

Table 2*

Maximum levels for cadmium in certain foodstuffs established by Commission Regulations No 1881/2006 and No 629/2008

Foodstuffs		Maximum levels (mg/kg wet weight)
3.2.1	Meat (excluding edible offal) of bovine animals, sheep, pig and poultry (6)	
3.2.2	Horsemeat, excluding offal (6)	0.02
3.2.3	Liver of bovine animals, sheep, pig, poultry and horse (6)	0.02
3.2.4	Kidney of bovine animals, sheep, pig, poultry and horse (6)	0.1
3.2.5	Muscle meat of fish (24) (25), excluding species listed in points 3.2.6, 3.2.7 and 3.2.8	0.5
3.2.6	Muscle meat of the following fish (24) (25): bonito (*Sarda sarda*) common two-banded seabream (*Diplodus vulgaris*) eel (*Anguilla anguilla*) grey mullet (*Mugil labrosus labrosus*) horse mackerel or scad (*Trachurus species*) louvar or luvar (*Luvarus imperialis*) mackerel *(Scomber species)* sardine (*Sardina pilchardus*) sardinops (*Sardinops species*) tuna (*Thunnus species, Euthynnus species, Katsuwonus pelamis*) wedge sole (*Dicologoglossa cuneata*)	0.3
3.2.7	Muscle meat of the following fish (24) (25): bullet tuna *(Auxis species)*	0.2
3.2.8	Muscle meat of the following fish (24) (25): anchovy (*Engraulis species*) swordfish (*Xiphias gladius*)	0.3
3.2.9	Crustaceans, excluding brown meat of crab and excluding head and thorax meat of lobster and similar large crustaceans (*Nephropidae* and *Palinuridae*) (26)	0.5
3.2.10	Bivalve molluscs (26)	1.0
3.2.11	Cephalopods (without viscera) (26)	1.0
3.2.12	Cereals excluding bran, germ, wheat and rice	0.1
3.2.13	Bran, germ, wheat and rice	0.2
3.2.14	Soybeans	0.2
3.2.15	Vegetables and fruit, excluding leaf vegetables, fresh herbs, fungi, stem vegetables, root vegetables and potatoes (27)	0.05
3.2.16	Stem vegetables, root vegetables and potatoes, excluding celeriac (27). For potatoes the maximum level applies to peeled potatoes.	0.1
3.2.17	Leaf vegetables, fresh herbs, celeriac and the following fungi (27): *Agaricus bisporus* (common mushroom), *Pleurotus ostreatus* (Oyster mushroom), *Lentinula edodes* (Shiitake mushroom)	0.2
3.2.18	Fungi, excluding those listed in point 3.2.17 (27)	1.0
3.2.19	Food supplements (**) excl. food supplements listed in point 3.2.20	1.0
3.2.20	Food supplements (**) consisting exclusively or mainly of dried seaweed or of products derived from seaweed	3.0

*Table 2 is reproduced from Commission Regulations (EC) No. 1881/2006 and No 629/2008. The references ( ) in the table refer to footnotes in this Regulation and persons intending to use the MLs should refer to the Regulation for further details.

** The maximum level applies to the food supplements as sold.

As can be seen from Tables 1 and 2, the maximum level for lead in food supplements (as sold) established by Regulation 629/2008 is 3 mg/kg, while that for cadmium is 1 mg/kg, with the exception of food supplements consisting exclusively or mainly of dried seaweed or of products derived from seaweed, where a higher limit of 3 mg/kg was allowed, due to the levels of cadmium found in such products in the surveillance activities carried out by Member States before the Regulation was adopted.

MATERIALS AND METHODS

A total of 50 dietary herbal supplements, as listed in Table 3 in the Annex to this report, were purchased at retail outlets ("off the shelf") in Dublin in 2008. The survey was not intended to be representative of all herbal supplements on the Irish market, but was intended to provide an overview of particular herbal supplements known to potentially contain higher levels of heavy metals. The samples were also taken as part of a survey of irradiation of herbal food supplements, and sampling was therefore multifunctional in nature. Mercury levels in herbal food supplements were not investigated in this study, since at the time of planning of the study it appeared likely that a maximum level for mercury in food supplements would not be set in Regulation 629/2008, as the available data had not indicated specific problems with this metal in supplements. Subsequent to the sampling phase of the study, a maximum level for mercury in food supplements was however introduced.

Samples were sent to the HSE Public Analyst' Laboratory in Cork for analysis. The supplement samples were initially digested with concentrated Nitric Acid and Hydrogen Peroxide using Microwave Acid Digestion. The digests were then analysed for lead and cadmium simultaneously by inductively coupled plasma mass spectrometry (ICP-MS) using cadmium and lead calibration standards. The results obtained for the individual samples were corrected for recovery, which for the majority of samples analysed was 78-79% for lead and 86-94% for cadmium. "Recovery" is the amount of substance being analysed, extracted from the food matrix for analysis, as a fraction of the total amount present in the food. Results were expressed as mg/kg supplement product on an "as sold" basis, and the Limit of Detection (LOD) for the analysis was 0.1 mg/kg for lead and 0.05 mg/kg for cadmium.

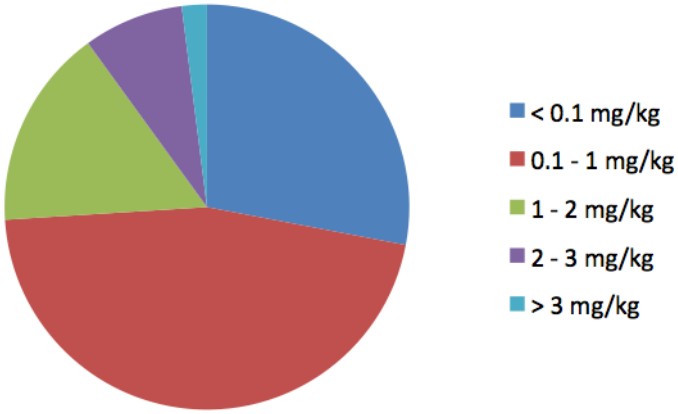
RESULTS

Lead

The results of the analysis of the 50 samples of herbal food supplements for lead are shown in Table 3 in the Annex to this report, and can be compared with the maximum level for lead in food supplements of 3 mg/kg (on an "as sold" basis) established via Commission Regulation (EC) No. 629/2008 in July 2008. It should be noted however that the survey was undertaken to compare the levels of lead and cadmium in these herbal food supplements with the legislative requirements introduced by the Regulation. Since the supplements purchased had all been placed on the market before the application date of 1st July 2008, even where (in one isolated case) a sample was found not to comply with the new limits, this was not regarded as non-compliance. However, future non-compliances of food supplements with the requirements of Regulation 629/2008 will be monitored and addressed under official control programmes of sampling/inspection.

As shown in Table 3 and also in Figure 1, only one sample was above the limit of 3.0 mg/kg, a sample of Butcher's Broom with Rosemary Oil, which contained a level of 4.27 mg lead/kg. The lead levels in fourteen of the 50 samples (28%) were below the Limit of Detection (LOD) of 0.1 mg/g, while a further twenty three samples (46%) contained greater than 0.1 mg/kg but less than 1 mg/kg lead. Eight samples contained between 1 and 2 mg/kg lead (16%) while four samples (8%) had levels lying in the range of 2-3 mg lead/kg.

Figure 1: lead levels in 50 samples of food supplements

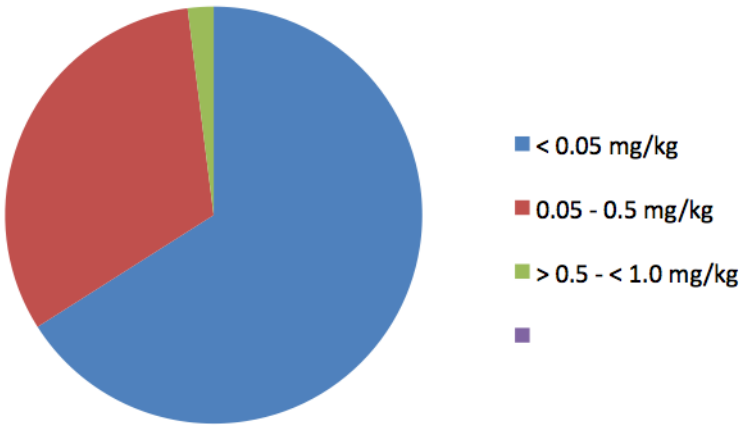


Cadmium

The results of the analysis of the 50 samples of herbal food supplements for cadmium are also shown in Table 3 in the Annex to this report, and can be compared with the maximum limit for cadmium in food supplements of 1 mg/kg (on an "as sold" basis).

As shown in Table 3 and also in Figure 2, none of the samples contained levels of cadmium in excess of the limit of 1.0 mg/kg. The cadmium levels in thirty three of the 50 samples (66%) were below the Limit of Detection (LOD) of 0.05 mg/g, while a further sixteen samples (32%) contained greater than 0.05 mg/kg but less than 0.5 mg/kg cadmium. Only one sample, a sample of organic spirulina, had a level greater than 0.5 mg/kg, at 0.6 mg cadmium/kg, but this sample was still well below the limit of 1.0 mg/kg.

Figure 2: cadmium levels in 50 samples of food supplements



DISCUSSION AND CONCLUSIONS

This surveillance study on levels of lead and cadmium in herbal food supplements available on the Irish market was undertaken in order to compare the levels found with legislative requirements introduced by Commission Regulation (EC) No. 629/2008 in July 2008.

The results obtained for the 50 samples of herbal food supplements analysed in the study show a high degree of compliance with the limits of 3 mg lead/kg and 1 mg cadmium/kg in the products as sold. Only one sample, a sample of Butcher's Broom with Rosemary Oil, had lead levels in excess of the limit of 3 mg/kg, at a level of 4.27 mg lead/kg. However, since this sample had been placed on the market before the application date of the legislation of July 1 2008, it was deemed to be satisfactory rather than non-compliant. However, future non-compliances of food supplements with the requirements of Regulation 629/2008 will be monitored and addressed under official control programmes of sampling/inspection. None of the samples exceeded the limit of 1 mg/kg for cadmium in food supplements.

Overall, the FSAI concludes that herbal food supplements on the Irish market contain low amounts of lead and cadmium, and that the levels observed do not raise concern for human health. The FSAI considers that the contribution of herbal food supplements to dietary lead and cadmium exposure of the Irish population is likely to be very low.

ACKNOWLEDGMENTS

The FSAI wishes to thank the HSE Public Analyst Laboratory in Cork for its work on the analysis of the samples presented in this report and its input into the planning of the survey and the reporting of the results.

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ANNEX

Table 3:
Levels of Cadmium and Lead in Herbal Food Supplements available on the Irish market (2008)

FSAI Code	Product	Result Cadmium mg/kg	Cadmium Recovery[1]	Result Lead mg/kg	Lead Recovery[1]
F Supp. 2008/01	Propolis	< 0.05	94	< 0.1	79
F Supp. 2008/02	Milk thistle	< 0.05	94	0.28	79
F Supp. 2008/03	Saw Palmetto	< 0.05	94	< 0.1	79
F Supp. 2008/04	Dong Quai	< 0.05	94	0.56	79
F Supp. 2008/05	Echinacea	< 0.05	94	0.72	79
F Supp. 2008/06	Ginger root	0.34	94	1.24	79
F Supp. 2008/07	Devil's claw root extract	< 0.05	94	0.29	79
F Supp. 2008/08	Echinacea	< 0.05	94	0.15	79
F Supp. 2008/09	Unique garlic - Higher strength	0.1	94	0.2	79
F Supp. 2008/10	Chondroitin/Glucosamine Complex	< 0.05	94	0.33	79
F Supp. 2008/11	Feverfew leaf extract	0.16	94	0.69	79
F Supp. 2008/12	Valerian root extract	0.17	87.1	1.78	102.6
F Supp. 2008/13	Kyolic Garlic	< 0.05	94	< 0.1	79
F Supp. 2008/14	Butchers broom with rosemary oil	0.15	87.1	4.27	102.6
F Supp. 2008/15	Korean ginseng	< 0.05	94	0.13	79
F Supp. 2008/16	Raspberry leaves	0.19	94	1.6	79
F Supp. 2008/17	Artichoke	0.1	94	0.13	79
F Supp. 2008/18	Turmeric	< 0.05	94	0.34	79
F Supp. 2008/19	Flexiherb	< 0.05	94	0.15	79
F Supp. 2008/20	Echinacea extract	< 0.05	90	0.78	78

[1] "Recovery" is the amount of substance being analysed, extracted from the food matrix for analysis, as a fraction of the total amount present in the food.

F Supp. 2008/21	Aloe vera	< 0.05	86	< 0.1	78
F Supp. 2008/22	Siberian ginseng	0.33	86	2.77	78
F Supp. 2008/23	Echinacea + zinc	< 0.05	86	< 0.1	78
F Supp. 2008/24	Pomegranate	0.19	86	< 0.1	78
F Supp. 2008/25	Amazonian Guarana	< 0.05	86	< 0.1	78
F Supp. 2008/26	Korean ginseng	< 0.05	86	< 0.1	78
F Supp. 2008/27	Glucosamine	< 0.05	86	0.21	78
F Supp. 2008/28	Black cohosh	0.2	87.1	2.76	102.6
F Supp. 2008/29	Frutin - natural minerals, micronized fruit fibres and peppermint oil	< 0.05	86	1.15	78
F Supp. 2008/30	Bee propolis	0.07	86	1	78
F Supp. 2008/31	Green Tea - organically grown	0.08	86	2.89	78
F Supp. 2008/32	Pelargonium	< 0.05	86	< 0.1	78
F Supp. 2008/33	Green tea extract	< 0.05	86	0.2	78
F Supp. 2008/34	Boldex	0.13	86	0.56	78
F Supp. 2008/35	Manchurian ginseng	< 0.05	86	< 0.1	78
F Supp. 2008/36	Green coffee	< 0.05	86	< 0.1	78
F Supp. 2008/37	Concentration Essence	< 0.05	86	< 0.1	78
F Supp. 2008/38	Butchers broom, horse chestnut, vine leaf	< 0.05	86	< 0.1	78
F Supp. 2008/39	Evening primrose oil	< 0.05	86	< 0.1	78
F Supp. 2008/40	Super evening primrose oil	< 0.05	90	0.67	78
F Supp. 2008/41	Echinacea junior	< 0.05	90	0.6	78
F Supp. 2008/42	Aesculus horse chestnut	< 0.05	90	0.23	78
F Supp. 2008/43	Feverfew tanacet	0.06	90	2.37	78
F Supp. 2008/44	Agnus castus, chaste tree	< 0.05	90	0.19	78
F Supp. 2008/45	Concentrated garlic	< 0.05	90	0.61	78
F Supp. 2008/46	Immunec – Vit. C, black elderberry, bilberry, ginger & zinc	0.12	90	0.81	78

F Supp. 2008/47	Spirulina	< 0.05	90	0.72	78
F Supp. 2008/48	Green tea	< 0.05	90	1.25	78
F Supp. 2008/49	Hawaiian Pacifica Spirulina	0.08	90	1.22	78
F Supp. 2008/50	Organic spirulina	0.6	90	1.77	78

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