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FD 10/04

Survey for polycyclic aromatic hydrocarbons (PAHs) in cereals, cereal products, vegetables, vegetable products and traditionally-smoked foods

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March 2011

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Survey for polycyclic aromatic hydrocarbons (PAHs) in cereals, cereal products, vegetables, vegetable products and traditionally-smoked foods

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Date:	March 2011
Sponsor:	Food Standards Agency Environmental Contaminants Branch 7th Floor Aviation House 125 Kingsway London WC2B 6NH
Sponsor's Project Number:	C02R0030
CSL Contract Number:	V7WH
CSL File Reference:	FLN 9088
Principal Workers:	M Miller, S Carlisle, J Stewart, J Holland
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Distribution:	1. Dr David Mortimer 2. Dr M Rose 3. J Holland 4. Dr A Fernandes 5. FLN 9088 6. FERA Information Centre

SUMMARY

1. The European Food Safety Authority (EFSA) recently identified vegetables, cereals and their products, and directly smoked, small-scale products such as traditionally smoked fish as important contributors to dietary polycyclic aromatic hydrocarbon (PAH) exposure. However these suggestions are based on limited data and a paucity of knowledge on current levels in specific products. In order to address this deficiency, 230 samples of the targeted foods were collected between September and November 2010, and analysed for 28 PAH compounds including the 15 compounds prioritised by EFSA as being toxicologically significant.

2. The accredited and validated methodology used for the analysis is based on isotope dilution /internal standardisation principles and measurement by Gas Chromatography-Mass Spectrometry. The method has been extensively validated and has successfully been used in inter-comparison exercises involving the European Union Reference Laboratory and specialist laboratories in member states. The specificity of the methodology results in reporting limits that are typically as low as 0.01µg/kg for individual PAHs.

3. In very general terms, the food products included in this study, show relatively low levels of PAHs. The most prevalent PAHs were lower molecular weight compounds and among the 28 compounds measured, relatively higher concentrations were observed for acenaphthylene, phenanthrene and fluorene. The more toxicologically significant compounds occurred to a relatively low extent and were frequently undetected, particularly in vegetables and cereal based foods. Smoked animal and fish based foods showed the highest concentrations and of these, 4 samples of smoked fish showed benzo[a]pyrene values that were above 5.0 µg/kg.

4. Apart from providing current information on contaminant levels in these foods the data will inform the ongoing review of EU PAH regulations with respect to the range of PAHs regulated, and the current limits. It will also complement

the existing data set and help refine the assessment of risk to human health from dietary PAH exposure.

5. A statistical summary of the concentrations, categorised by the type of food is given in the table below.

Food Type		Benzo[a]pyrene	Sum, EU-proposed 4 compounds	Sum, EFSA-15 compounds	Sum, 28 PAH compounds
		Upper-bound concentration in µg/kg			
Smoked fish and shellfish	Median	0.07	0.41	1.37	33
	Mean	0.68	4.02	8.15	90
	Range	0.03 - 10.1	0.11 - 54	0.6 - 94	3.3 - 658
Smoked meat/products	Median	0.07	0.28	1.0	19.4
	Mean	0.12	0.69	1.73	31
	Range	0.03 - 0.9	0.12 - 6.4	0.66 - 11.5	2.9 - 190
Smoked poultry and game	Median	0.07	0.61	1.42	24
	Mean	0.12	0.92	2.0	35
	Range	0.05 - 0.64	0.21 - 3.5	0.85 - 6.2	5.6 - 95
Vegetables and vegetable products	Median	0.03	0.08	0.58	1.79
	Mean	0.04	0.14	0.67	2.39
	Range	0.03 - 0.17	0.07 - 0.6	0.54 - 1.5	1.5 - 7.1
Cereal products, bread and flour	Median	0.04	0.18	0.75	3.69
	Mean	0.06	0.32	1.0	5.01
	Range	0.03 - 0.49	0.07 - 3.3	0.54 - 7.7	1.35 - 50

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GLOSSARY

BAP	benzo[a]pyrene
BCR	Community Bureau of Reference
CRM	Certified Reference Material
EFSA	European Food Safety Authority
GC-MS	Gas chromatography - unit resolution mass spectrometry
IUPAC	International Union of Pure and Applied Chemistry
LC-MS	High Pressure Liquid Chromatography - mass spectrometry
PCB	Polychlorinated biphenyl
PTMI	Provisional tolerable monthly intake
PTV	Programmed temperature vaporisation
RM	Reference Material
SCF	EU Scientific Committee on Food
TDI	Tolerable Daily Intake
TDS	Total diet survey
TEF	Toxic Equivalence Factor
TEQ	Toxic equivalence
WHO	World Health Organisation
WHO-TEF	Toxic Equivalence Factor
%U	Percentage Uncertainty

INTRODUCTION

Polycyclic aromatic hydrocarbons (PAHs) are a complex group of chemicals with two or more fused aromatic ring systems. The molecules do not contain heteroatoms and are not substituted. PAHs occur naturally in coal, crude oil and tar deposits, and can be inadvertently produced as by-products of incomplete fossil fuel or biomass combustion. As environmental pollutants, they are of concern because some compounds have been identified as genotoxic carcinogens, mutagens and teratogens. They occur widely in the environment and their environmental transport is governed by their volatility and chemical reactivity. They are also lipophilic with poor aqueous solubility and unless metabolised, tend to occur in the lipid rich tissues of plants and animals.

PAH toxicity

The toxicity of individual PAHs varies from benign to extremely toxic and is governed by the chemical structure of the molecules, independent of size. Carcinogenicity is one of the more recognised expressions of PAH toxicity, with carcinogenesis generally thought to be induced via the binding of PAH metabolites to deoxyribonucleic acid (DNA). For example, the metabolite benzo(a)pyrene diol epoxide adducts bind covalently to several guanine positions of the bronchial epithelial cell DNA p53 gene, where cancer mutations are known to occur from exposure to cigarette smoke (Denissenko 1996). High prenatal exposure to PAHs has been associated with lower IQ and childhood asthma (Perera et al 2009). The Center for Children's Environmental Health, reports studies that demonstrate that exposure to PAH pollution during pregnancy is related to adverse birth outcomes including low birth weight, premature delivery, and heart malformations. Cord blood of exposed babies shows DNA damage that has been linked to cancer. Follow-up studies show a higher level of developmental delays at age three, lower scores on IQ tests and increased behavorial problems at ages six and eight (Perera et al 2006, 2009).

In the US, the Environmental protection Agency, (EPA) has classified seven PAH compounds as probable human carcinogens; benz[a]anthracene, chrysene, benzo(a)pyrene, benzo[b]fluoranthene, benzo[k)fluoranthene, indeno [123cd]pyrene, and dibenzo[ah]anthracene. Within the European Union, the European Food Safety Authority (EFSA) concluded that 15 PAHs, namely benz[a]anthracene, benzo[b] fluoranthene, benzo[j]fluoranthene, benzo [k]fluoranthene, benzo[ghi]perylene, benzo[a]pyrene, chrysene, cyclopenta [cd]pyrene, dibenz[a,h]anthracene, dibenzo[a,e] pyrene, dibenzo[a,h]pyrene, dibenzo[a,i]pyrene, dibenzo[a,l]pyrene, indeno[1,2,3-cd]pyrene and the metabolite,5-methylchrysene show clear evidence of mutagenicity /genotoxicity in somatic cells, in experimental animals in vivo and with the exception of benzo[ghi]perylene have also shown clear carcinogenic effects in

various types of bioassays in experimental animals (EFSA 2008). Thus, EFSA reasoned that these compounds may be regarded as potentially genotoxic and carcinogenic to humans and therefore represent a priority group in the assessment of the risk of long-term adverse health effects following dietary intake of PAHs.

Human Exposure

A major route of human exposure to PAHs is via the ingestion of food although for those who smoke tobacco, inhalation may be as significant a source as dietary intake. Food can be contaminated from environmental sources, industrial food processing and from certain home cooking practices. The European Commission regulates PAHs in food, by setting maximum limits for benzo[a]pyrene in a number of food types (European Commission 2006). A review of these limits covering the types of food and the range of PAHs covered by this legislation, has already begun and the data generated by this project will help inform this process. EFSA identified the vegetable and cereal categories as important contributors to dietary PAH exposure but this was on the basis of limited data and a lack of knowledge of the levels of PAHs likely to be found in specific cereal and vegetable products. Examination of the data compiled by EFSA also suggests that small-scale, hot, direct smoked products such as traditionally smoked fish may have been under-represented.

The processing of food – smoking, cooking over a direct heat source (barbecuing), drying etc, are generally recognised as a major source of PAH contamination in food (Lijinsky and Ross 1967, Saint-Aubert et al 1992, Lintas et al 1979, White et al 2008). The occurrence of PAHs in smoked food is dependent on a number of parameters such as the type of food and the availability of surface lipid, duration of smoking, type of fuel used, distance from the source and the temperature of the food. The condensation and absorption mechanisms on the surface of the food lead to the PAHs being incorporated into the food.

Previous research on food samples from the UK 2000 Total Diet Study (TDS) (Food Standards Agency 2002) at FERA and subsequent dietary exposure estimates carried out by the FSA have revealed that upper bound average and high level dietary intakes by adults of Benzo[a[pyrene were 1.6 and 2.7 ng/kg bodyweight/day. Estimated intakes by schoolchildren (4-18 years) and toddlers (1.5–4.5 years) were higher than for adults with average and high level intakes of up to 3.8 and 6.2 ng/kg bodyweight/day. The data for PAHs available from TDS reports in 1979 and 2000 show a declining trend in PAH exposure. The estimated intakes by adults and children of benzo[a]pyrene and benz[a]anthracene are 2 to 5 fold lower in 2000 compared with 1979 for average and high level consumers (Food Standards Agency 2002).

This study will provide reliable data for individual PAH compounds in 230 foods, which include cereal and vegetable products and hot, direct smoked foods such as traditionally smoked fish.

EXPERIMENTAL

Analytes

The following individual PAH compounds were determined:

acenaphthene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, **benzo[c]fluorene**, pyrene, benzo[e]pyrene, benzo[b]naptho[2,1-d]thiophene, anthanthrene, coronene, benzo[ghi]fluoranthene, **benz[a]anthracene**, **chrysene**, **benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k)fluoranthene, benzo[a]pyrene**, **cyclopenta[c,d]pyrene**, **indeno[123cd]pyrene**, **dibenzo[ah]anthracene**, **benzo[ghi]perylene**, **dibenzo[al]pyrene**, **dibenzo[ae]pyrene**, **dibenzo[ai]pyrene**, **dibenzo[ah]pyrene** and the substituted PAH, **5-methylchrysene**.

The 15 PAHs prioritised by EFSA are shown in bold. Additionally, JECFA recommended the inclusion of benzo[*c*]fluorene and this is also shown in bold.

Sampling and sample preparation

Based on a structured and representative sampling plan, 230 samples of the targeted foods - cereal and vegetable products and hot, direct smoked foods - were collected between September to November 2010. On receipt at the laboratory each sample was given a unique laboratory reference number and the sample details logged into a database. Depending on time of receipt, the samples were either prepared for analysis immediately or were stored frozen prior to preparation.
Details of the sampling plan (including location of the sampling sites) constructed in conjunction with the FSA have been reported elsewhere (Ventress Technical Report 2011).
Sample preparation involved size reduction, by cutting and grinding followed by blending through food processing units. The samples were then thoroughly mixed before taking sub-samples for analysis. The analytical methodology is described in the following paragraphs.

Chemical Analysis – Standards and Reagents

Reference standards of PAHs and ^{13}C labelled surrogates for use as internal standards were purchased from Promochem (Welwyn Garden City, Herts) and Qm_x (Thaxted, Essex) as solutions in n-nonane, iso-octane or cyclohexane with a specified 10% tolerance on concentration. These were diluted as required, to working standard solutions in n-nonane The internal standard solution

contained nominal concentrations of 200 pg/µl of each of 16 ^{13}C labelled analogues and 400 pg/µl of each of 2 ^{13}C labelled analogues of the selected PAH compounds. The sensitivity standard solution contained ^{13}C PCB 52 and ^{13}C PCB 202 at a nominal concentration of 200 pg/µl.

Cyclohexane, dichloromethane, methanol and n-nonane were purchased as doubly glass distilled (Rathburn, Scotland). Silica gel was Silica 60A, Spherical (YMC, Japan) and was used after activating overnight at 450°C and then deactivating with water (5% w/w), keeping the container sealed except when withdrawing material for use. All other chemicals employed were AnalaR grade materials (BDH, Lutterworth, UK).
All equipment was scrupulously cleaned and thoroughly rinsed with dichloromethane prior to use. Care was taken to avoid airborne contamination of containers by keeping vials capped even when empty and covering flasks and concentration tubes with cleaned aluminium foil.

Determination of PAHs in food samples

The method used was based on that used at FERA for survey work conducted for the FSA. The method has been subject to a single laboratory validation study and is to be put forward as an ISO method. A summary is given below and details can be found in Rose et al, 2007.

Extraction and purification
Typically, a 10-20g aliquot of the sample was taken for analysis. After addition and stabilisation of the internal standard (50ul solution), the sample was saponified, by blending with 200 ml of methanolic KOH and agitation for 30m at 60 °C in a shaking water bath. The saponified mixture was filtered through glass wool and partitioned against 100ml of cyclohexane, by agitation for 3 minutes. The cyclohexane layer was removed and the process repeated a second time. The 2 cyclohexane fractions were combined and washed 3 times with 50ml of a 4:1 v:v methanol/water mixture followed by concentration to ~50ml. This concentrated cyclohexane extract was partitioned against the same volume of a 9:1 v:v dimethyl formamide/ water mixture. The dimethyl formamide phase was removed and diluted with the same volume of a 1% sodium chloride solution. This diluted phase was extracted with 100 ml of cyclohexane by shaking for 3 minutes and the extract concentrated to approximately 3ml.

The concentrated extract was chromatographed on 2g of silica gel in a glass column, eluting the PAHs with 200 ml cyclohexane. The eluate was concentrated gently at 40 °C, taking care to rinse interior walls of the container repeatedly with cyclohexane, as the provisional end-volume of 0.2-0.5 ml was reached. The concentrate was transferred to a measurement vial with the addition of 50 µl of syringe standard solution and blown down under nitrogen to the final extract volume of 50 µl.

GC-LRMS determination of PAHs

The extracts were analysed by gas chromatography-mass spectrometry, performed on a 6890N Network gas chromatograph coupled to a unit resolution MSD5973 inert quadrupole mass elective detector (Agilent Technologies, Strathaven). Sample introduction was facilitated using a 7683 series autosampler injecting 5 µl of extract into a programmed temperature vapourisation (PTV) inlet. Alternatively samples were analysed on a Thermo Finnigan Trace GC-MS fitted with an AS 2000 autosampler. Chromatographic separation was achieved using a 60m J&W DB-5 capillary column with a 0.25µm mobile phase. Analyte transfer to the GC column used the following PTV programme; 50°C, hold 1min; 10°C/sec to 320°C, hold 40 min. The chromatograph oven temperature programme consisted of a 2.5 min isothermal period at 60°C followed by heating at 7°C/min to 215°C with a 5 min isothermal period then at 2°C/min to 260°C with a 3 min isothermal period and finally at 3.5°C/min to 340°C with an isothermal period of 15 min. Selected ion monitoring using positive mode electron ionisation was employed generally using the most intense ions from each molecular ion cluster in order to enhance specificity, and a second confirmatory ion. Detection by electron multiplier was achieved at a typical setting of 1600 EM Volts.

Data handling

Data reduction for GC-MS analysis and processing to calculate the mass of each compound present was performed using Masslynx 3.5 software supplied by Micromass. Results were exported into Excel for additional processing.

Quality control

The methodology used here for the determination of individual PAH compounds has been subjected to single laboratory validation, peer reviewed and published (Rose et al, 2007). All stages of the analysis were monitored by the use of a range of ^{13}Carbon labelled surrogates of the PAH analytes which were also used for internally standardised measurement This allowed more accurate determination of analytes and gave better precision of measurement which was typically of the order of 16% (RSD). The specificity of the methodology results in reporting limits that are typically as low as 0.01µg/kg for individual PAHs. Analytical recoveries were generally within the range of 60 - 120%.

Samples were analysed in sets of 12 which incuded a full method blank and a reference material. The performance of the GC-MS measurement processes and in particular the calibration of measurement was verified by the inclusion of standard reference solutions before, during and after, sample extract analysis. The blanks were assessed for the presence of native PAHs and data rejected if these were not satisfactory. Similarly, the results of the reference material analyses were assessed against expected values, in order to validate

the analysis and measurement process. The certified reference material prepared by the BCR, (CRM458) was a coconut oil (Luther et al 1997), which was certified for 6 PAH compounds. Additionally, a cocoa butter reference material was also analysed in some batches and more relevantly to the current study, a smoked fish reference material.The results of the reference material analyses together with accepatable values are given in Table 4.

Measurement uncertainty was estimated for all PAHs as per the Eurachem guide (Ellison et al 2000). The estimates take into account contributory parameters such as the individual uncertainties associated with sample size, results of the analysis of fortified samples, and limits of detection. Typical uncertainties, for example, are of the order of 17% at the 1 to 5 µg/kg concentration level but can rise to around 200% at the limit of detection (typically 0.01 µg/kg, but dependent on the individual compound and sample size). In perspective, this is the same degree of uncertainty achieved by FERA in recent international inter-comparison exercises for PAHs (FAPAS 2010, JRC-IRMM 2010) where measurements were made at similar concentrations and results reported by the laboratory were in good agreement (z-scores within ±2) with consensus data.

RESULTS AND DISCUSSION

A list of samples including a description and FERA sample number is given in Table 1. Further details are available from the sampling contractors report (Ventress Technical Report 2011).

The concentrations of the 28 PAH compounds measured in this study are given in Table 2. The concentrations are reported in µg/kg of product. Data were rounded to two decimal places for all analytes. Measurement uncertainty has been included for each sample and this is summarised as a minimum, maximum and average uncertainty for the sample. Individual values for each compound can also be provided if required.

The reporting limits quoted (as "<") for all analytes was the limit of determination that prevailed in that instance. The limit is calculated dynamically for each compound in each sample, and takes into account instrument signal-to-noise levels, sample weight, analytical recovery and concentrations detected in method balnks. Typically, this level was as low as 0.01µg/kg, but could rise to 0.1 µg/kg for the higher molecular weight PAHs which tend to be more labile. In general, for all analytes, the limits were consistent with those reported in earlier work and were generally better, or at least equivalent to those reported in the literature.

The data in Table 1 covers a range of PAH concentrations over 4 orders of magnitude from 0.01 to 153 µg/kg of acenaphthylene in a sample of smoked fish. In general, for all types of foods studied, the lower molecular weight

PAHs were detected more frequently and at higher concentrations. The higher molecular weight compounds which include most of the 15 compounds prioritised by EFSA, and the substituted PAH – 5 methylchrysene were often undetected. This is consistent with the environmental occurrence of these contaminants and with the results of other studies on foods (FSA 2002, White et al 2007, White et al 2008).

A summary of the concentrations categorised by the type of food is given in Table 3 and includes values for the median, average and range for each food type. These values are given for benzo[a]pyrene, the sum of the 4 PAHs that have been proposed for regulation by the EU, the sum of the 15 compounds prioritised by EFSA and for the sum of all measured compounds. It is evident from the table, that smoked animal and fish based foods show the highest concentrations. The mean and median values generally also show large differences for these foods and the positively skewd distributions may indicate particular samples (and particular food preparation practices) that may be more prone to higher concentrations. The lowest concentrations were associated with vegetable and vegetable products.

From a food safety point of view, maximum permitted limits for benzo[a]pyrene in some foods are specified in EU commission regulations (European Commission 2006). The vast majority of the samples analysed here (n=230) were well below any of the applicable limits. The limit for fish is 5 µg/kg and from the data in Table 2 it is clear that 4 samples of smoked fish show benzo[a]pyrene concentrations that are above this limit.

Apart from providing new and current information on contaminant levels in these foods the data will inform the ongoing review of EU PAH regulations with respect to the range of PAHs regulated, and the current limits. It will also add to the existing data and help refine the assessment of risk to human health from dietary PAH exposure.The continued detection of PAH compounds in some foods make it prudent to continue surveillance on the occurrence of these contaminants.

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Table 1: Sample listing and description

OPHA Sample No.	LIMS No.	Customer Reference	Description
19089	S10-017140	**234-001**	Traditionally smoked undyed haddock
19090	S10-017141	**234-002**	Smoked mackerel
19091	S10-017142	**234-003**	Handmade gourmet fishcakes - smoked haddock & smoked bacon
19092	S10-016881	**234-004**	Spring cabbage
19093	S10-016926	**234-005**	Wholemeal bread - steamed
19094	S10-016927	**234-006**	Large white rolls (pack of 5)
19095	S10-016878	**234-007**	Leek
19096	S10-016880	**234-008**	Marfona potato
19097	S10-017143	**234-009**	Creamy oat porridge for babies
19098	S10-017144	**234-010**	Applewood smoked streaky bacon
19099	S10-016879	**234-011**	Leafy rocket salad
19100	S10-17145	**234-012**	10 frankfurters
19101	S10-17146	**234-013**	Little Nibbles organic elephant biscuits
19102	S10-17147	**234-014**	Organic buttery root vegetables with green lentils
19103	S10-17148	**234-015**	Wholegrain wheat cereal biscuits
19104	S10-17149	**234-016**	Plain cous cous
19105	S10-17150	**234-017**	Homestyle roast potatoes
19106	S10-17151	**234-018**	Sweet pickled sliced beetroot
19107	S10-016928	**234-019**	Seeded batch loaf
19108	S10-017153	**234-020**	Plain flour
19109	S10-017154	**234-021**	Rigatoni pasta
19110	S10-017155	**234-022**	Salad crisp sweetcorn
19111	S10-017156	**234-023**	Garden peas
19112	S10-017157	**234-024**	Corn flakes
19113	S10-016929	**234-025**	Soft white 50/50 rolls
19114	S10-017158	**234-026**	Mixed wholegrain cereal loops with honey
19115	S10-017159	**234-027**	Polenta
19116	S10-017160	**234-028**	Oat & linseed bread mix
19117	S10-016930	**234-029**	Medium white superlife bread
19118	S10-017161	**234-030**	Strong plain stoneground organic spelt flour
19122	S10-017162	**234-031**	Long sliced smoked salmon
19123	S10-017163	**234-032**	Lightly smoked cod loin
19124	S10-017164	**234-033**	Smoked kipper fillet
19125	S10-016882	**234-034**	Carrot, parsnip and turnip
19126	S10-016883	**234-036**	Broccoli
19127	S10-017165	**234-037**	Applewood smoked pork loin
19128	S10-016931	**234-038**	Sliced oven wheaten
19129	S10-017166	**234-040**	Cooked diced bacon
19130	S10-017167	**234-041**	Baby wheat flakes

Table 1 (cont'd): Sample listing and description

OPHA Sample No.	LIMS No.	Customer Reference	Description
19131	S10-017168	**234-042**	Irish buttermilk scone mix
19132	S10-017169	**234-043**	Soup mix
19133	S10-016932	**234-045**	Sliced hi-fibre plain brown
19134	S10-016884	**234-048**	Diced turnip
19135	S10-017170	**234-049**	Handmade crunchy granola
19136	S10-016885	**234-053**	Mangetout
19137	S10-017171	**234-051**	Milk and honey oats
19138	S10-016933	**234-054**	Wholemeal traditional thick sliced bread
19139	S10-017172	**234-055**	Self raising cake flour
19141	S10-017173	**234-035**	Farley's rusks - original
19142	S10-017174	**234-039**	Broad beans
19143	S10-017175	**234-044**	Swede
19144	S10-017176	**234-046**	Wholewheat flakes & rolled oats with raisins and roasted sliced hazelnuts & almonds
19145	S10-017177	**234-047**	Wholewheat cereal biscuits
19146	S10-017178	**234-050**	Cornflour
19147	S10-017179	**234-052**	Semolina
19148	S10-017180	**234-056**	Vegetable lasagne
19149	S10-017181	**234-057**	Sweet potato
19154	S10-017025	**234-061**	Naturally smoked haddock
19155	S10-017026	**234-062**	Cauliflower
19156	S10-017027	**234-063**	Runner beans
19157	S10-017028	**234-064**	Organic rye flour
19158	S10-017029	**234-065**	Organic bulgar wheat
19159	S10-017030	**234-066**	Manx kippers
19160	S10-017031	**234-067**	Large white round loaf
19161	S10-017032	**234-068**	Brussel sprouts
19162	S10-017033	**234-069**	Celery
19163	S10-017034	**234-070**	Scottish smoked salmon
19164	S10-017035	**234-071**	Smoked Wiltshire cured ham
19165	S10-017036	**234-072**	Organic carrots, apples and parsnips
19166	S10-017037	**234-073**	Fruity breakfast cereal
19167	S10-017038	**234-074**	Porridge with spelt
19168	S10-017039	**234-075**	Organic four grain cereal
19169	S10-017040	**234-076**	Original pickled onions
19170	S10-017041	**234-077**	Soya & linseed bread
19171	S10-017042	**234-078**	Organic seeded farmhouse bread
19172	S10-017043	**234-079**	Smoked rainbow trout
19173	S10-017044	**234-080**	Young spinach
19174	S10-017045	**234-081**	Sliced carrots
19175	S10-017046	**234-082**	Broccoli florets
19176	S10-017047	**234-083**	Toasted rice cereal

Table 1 (cont'd): Sample listing and description

OPHA Sample No.	LIMS No.	Customer Reference	Description
19177	S10-017048	**234-084**	Organic corn flakes
19178	S10-017049	**234-085**	Toasted squares of wholewheat and rice with sugar and cinnamon
19179	S10-017050	**234-086**	Organic oats
19180	S10-017051	**234-087**	Plain flour
19181	S10-017052	**234-088**	Wholemeal self raising flour
19182	S10-017053	**234-089**	Organic baby rice
19183	S10-017054	**234-090**	Pearl barley
19186	S10-17194	**234-091**	Smoked back bacon
19187	S10-17195	**234-095**	Scottish cold smoked beef
19188	S10-17196	**234-099**	Loch Fyne kippers
19189	S10-17197	**234-100**	Aberdeen haddock
19190	S10-17198	**234-101**	Peat smoked haddock
19191	S10-17199	**234-102**	Smoked chicken breast
19192	S10-17200	**234-103**	Smoked mackerel
19193	S10-17201	**234-104**	Hot smoked mackerel
19194	S10-17202	**234-105**	Pale smoked haddock
19195	S10-17203	**234-106**	Arbroath smokies
19196	S10-17204	**234-107**	Smoked ham rib
19197	S10-17205	**234-108**	Smoked back bacon
19198	S10-17206	**234-109**	Pale smoked haddock
19199	S10-17207	**234-111**	Whisky oak smoked Scottish salmon
19200	S10-17208	**234-114**	Organic dry cured back rashers - cherry wood smoked
19201	S10-17209	**234-115**	Smoked Scottish salmon
19206	S10-017327	**234-112**	Smoked duck
19207	S10-017328	**234-121**	Barley couscous
19208	S10-017329	**234-122**	Asparagus
19209	S10-017330	**234-123**	Organic oriental semi wholewheat noodles with brown rice
19210	S10-017331	**234-124**	Medium chapati flour
19211	S10-017332	**234-125**	Sultana bran - bran enriched wheat flakes with sultanas
19212	S10-017333	**234-126**	Puffed wheat
19213	S10-017334	**234-127**	Crunchy wheat and malted barley cereal
19214	S10-017335	**234-128**	Pasta flour
19215	S10-017336	**234-129**	Fine corn meal
19216	S10-017337	**234-130**	Family stir fry
19217	S10-017338	**234-131**	Mediterranean style roasting vegetables
19218	S10-017339	**234-132**	Wholegrain oat and oat bran flakes
19219	S10-017340	**234-133**	Self raising flour
19220	S10-017341	**234-134**	Cocktail gherkins
19221	S10-017342	**234-135**	Farmhouse soft white bread
19222	S10-017343	**234-136**	Pearl barley
19245	S10-017465	**234-137**	Hot smoked salmon fillet

Table 1 (cont'd): Sample listing and description

OPHA Sample No.	LIMS No.	Customer Reference	Description
19246	S10-017466	**234-138**	Smokies
19247	S10-017467	**234-139**	Hot smoked mackerel
19248	S10-017468	**234-140**	Hot smoked salmon fillet
19249	S10-017469	**234-141**	Peppered smoked mackerel fillets
19250	S10-017470	**234-142**	Smokies
19251	S10-017471	**234-143**	Undyed whole kippers
19252	S10-017472	**234-144**	Smokies
19253	S10-017473	**234-145**	Smoked mackerel fillets (plain)
19254	S10-017474	**234-146**	Hot smoked trout
19255	S10-017475	**234-147**	Hot smoked salmon
19256	S10-017476	**234-148**	Flaky smoked salmon
19257	S10-017477	**234-149**	Smoked Beltie beef sausage
19258	S10-017478	**234-150**	Scottish smoked mackerel fillets
19259	S10-017479	**234-151**	Roasted salmon fillets with sweet chilli
19260	S10-017480	**234-152**	Sliced hot smoked duck
19261	S10-017481	**234-153**	Smoked trout fillets
19262	S10-017482	**234-154**	Sliced smoked chicken breast
19263	S10-017483	**234-155**	Smoke roasted salmon tail pieces
19264	S10-017484	**234-156**	Peppered smoked mackerel fillets
19265	S10-017485	**234-157**	Hot smoked side of salmon
19269	S10-017527	**234-158**	Smoked eel
19270	S10-017528	**234-159**	Smoked chicken breast
19271	S10-017529	**234-160**	Roast smoked trout
19272	S10-017530	**234-161**	Smoked mussels
19273	S10-017531	**234-162**	Roast smoked salmon
19284	S10-017655	**234-098**	Smoked Ayrshire back bacon
19285	S10-017656	**234-110**	Scottish cold smoked venison
19286	S10-017657	**234-113**	German salami
19287	S10-017658	**234-163**	Sliced smoked duck
19288	S10-017659	**234-164**	Sliced smoked chicken
19289	S10-017660	**234-165**	Hot smoked trout fillet
19290	S10-017661	**234-166**	Hot smoked salmon
19291	S10-017662	**234-167**	Smoked duck breast
19292	S10-017663	**234-168**	Fairlie kippers
19318	S10-017803	**234-116**	Farmed Scottish salmon - kiln roasted
19319	S10-017804	**234-117**	Smoked trout fillets (4)
19320	S10-017805	**234-118**	Hot smoked mackerel fillets
19321	S10-017806	**234-119**	Oat smoked duck breast
19322	S10-017807	**234-120**	Smoked whole chicken
19323	S10-017808	**234-169**	Slow roasted salmon
19324	S10-017809	**234-170**	Smoked salmon
19326	S10-017870	**234-058**	Cabbage and leek mix

Table 1 (cont'd): Sample listing and description

OPHA Sample No.	LIMS No.	Customer Reference	Description
19327	S10-017871	**234-059**	Aromatic stir fry
19328	S10-017872	**234-060**	Family casserole
19329	S10-017873	**234-092**	Squash
19330	S10-017874	**234-093**	Tiger baton
19331	S10-017875	**234-094**	Trattoria bake at home half ciabatta
19332	S10-017876	**234-096**	Wheatgerm bread
19333	S10-017877	**234-097**	Chopped tomatoes
19334	S10-017878	**234-172**	chicken
19335	S10-017879	**234-173**	Cluny smokies (pair)
19336	S10-017880	**234-174**	Hot smoked mackerel
19337	S10-017881	**234-175**	Roasted smoked salmon
19338	S10-017882	**234-176**	Kippers
19339	S10-017883	**234-177**	Smoked haddock
19340	S10-017884	**234-202**	Organic gingerbread biscotti
19341	S10-017885	**234-203**	Organic raspberry & apple soft oaty bars
19342	S10-017886	**234-204**	Natural wheatgerm
19343	S10-017887	**234-205**	Millet grain
19344	S10-017888	**234-206**	Organic Fairtrade quinoa
19345	S10-017889	**234-207**	Rye flakes
19346	S10-017890	**234-208**	Organic self raising flour
19347	S10-017891	**234-209**	Quality plain flour
19350	S10-030345	**234-171**	Manuka smoked duck
19351	S10-030346	**234-178**	Smoked pheasant (boned)
19352	S10-030347	**234-179**	Smoked duck breast
19353	S10-030348	**234-180**	Smoked chicken breast
19354	S10-030349	**234-181**	Kiln roasted smoked salmon
19355	S10-030350	**234-185**	Hot smoked Scottish salmon
19356	S10-030351	**234-186**	Whole smoked Rainbow trout
19357	S10-030352	**234-187**	Smoked duck breast
19358	S10-030353	**234-188**	Oak smoked whole chicken
19359	S10-030354	**234-189**	Smoked whole trout
19360	S10-030355	**234-190**	Smoked mackerel
19361	S10-030356	**234-191**	Smoked Scottish venison (sliced)
19362	S10-030357	**234-192**	Smoked chicken legs
19363	S10-030358	**234-193**	Sliced smoked duck breast
19364	S10-030359	**234-194**	Hot roasted smoked Cajun salmon
19365	S10-030360	**234-195**	Smoked whole trout
19366	S10-030361	**234-210**	Okra
19367	S10-030362	**234-211**	Organic chickpeas
19368	S10-030363	**234-212**	Coarse boulgur wheat
19369	S10-030364	**234-213**	Chip shop batter mix
19370	S10-030410	**234-182**	Kiln roasted smoked salmon

Table 1 (cont'd): Sample listing and description

OPHA Sample No.	LIMS No.	Customer Reference	Description
19371	S10-030411	**234-184**	Smoked haddock
19372	S10-030412	**234-200**	Oak roasted duck breast
19373	S10-030413	**234-201**	Oak roasted chicken breast
19374	S10-030414	**234-214**	Courgettes
19375	S10-030415	**234-215**	Crispy salad
19376	S10-030416	**234-216**	Peat smoked roasted sea trout with horseradish & dill
19377	S10-030417	**234-217**	Peat smoked roasted salmon
19406	S10-030968	**234-196**	Smoked trout
19407	S10-030969	**234-197**	Smoked duck breast
19408	S10-030970	**234-218**	Smoked back bacon
19409	S10-030971	**234-219**	Hot smoked trout
19410	S10-030972	**234-220**	Smoked ham shank
19411	S10-030973	**234-221**	Smoked guinea fowl (oven ready)
19412	S10-030974	**234-222**	Smoked pheasant (oven ready)
19413	S10-030975	**234-223**	Carpaccio cut smoked Aberdeen Angus beef
19445	S10-031627	**234-183**	Kiln roasted trout fillets
19446	S10-031628	**234-198**	Smoked chicken breast
19447	S10-031629	**234-224**	Roast smoked Isle of Bute lamb
19448	S10-031630	**234-225**	Sleeping warrior - roast smoked merguez sausage
19449	S10-031631	**234-226**	Roast smoked Loch Fad trout
19450	S10-031632	**234-227**	Roast smoked Scotch beef
19505	S10-032238	**234-199**	Hot flaky smoked salmon
19506	S10-032239	**234-228**	Roast smoked Rainbow trout
19507	S10-032240	**234-229**	Roast smoked salmon
19508	S10-032241	**234-230**	Smoked duck breast

Table 2: Concentrations of PAHs in food

OPHA Sample No.	19089	19090	19091	19092	19093	19094	19095	19096	19097	19098	19099	19100
FERA LIMs No.	S10-017140	S10-017141	S10-017142	S10-016881	S10-016926	S10-016927	S10-016878	S10-016880	S10-017143	S10-017144	S10-016879	S10-17145
FSA/Ventress Reference	234-001	234-002	234-003	234-004	234-005	234-006	234-007	234-008	234-009	234-010	234-011	234-012
Sample Details:	Traditionally smoked undyed haddock	Smoked mackerel	Fishcakes - smoked haddock & bacon	Spring cabbage	Wholemeal bread - steamed	Large white rolls (pack of 5)	Leek	Marfona potato	Creamy oat porridge for babies	Applewood smoked streaky bacon	Leafy rocket salad	10 frankfurters
ug/kg whole weight												
acenaphthylene	0.25i	1.41i	<0.23	<0.04	<0.1	<0.07	<0.04	<0.04	<0.08	10.2i	0.06	<0.38
acenaphthene	0.46	2.66	<0.33	<0.16	0.18	<0.17	<0.16	<0.16	<0.19	2.51	<0.9	<0.35
fluorene	2.20	8.20	<0.33	<0.17	0.36	0.26	<0.17	<0.17	<0.17	8.05	<0.17	0.91
phenanthrene	6.77	25.29	0.74	<0.2	1.38	1.59	<0.2	<0.2	0.36	6.26	1.17	0.90
anthracene	0.63	4.35	<0.06	<0.2	0.09	0.14	<0.2	<0.19	0.01	1.87	<0.2	0.20
fluoranthene	0.32	4.39	0.24	<0.11	0.34	0.46	<0.11	<0.11	0.13	0.71	0.50	<0.26
benzo[c]fluorene	<0.03	0.26	<0.02	<0.02	0.01	0.02	<0.02	<0.02	<0.01	0.07	<0.02	<0.02
pyrene	0.31i	3.01i	<0.24	<0.1	0.26i	0.43	<0.1	<0.1	<0.09	0.68	0.42	0.27
benzo[ghi]fluoranthene	0.02	0.22	<0.04	<0.01	0.02	0.03	<0.01	<0.01	<0.01	0.06	0.04	<0.03
benz (a) anthracene	0.04	0.35	0.02	<0.01	0.06	0.08	0.01	0.01	<0.01	0.16	0.06	<0.02
benzo[b]naphtho[2,1-d]thiophene	0.02	<0.02	<0.01	<0.01	<0.02	<0.03	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
cyclopenta[c,d]pyrene	<0.01	0.12	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.06	0.01	<0.02
chrysene	0.08i	0.32i	<0.04	<0.01	<0.09	0.09	0.02i	0.02i	<0.02	0.11i	0.13i	<0.04
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.03	0.07	0.06	<0.02	0.07	0.06	0.02	0.02	<0.03	<0.09	0.08	<0.06
benzo[j]fluoranthene	<0.01	0.04	<0.02	<0.01	0.03	0.02	0.01	<0.01	<0.02	0.04	0.05	<0.01
benzo[k]fluoranthene	<0.01	0.03	0.02	<0.01	0.03	0.03	0.01	<0.01	<0.03	0.03	0.03	<0.01
benzo[e]pyrene	0.02	0.05	<0.05	<0.01	0.06	0.05	0.02	0.02	<0.03	<0.05	0.06	<0.05
benzo[a]pyrene	<0.06	<0.07	<0.07	<0.03	0.05	0.05	<0.03	<0.03	<0.04	0.1	0.04	<0.07
indeno[1,2,3-cd]pyrene	<0.03	<0.05	<0.03	<0.02	<0.05	<0.05	<0.02	<0.02	<0.03	<0.05	<0.05	<0.03
dibenz[ah]anthracene	<0.02	<0.03	<0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02	<0.03
benzo-[g,h,i]perylene	<0.02	<0.03	<0.02	<0.01	0.05	0.05	0.02	0.01	0.03	0.03	0.05	<0.02
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.17	<0.21	<0.19	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.21	<0.1	<0.21
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**23**	**17**	**101**	**201**	**31**	**25**	**101**	**101**	**69**	**22**	**22**	**64**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**146**	**107**	**193**	**201**	**137**	**125**	**190**	**194**	**190**	**119**	**132**	**188**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19101	19102	19103	19104	19105	19106	19107	19108	19109	19110	19111	19112
FERA LIMs No.	S10-17146	S10-17147	S10-17148	S10-17149	S10-17150	S10-17151	S10-016928	S10-017153	S10-017154	S10-017155	S10-017156	S10-017157
FSA/Ventress Reference	234-013	234-014	234-015	234-016	234-017	234-018	234-019	234-020	234-021	234-022	234-023	234-024
Sample Details:	Little Nibbles organic biscuits	Organic buttery root vegetables / lentils	Wholegrain wheat cereal biscuits	Plain cous cous	Homestyle roast potatoes	Sweet pickled sliced beetroot	Seeded batch loaf	Plain flour	Rigatoni pasta	Salad crisp sweetcorn	Garden peas	Corn flakes
ug/kg whole weight												
acenaphthylene	0.03	<0.09	0.06	<0.02	<0.06	<0.05	<0.19	0.11	0.04	<0.05	<0.06	0.02
acenaphthene	<0.1	<0.18	0.28	<0.1	<0.11	<0.14	<0.17	0.30	0.21	<0.14	<0.11	<0.1
fluorene	0.19	<0.17	0.46	<0.13	<0.15	<0.15	0.32	0.39	0.21	<0.15	<0.15	0.30
phenanthrene	0.50	0.61	1.23	0.28	<0.2	<0.19	1.23	0.88	0.50	<0.2	<0.2	1.36
anthracene	0.03	0.02	<0.28	0.01	<0.02	<0.01	0.08	0.24	0.06	<0.01	<0.02	0.16
fluoranthene	0.05	0.25	0.18	0.07	<0.11	<0.09	0.27	0.27	0.11	<0.09	<0.11	0.08
benzo[c]fluorene	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	<0.01
pyrene	<0.06	0.12i	0.22i	0.07i	<0.11	<0.09	0.31i	0.26i	0.09	<0.09	<0.11	0.22i
benzo[ghi]fluoranthene	<0.01	0.03	0.02	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	0.01
benz (a) anthracene	<0.01	0.03	0.03	<0.01	<0.01	<0.01	0.05	0.06	<0.01	<0.01	<0.01	<0.01
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	0.02	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	<0.01	0.02	0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	0.02
chrysene	0.02	<0.06	0.09	0.01i	<0.01	<0.02	0.07i	0.07i	0.02	<0.02	0.01i	0.02i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.01	<0.02	0.03	<0.01	<0.02	<0.01	0.06	0.08	0.01	<0.01	<0.02	<0.01
benzo[j]fluoranthene	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.03	0.04	<0.01	<0.01	<0.01	<0.01
benzo[k]fluoranthene	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	0.03	<0.01	<0.01	<0.01	<0.01
benzo[e]pyrene	0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.05	0.07	<0.01	<0.01	<0.01	0.02
benzo[a]pyrene	<0.04	<0.03	<0.04	<0.04	<0.04	<0.03	<0.04	0.07	<0.04	<0.03	<0.04	<0.04
indeno[1,2,3-cd]pyrene	<0.02	<0.01	<0.03	<0.01	<0.02	<0.01	0.05	0.06	<0.01	<0.01	<0.02	<0.01
dibenz[ah]anthracene	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.01	<0.02
benzo-[g,h,i]perylene	0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.06	0.06	<0.01	<0.01	<0.01	0.03
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.11	<0.1	<0.11	<0.11	<0.1	<0.1	<0.1	<0.11	<0.11	<0.1	<0.1	<0.11
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**67**	**60**	**27**	**116**	**201**	**201**	**33**	**23**	**39**	**201**	**201**	**24**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**183**	**172**	**134**	**195**	**201**	**201**	**127**	**103**	**171**	**201**	**201**	**161**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19113	19114	19115	19116	19117	19118	19122	19123	19124	19125	19141	19126
FERA LIMs No.	S10-016929	S10-017158	S10-017159	S10-017160	S10-016930	S10-017161	S10-017162	S10-017163	S10-017164	S10-016882	S10-017173	S10-016883
FSA/Ventress Reference	234-025	234-026	234-027	234-028	234-029	234-030	234-031	234-032	234-033	234-034	234-035	234-036
Sample Details:	Soft white 50/50 rolls	Mixed wholegrain cereal loops	Polenta	Oat & linseed bread mix	Medium white superlife bread	Strong plain stonegrou nd organic spelt flour	Long sliced smoked salmon	Lightly smoked cod loin	Smoked kipper fillet	Carrot, parsnip and turnip	Farley's rusks - original	Broccoli
ug/kg whole weight												
acenaphthylene	<0.1	0.04	<0.13	<0.13	<0.06	0.06	3.78	0.16i	77.93i	<0.04	<0.08	0.09
acenaphthene	<0.18	0.14	<0.38	0.53	<0.17	0.64	0.68	1.13	10.42	<0.17	<0.15	0.59
fluorene	0.29	0.37	0.66	0.59	0.25	0.74	1.91	2.36	28.07i	<0.17	<0.17	0.67
phenanthrene	1.53	1.36	1.56	1.92	0.78	1.52	3.13	3.07	67.79i	<0.21	0.50	0.77
anthracene	0.25	<0.16	0.2	0.12	0.06	0.08	2.17	0.72	16.53	<0.2	<0.03	<0.2
fluoranthene	0.86	0.13	0.23	0.37	0.25	0.19	0.36	0.28	7.6	<0.11	0.17	0.18
benzo[c]fluorene	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.02	<0.02	0.35	<0.02	<0.01	<0.02
pyrene	0.68	0.13i	0.22	0.33	0.25i	0.17i	0.38i	0.24i	4.94i	<0.1	0.14i	0.13i
benzo[ghi]fluoranthene	0.06	<0.01	0.01	0.05	0.02	0.01	<0.02	0.01	0.28	<0.01	0.01	0.01
benz (a) anthracene	0.29	<0.01	0.04	0.08	0.07	0.03	<0.03	0.02	0.36	<0.01	0.05	0.05
benzo[b]naphtho[2,1-d]thiophene	<0.03	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	0.03	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	0.03	0.44	<0.01	<0.01	<0.01
chrysene	0.23i	0.01i	<0.06	0.09i	0.08i	0.08i	<0.04	0.02i	0.52i	0.02i	<0.06	0.06i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.15	<0.01	<0.03	0.1	0.08	0.05	<0.05	<0.03	0.16	<0.02	0.04	0.07
benzo[j]fluoranthene	0.09	<0.01	<0.02	0.06	0.03	0.02	<0.01	<0.01	0.11	<0.01	0.02	0.05
benzo[k]fluoranthene	0.08	<0.01	<0.03	0.05	0.05	0.02	<0.01	<0.01	0.08	<0.01	<0.03	0.04
benzo[e]pyrene	0.12	<0.01	<0.03	0.08	0.07	0.06	<0.05	<0.01	0.15	<0.01	0.04	0.06
benzo[a]pyrene	0.13	<0.04	<0.04	0.1	0.08	0.04	<0.07	<0.06	0.16	<0.03	0.04	0.07
indeno[1,2,3-cd]pyrene	0.09	<0.01	<0.02	0.1	0.06	0.05	<0.03	<0.03	<0.15	<0.02	<0.05	0.06
dibenz[ah]anthracene	<0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02	<0.06	<0.02	<0.02	<0.02
benzo-[g,h,i]perylene	0.09	<0.01	0.01	0.12	0.07	0.07	<0.02	<0.02	0.12	<0.01	0.04	0.06
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.11	<0.1	<0.1	<0.1	<0.11	<0.2	<0.17	<0.11	<0.11	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**17**	**32**	**23**	**23**	**30**	**30**	**22**	**23**	**16**	**101**	**43**	**37**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**107**	**176**	**169**	**104**	**125**	**122**	**168**	**159**	**97**	**197**	**176**	**129**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19127	19128	19142	19129	19130	19131	19132	19143	19133	19144	19145	19134
FERA LIMs No.	S10-017165	S10-016931	S10-017174	S10-017166	S10-017167	S10-017168	S10-017169	S10-017175	S10-016932	S10-017176	S10-017177	S10-016884
FSA/Ventress Reference	234-037	234-038	234-039	234-040	234-041	234-042	234-043	234-044	234-045	234-046	234-047	234-048
Sample Details:	Applewood smoked pork loin	Sliced oven wheaten	Broad beans	Cooked diced bacon	Baby wheat flakes	Irish buttermilk scone mix	Soup mix	Swede	Sliced hi-fibre plain brown	Wholewheat flakes & oats / raisins & nuts	Wholewheat cereal biscuits	Diced turnip
ug/kg whole weight												
acenaphthylene	4.24	<0.11	<0.05	<0.25	<0.02	<0.11	<3.01	<0.05	0.13	<0.18	<0.1	<0.04
acenaphthene	0.35	0.13	<0.14	<0.32	<0.1	0.6	<0.34	<0.17	1.61	0.77i	0.31i	<0.16
fluorene	0.96	0.23	<0.15	0.38	<0.13	0.42	1.90	<0.18	0.62	0.64	0.54	<0.17
phenanthrene	1.62	1.2	<0.2	0.75	<0.16	1	14.74	<0.2	0.74	2.52	1.71	<0.2
anthracene	0.39	0.1	<0.01	<0.06	<0.01	0.07	3.42	<0.01	0.06	0.15	0.23	<0.2
fluoranthene	0.37	0.31	<0.09	<0.24	<0.05	0.16	7.78	<0.07	0.34	0.42	0.22	<0.11
benzo[c]fluorene	0.02	0.05	<0.01	<0.02	<0.01	<0.05	<0.01	<0.01	0.01	<0.01	<0.02	<0.02
pyrene	0.33	0.42	<0.09	<0.23	0.07i	0.18i	9.12i	<0.07	0.35	0.43	0.23i	<0.1
benzo[ghi]fluoranthene	0.05	0.04	<0.01	<0.02	<0.01	0.01	1.19	<0.01	0.04	0.02	0.01	<0.01
benz (a) anthracene	0.05	0.06	<0.01	<0.02	<0.01	0.02	1.26	<0.01	0.05	0.03	0.04	<0.01
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	0.02	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	0.1	0.04	<0.01	<0.01	<0.01	0.02	3.27	<0.01	0.02	<0.01	<0.01	<0.01
chrysene	0.04i	0.08i	<0.02	<0.04	0.02i	<0.04	1.04i	<0.02	0.09i	<0.06	<0.07	<0.01
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.03	0.06	<0.01	<0.05	<0.01	0.03	0.30	<0.01	0.08	<0.03	0.04	<0.02
benzo[j]fluoranthene	0.02	0.03	<0.01	<0.01	<0.01	0.01	0.33	<0.01	0.04	<0.02	0.02	<0.01
benzo[k]fluoranthene	0.02	0.03	<0.01	<0.01	<0.01	<0.01	0.23	<0.01	0.03	<0.03	<0.03	<0.01
benzo[e]pyrene	<0.03	0.05	<0.01	<0.05	<0.01	0.02	0.23	<0.01	0.06	<0.03	0.04	<0.01
benzo[a]pyrene	0.04	0.04	<0.03	<0.06	<0.04	<0.03	0.40	<0.04	0.05	<0.04	<0.04	<0.03
indeno[1,2,3-cd]pyrene	<0.03	<0.05	<0.01	<0.03	<0.01	<0.02	0.14	<0.01	<0.06	<0.02	0.04	<0.02
dibenz[ah]anthracene	<0.01	<0.02	<0.01	<0.03	<0.02	<0.02	<0.03	<0.01	<0.02	<0.02	<0.02	<0.02
benzo-[g,h,i]perylene	0.03	0.05	<0.01	<0.02	<0.01	0.03	0.16	<0.01	0.08	0.02	0.04	<0.01
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.19	<0.11	<0.1	<0.19	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**22**	**30**	**201**	**119**	**101**	**40**	**16**	**201**	**25**	**25**	**23**	**201**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**126**	**123**	**201**	**197**	**196**	**152**	**99**	**201**	**113**	**155**	**153**	**201**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19135	19146	19137	19147	19136	19138	19139	19148	19149	19326	19327	19328
FERA LIMs No.	S10-017170	S10-017178	S10-017171	S10-017179	S10-016885	S10-016933	S10-017172	S10-017180	S10-017181	S10-017870	S10-017871	S10-017872
FSA/Ventress Reference	234-049	234-050	234-051	234-052	234-053	234-054	234-055	234-056	234-057	234-058	234-059	234-060
Sample Details:	Handmade crunchy granola	Cornflour	Milk and honey oats	Semolina	Mangetout	Wholemeal sliced bread	Self raising cake flour	Vegetable lasagne	Sweet potato	Cabbage and leek mix	Aromatic stir fry	Family casserole
ug/kg whole weight												
acenaphthylene	0.65i	<0.06	<0.39	<0.06	<0.04	<0.12	<0.06	<0.18	<0.05	<0.06	<0.06	<0.06
acenaphthene	0.64	<0.11	0.9i	<0.12	<0.17	0.19	<0.12	<0.35	<0.17	<0.11	<0.11	<0.12
fluorene	1.17	0.2	0.78	<0.13	0.35	0.29	0.43	<0.33	<0.19	0.14	0.18	<0.15
phenanthrene	3.17	0.78	3.09	0.19	2.09	1.10	1.15	<0.36	<0.2	0.53	0.8	<0.19
anthracene	0.31	0.15	0.19	<0.02	<0.2	0.10	0.05	<0.03	<0.02	<0.02	0.06	<0.02
fluoranthene	0.91	0.07	0.31	<0.06	1.1	0.39	0.19	<0.13	<0.07	0.2	0.49	<0.11
benzo[c]fluorene	0.04	<0.01	0.01	<0.01	<0.07	0.02	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
pyrene	0.77	<0.11	0.47	<0.11	1.0i	0.41	0.19i	<0.15	<0.07	<0.1	0.25i	<0.11
benzo[ghi]fluoranthene	0.08	<0.01	0.02	<0.01	0.2	0.03	0.02	0.02	<0.01	<0.01	0.05	<0.01
benz (a) anthracene	0.23	0.04	0.04	<0.01	0.11	0.10	0.03	0.02	<0.01	<0.01	0.05	<0.01
benzo[b]naphtho[2,1-d]thiophene	<0.04	<0.01	<0.01	<0.01	<0.01	<0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	0.06	0.02	<0.03	<0.03	0.09	0.02	<0.01	<0.01	<0.01	<0.02	0.02	<0.01
chrysene	0.17i	<0.05	<0.07	<0.02	0.19i	0.17	<0.05	<0.05	<0.02	<0.04	<0.04	<0.01
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.17	0.03	<0.03	<0.01	0.04	0.10	0.04	<0.03	<0.01	0.01	0.03	<0.02
benzo[j]fluoranthene	0.09	0.01	<0.02	<0.01	0.04	0.04	0.01	0.02	<0.01	<0.01	0.03	<0.01
benzo[k]fluoranthene	0.08	<0.01	<0.03	<0.01	0.03	0.06	<0.02	<0.02	<0.01	<0.01	<0.02	<0.01
benzo[e]pyrene	0.14	0.02	<0.03	<0.01	0.02	0.08	0.03	0.02	<0.01	<0.01	0.02	<0.01
benzo[a]pyrene	0.16	<0.03	<0.04	<0.03	0.04	0.07	<0.03	<0.06	<0.04	<0.03	<0.03	<0.04
indeno[1,2,3-cd]pyrene	0.13	<0.02	<0.02	<0.02	<0.02	0.07	<0.03	<0.03	<0.01	<0.02	<0.03	<0.02
dibenz[ah]anthracene	<0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03	<0.01	<0.02	<0.02	<0.01
benzo-[g,h,i]perylene	0.14	0.01	0.02	0.89	<0.01	0.08	0.03	<0.01	<0.01	<0.01	0.01	<0.01
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.1	<0.11	<0.1	<0.1	<0.19	<0.1	<0.1	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**18**	**34**	**24**	**16**	**19**	**25**	**36**	**101**	**201**	**64**	**32**	**201**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**85**	**169**	**154**	**193**	**134**	**112**	**155**	**187**	**201**	**190**	**147**	**201**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19154	19155	19156	19157	19158	19159	19160	19161	19162	19163	19164	19165
FERA LIMs No.	S10-017025	S10-017026	S10-017027	S10-017028	S10-017029	S10-017030	S10-017031	S10-017032	S10-017033	S10-017034	S10-017035	S10-017036
FSA/Ventress Reference	234-061	234-062	234-063	234-064	234-065	234-066	234-067	234-068	234-069	234-070	234-071	234-072
Sample Details:	Naturally smoked haddock	Cauliflower	Runner beans	Organic rye flour	Organic bulgar wheat	Manx kippers	Large white round loaf	Brussel sprouts	Celery	Scottish smoked salmon	Smoked Wiltshire cured ham	Organic carrots, apples and parsnips
ug/kg whole weight												
acenaphthylene	0.3	<0.05	<0.05	<0.14	<0.19	46.22i	<0.18	<0.06	<0.06	3.02i	2.63i	<0.09
acenaphthene	0.5	<0.14	<0.14	0.55	0.21	5.7i	0.23	<0.14	<0.14	0.6	0.73	<0.22
fluorene	2.36	<0.15	<0.15	0.5	0.41	35.26i	0.5	<0.16	<0.16	1.42	2.46	<0.17
phenanthrene	6.98i	<0.2	<0.2	1.28	0.73	58.3i	4.8	0.3	0.29	1.47	1.77	<0.18
anthracene	0.64	<0.01	<0.01	1.01	<0.19	18.59i	0.49	0.01	<0.01	0.37	0.45	<0.01
fluoranthene	0.23	<0.09	<0.09	0.32	0.17	8.06	0.57	<0.08	<0.08	<0.18	0.21	<0.06
benzo[c]fluorene	0.02	<0.01	<0.01	0.01	<0.06	0.33	0.11	<0.01	<0.01	<0.01	<0.02	<0.01
pyrene	0.24i	<0.09	0.09	0.31	0.15i	3.71i	0.76	<0.07	<0.07	<0.2	0.2i	<0.07
benzo[ghi]fluoranthene	<0.01	<0.01	<0.01	0.04	0.01	0.23	0.04	<0.01	<0.01	<0.01	<0.02	<0.01
benz (a) anthracene	0.03	<0.01	<0.01	0.05	0.02	0.24	0.11	<0.01	<0.01	<0.02	0.04	0.01
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	<0.01	<0.01	<0.01	0.09	<0.01	0.43	0.02	<0.01	<0.01	<0.01	<0.03	<0.01
chrysene	0.03i	<0.02	<0.04	0.07i	0.03i	0.26i	0.15i	<0.02	<0.03	0.04i	0.05i	<0.02
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.03	<0.01	0.02	0.05	<0.02	0.08	0.05	<0.01	<0.02	<0.04	<0.03	0.01
benzo[j]fluoranthene	<0.01	<0.01	<0.01	0.02	<0.01	0.05	0.03	<0.01	<0.01	<0.01	0.01	<0.01
benzo[k]fluoranthene	<0.01	<0.01	<0.01	0.02	<0.01	0.04	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[e]pyrene	<0.03	<0.01	0.01	0.04	0.01	0.06	0.05	<0.01	<0.01	<0.02	<0.03	0.01
benzo[a]pyrene	<0.03	<0.03	<0.03	0.04	<0.04	0.09	0.05	<0.04	<0.04	<0.07	<0.03	<0.03
indeno[1,2,3-cd]pyrene	<0.02	<0.01	<0.01	<0.03	<0.02	<0.05	<0.05	<0.01	<0.01	<0.04	<0.02	<0.01
dibenz[ah]anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.03	<0.01	<0.01
benzo-[g,h,i]perylene	<0.01	<0.01	<0.01	0.04	0.01	0.05	0.05	<0.01	<0.01	<0.03	0.01	<0.01
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**22**	**201**	**101**	**21**	**54**	**16**	**21**	**128**	**133**	**24**	**23**	**201**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**155**	**201**	**197**	**122**	**174**	**94**	**114**	**198**	**198**	**168**	**156**	**201**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19166	19167	19168	19169	19170	19171	19172	19173	19174	19175	19176	19177
FERA LIMs No.	S10-017037	S10-017038	S10-017039	S10-017040	S10-017041	S10-017042	S10-017043	S10-017044	S10-017045	S10-017046	S10-017047	S10-017048
FSA/Ventress Reference	234-073	234-074	234-075	234-076	234-077	234-078	234-079	234-080	234-081	234-082	234-083	234-084
Sample Details:	Fruity breakfast cereal	Porridge with spelt	Organic four grain cereal	Original pickled onions	Soya & linseed bread	Organic seeded farmhouse bread	Smoked rainbow trout	Young spinach	Sliced carrots	Broccoli florets	Toasted rice cereal	Organic corn flakes
ug/kg whole weight												
acenaphthylene	<0.16	<0.2	<0.19	<0.09	<0.17	0.21	1.21i	<0.05	<0.08	<0.13	<0.16	<0.15
acenaphthene	<0.17	0.2	0.32	<0.18	0.31	0.41	0.34	<0.14	<0.15	<0.14	0.23	0.21
fluorene	<0.2	<0.2	0.21	<0.17	0.38	0.85	1.1	<0.15	<0.17	<0.38	0.36	0.21
phenanthrene	0.28	0.41	0.48	0.25	0.92	3.04	1.93	0.72	<0.21	0.72	1.89	1.2
anthracene	<0.02	0.05	0.03	0.02	0.07	0.26	0.56	<0.03	<0.01	0.05	0.07	0.06
fluoranthene	0.11	0.66	0.19	0.09	0.26	0.84	0.28	0.74	<0.12	0.28	0.3	0.15
benzo[c]fluorene	<0.02	0.08	<0.01	<0.01	<0.01	0.04	<0.01	0.01	<0.01	<0.01	<0.01	0.03
pyrene	0.11i	0.8i	0.15i	0.1i	0.32	0.85i	<0.2	0.32	<0.11	0.17i	0.37	0.19i
benzo[ghi]fluoranthene	0.02	0.09	0.01	<0.01	0.02	0.05	<0.01	0.04	<0.01	0.02	0.01	<0.01
benz (a) anthracene	0.02	0.08	0.01	0.01	0.05	0.18	<0.02	0.02	<0.01	0.03	0.01	<0.01
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.01	<0.01	<0.02	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	0.02	0.03	<0.01	<0.01	<0.02	<0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
chrysene	0.02i	0.13i	0.03i	<0.03	0.05i	0.21i	<0.02	0.18i	<0.02	0.05i	0.02i	<0.02
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.03	0.03	<0.02	0.01	0.06	0.17	<0.04	0.09	<0.01	0.04	<0.02	<0.02
benzo[j]fluoranthene	0.02	0.02	<0.01	<0.01	0.03	0.08	<0.01	0.04	<0.01	0.02	<0.01	<0.01
benzo[k]fluoranthene	0.01	<0.01	<0.01	<0.01	<0.01	0.08	<0.01	0.03	<0.01	0.02	<0.01	<0.01
benzo[e]pyrene	0.03	0.03	<0.01	<0.01	0.05	0.15	<0.02	0.07	<0.01	0.02	<0.01	<0.01
benzo[a]pyrene	<0.04	<0.04	<0.04	<0.03	0.06	0.14	<0.07	0.04	<0.03	<0.04	<0.04	<0.04
indeno[1,2,3-cd]pyrene	<0.03	<0.01	<0.01	<0.01	0.06	0.12	<0.04	0.04	<0.02	<0.04	<0.01	<0.02
dibenz[ah]anthracene	<0.01	<0.01	<0.01	<0.01	<0.02	<0.03	<0.03	<0.02	<0.02	<0.01	<0.01	<0.01
benzo-[g,h,i]perylene	0.03	0.01	<0.01	<0.01	0.08	0.13	<0.03	0.04	<0.01	0.02	<0.01	0.04
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.1	<0.12	<0.1	<0.2	<0.1	<0.12	<0.1	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**69**	**27**	**94**	**102**	**30**	**19**	**24**	**27**	**201**	**43**	**31**	**42**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**171**	**141**	**182**	**191**	**129**	**94**	**173**	**135**	**201**	**153**	**175**	**168**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19178	19179	19180	19181	19182	19183	19186	19329	19330	19331	19187	19332
FERA LIMs No.	S10-017049	S10-017050	S10-017051	S10-017052	S10-017053	S10-017054	S10-17194	S10-017873	S10-017874	S10-017875	S10-17195	S10-017876
FSA/Ventress Reference	234-085	234-086	234-087	234-088	234-089	234-090	234-091	234-092	234-093	234-094	234-095	234-096
Sample Details:	Toasted whole wheat, rice with sugar, cinnamon	Organic oats	Plain flour	Wholemeal self raising flour	Organic baby rice	Pearl barley	Smoked back bacon	Squash	Tiger baton	Trattoria bake at home half ciabatta	Scottish cold smoked beef	Wheatgerm bread
ug/kg whole weight												
acenaphthylene	<0.24	<0.24	<0.19	<0.14	<0.15	<0.19	1.72i	<0.05	<0.11	<0.1	0.88	<0.21
acenaphthene	0.75	0.72	0.61	<0.18	<0.17	0.86	1.82i	<0.14	0.22	0.14	0.38	0.62
fluorene	0.38	1.36	0.81	0.35	<0.2	0.45	2.83	<0.15	0.27	0.23	2.94	0.68
phenanthrene	0.77	3.9	2.33	0.96	<0.22	0.88	3.24	<0.19	0.76	0.69	12.61	2.24
anthracene	0.12	0.3	0.2	0.2	<0.02	0.04	0.84	<0.01	<0.06	<0.06	1.84	<0.2
fluoranthene	0.34	0.45	0.52	0.29	<0.1	0.19	0.32	<0.09	0.24	0.2	2.34i	0.44
benzo[c]fluorene	<0.04	<0.02	<0.03	<0.02	<0.01	<0.01	0.02	<0.01	<0.02	<0.02	0.12i	<0.07
pyrene	0.32	0.62	0.62	0.26i	<0.08	0.1i	0.33i	<0.09	0.22i	0.19i	1.36i	0.48
benzo[ghi]fluoranthene	0.06	0.04	0.06	0.02	<0.01	<0.01	0.01	0.01	0.02	0.02	0.06	0.04
benz (a) anthracene	0.07	<0.03	0.05	0.05	<0.01	<0.01	0.02	<0.01	0.04	0.04	0.08	0.07
benzo[b]naphtho[2,1-d]thiophene	<0.02	<0.03	<0.03	0.02	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.02	0.02
cyclopenta[c,d]pyrene	<0.02	0.03	0.05	0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	0.02
chrysene	0.14i	0.07i	0.07i	0.09i	<0.02	<0.02	<0.03	<0.03	0.08i	0.07i	0.13i	0.12i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.09	<0.02	0.05	0.07	<0.02	<0.02	<0.02	0.04	0.06	0.05	<0.06	0.08
benzo[j]fluoranthene	0.05	<0.01	0.03	0.04	<0.01	<0.01	<0.01	0.01	0.03	0.02	<0.01	0.04
benzo[k]fluoranthene	0.04	<0.01	0.02	0.04	<0.01	<0.01	<0.01	<0.01	0.03	0.02	<0.02	0.04
benzo[e]pyrene	0.08	0.02	0.04	0.06	<0.01	<0.01	<0.01	<0.01	0.05	0.04	<0.03	0.08
benzo[a]pyrene	0.06	<0.04	0.04	0.06	<0.04	<0.04	<0.05	<0.03	0.05	0.04	<0.06	0.07
indeno[1,2,3-cd]pyrene	0.06	<0.02	<0.04	0.05	<0.01	<0.01	<0.03	<0.02	<0.06	<0.05	<0.04	0.06
dibenz[ah]anthracene	<0.02	<0.01	<0.01	<0.02	<0.01	<0.01	<0.03	<0.02	<0.02	<0.01	<0.03	<0.02
benzo-[g,h,i]perylene	0.08	0.02	0.04	0.06	<0.01	<0.01	<0.02	0.01	0.07	0.05	<0.03	0.08
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.18	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**30**	**24**	**28**	**27**	**201**	**45**	**22**	**53**	**30**	**33**	**21**	**23**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**116**	**143**	**119**	**121**	**201**	**178**	**160**	**195**	**139**	**149**	**138**	**111**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19333	19284	19188	19189	19190	19191	19192	19193	19194	19195	19196	19197
FERA LIMs No.	S10-017877	S10-017655	S10-17196	S10-17197	S10-17198	S10-17199	S10-17200	S10-17201	S10-17202	S10-17203	S10-17204	S10-17205
FSA/Ventress Reference	234-097	234-098	234-099	234-100	234-101	234-102	234-103	234-104	234-105	234-106	234-107	234-108
Sample Details:	Chopped tomatoes	Smoked Ayrshire back bacon	Loch Fyne kippers	Aberdeen haddock	Peat smoked haddock	Smoked chicken breast	Smoked mackerel	Hot smoked mackerel	Pale smoked haddock	Arbroath smokies	Smoked ham rib	Smoked back bacon
ug/kg whole weight												
acenaphthylene	<0.08	8.21i	11.2i	3.76	1.03	9.59	0.68	6.99i	11.08	61.2i*	10.62i	0.44
acenaphthene	<0.14	1.01i	3.5	0.86	0.48	2.58	0.52	1.22	2.21	7.63	4.29	<0.26
fluorene	<0.17	3.23	8.47	3.18	2.47	8.59	1.06	4.94	7.95	26.21i	12.4i	0.29
phenanthrene	<0.21	7.29	30.91	9.02	3.82	16.49	1.1	17.13	23.02i	64.66i*	25.63i	<0.36
anthracene	<0.01	1.7	4.99	1.74	0.83	4.31	0.44	3.92	4.65	28.31i	7.21	0.07
fluoranthene	<0.12	1.36	1.85	0.51	0.41	2.3	0.33	4.32	1.93	23.41i	2.83	<0.21
benzo[c]fluorene	<0.01	0.06	0.04	<0.03	<0.05	0.15	<0.01	0.19	0.12	1.76	0.36	<0.01
pyrene	<0.11	1.03	1.08	0.36i	0.31i	1.92i	<0.29	2.63i	1.59i	19.36i	2.03i	<0.24
benzo[ghi]fluoranthene	<0.01	0.04	0.03	<0.02	<0.01	0.11	<0.02	0.28	0.06	1.26	0.09	<0.02
benz (a) anthracene	<0.01	0.04	0.05	0.03	0.02	0.27	<0.02	0.45	0.08	3.11	0.23	0.01
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01
cyclopenta[c,d]pyrene	<0.01	0.09	<0.01	0.01	<0.01	0.07	<0.01	0.26	0.13	4.31	0.07	<0.01
chrysene	<0.02	<0.04	0.05i	<0.02	<0.04	0.24i	<0.02	0.26i	0.06i	3.27i	0.19i	<0.02
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.01	<0.03	<0.04	<0.06	<0.03	<0.06	<0.07	0.16	<0.04	1.3	<0.06	<0.06
benzo[j]fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.02	0.06	0.02	0.89	0.02	<0.01
benzo[k]fluoranthene	<0.01	<0.05	<0.01	<0.02	<0.01	<0.02	<0.02	<0.04	<0.02	0.54	<0.02	<0.02
benzo[e]pyrene	<0.01	<0.02	<0.02	<0.03	<0.02	<0.03	<0.04	0.1	0.03	1.03	0.03	<0.03
benzo[a]pyrene	<0.03	<0.05	<0.07	<0.06	<0.06	<0.06	<0.07	0.09	<0.07	1.46	<0.06	<0.06
indeno[1,2,3-cd]pyrene	<0.02	<0.02	<0.04	<0.04	<0.02	<0.04	<0.05	<0.06	<0.04	0.8	<0.04	<0.04
dibenz[ah]anthracene	<0.02	<0.02	<0.03	<0.03	<0.02	<0.03	<0.03	<0.04	<0.03	0.16	<0.03	<0.03
benzo-[g,h,i]perylene	<0.01	<0.07	<0.03	<0.03	<0.01	<0.03	<0.04	0.06	0.02	0.64	<0.03	<0.03
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.61	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.12	<0.17	<0.2	<0.17	<0.18	<0.18	<0.21	<0.25	<0.1	<0.57	<0.18	<0.17
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.16	<0.1	<0.48	<0.1	<0.1
% Uncert Min	**201**	**21**	**21**	**21**	**23**	**17**	**28**	**16**	**21**	**16**	**18**	**46**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**201**	**136**	**137**	**159**	**163**	**122**	**175**	**113**	**118**	**68**	**122**	**191**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19198	19285	19199	19206	19286	19200	19201	19318	19319	19320	19321	19322
FERA LIMs No.	S10-17206	S10-017656	S10-17207	S10-017327	S10-017657	S10-17208	S10-17209	S10-017803	S10-017804	S10-017805	S10-017806	S10-017807
FSA/Ventress Reference	234-109	234-110	234-111	234-112	234-113	234-114	234-115	234-116	234-117	234-118	234-119	234-120
Sample Details:	Pale smoked haddock	Scottish cold smoked venison	Whisky oak smoked Scottish salmon	Smoked duck	German salami	Organic dry cured smoked bacon	Smoked Scottish salmon	Farmed Scottish salmon - kiln roasted	Smoked trout fillets (4)	Hot smoked mackerel fillets	Oat smoked duck breast	Smoked whole chicken
ug/kg whole weight												
acenaphthylene	15.61i	0.56	9.09	0.48	1.13	6.39i	3.77	<2.58	7.82i	<0.65	0.7	0.97
acenaphthene	2.78	<0.52	1.42	<0.29	0.34	2.22	<0.29	0.93	1.53	<0.29	1.71	1.86
fluorene	9.26	2.91	5.13	1.14	2.24	8.49	0.93	2.73	3.25	0.73	7.2i	7.46i
phenanthrene	25.42i	9.29	4.47	1.72	3.71	9.66	0.89	6.54	6.93	0.8	5.93	6.63
anthracene	4.81	1.27	4.64	0.2	1.16	3.22	2.67	2.59	2.96	0.61	1.67	1.46
fluoranthene	1.91	1.82	0.5	0.28	0.71	1.56	<0.25	0.26	1.47	0.17	0.93	1.04
benzo[c]fluorene	0.11	0.09	0.01	<0.03	<0.05	0.24	<0.01	0.03	0.41	<0.01	0.14	0.11
pyrene	1.45i	1.15	<0.29	<0.29	0.6	1.38i	<0.29	0.22i	1.07	<0.17	1.02	0.93
benzo[ghi]fluoranthene	0.05	0.05	<0.02	<0.02	<0.03	0.08	<0.02	<0.02	0.1	<0.02	0.06	0.07
benz (a) anthracene	0.08	0.07	<0.03	0.03	<0.04	0.19	<0.02	<0.01	0.15	<0.01	0.21	0.18
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.02	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01
cyclopenta[c,d]pyrene	0.04	<0.01	<0.01	<0.01	<0.01	0.22	<0.01	<0.01	0.33	<0.01	0.04	0.05
chrysene	0.06i	0.07i	0.04i	0.07	0.05i	0.16i	<0.02	<0.01	0.19i	<0.01	0.26i	0.27i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.03	<0.07	<0.07	<0.07	<0.07	0.07	<0.07	<0.02	0.05	<0.02	<0.07	0.06
benzo[j]fluoranthene	0.02	<0.01	<0.02	<0.02	<0.01	0.04	<0.02	<0.01	0.02	<0.01	0.03	0.03
benzo[k]fluoranthene	<0.01	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.01	0.02	<0.01	<0.02	<0.02
benzo[e]pyrene	<0.03	<0.04	<0.04	<0.04	<0.06	0.06	<0.04	<0.01	0.04	<0.01	0.04	0.07
benzo[a]pyrene	<0.06	<0.07	<0.07	<0.07	<0.07	0.11	<0.07	<0.07	<0.07	<0.07	<0.07	<0.06
indeno[1,2,3-cd]pyrene	<0.03	<0.04	<0.05	<0.05	<0.04	<0.07	<0.05	<0.02	<0.03	<0.02	<0.04	<0.03
dibenz[ah]anthracene	<0.02	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.02	<0.02	<0.02	<0.03	<0.02
benzo-[g,h,i]perylene	0.02	<0.04	0.2	<0.04	0.06	0.05	<0.04	<0.01	0.02	<0.01	<0.04	<0.03
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.17	<0.22	<0.21	<0.21	<0.21	<0.17	<0.21	<0.18	<0.18	<0.18	<0.22	<0.18
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**21**	**22**	**21**	**45**	**23**	**18**	**21**	**21**	**17**	**23**	**18**	**19**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**125**	**145**	**157**	**169**	**161**	**108**	**180**	**168**	**105**	**186**	**126**	**119**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19207	19208	19209	19210	19211	19212	19213	19214	19215	19216	19217	19218
FERA LIMs No.	S10-017328	S10-017329	S10-017330	S10-017331	S10-017332	S10-017333	S10-017334	S10-017335	S10-017336	S10-017337	S10-017338	S10-017339
FSA/Ventress Reference	234-121	234-122	234-123	234-124	234-125	234-126	234-127	234-128	234-129	234-130	234-131	234-132
Sample Details:	Barley couscous	Asparagus	Organic wheat noodles with brown rice	Medium chapati flour	Bran enriched wheat flakes &sultanas	Puffed wheat	Crunchy wheat and malted barley cereal	Pasta flour	Fine corn meal	Family stir fry	Mediterranean style roasting vegetables	Wholegrain oat and oat bran flakes
ug/kg whole weight												
acenaphthylene	<0.08	<0.05	<0.55	<0.08	<0.24	<0.21	<0.09	<0.08	<0.19	<0.08	<0.1	<0.12
acenaphthene	<0.14	<0.14	0.5	0.36	0.53	0.87	0.57	0.35	0.38	<0.14	0.73	<0.63
fluorene	<0.17	<0.15	1.97	0.35	0.83	1.32	0.31	0.35	0.21	<0.17	0.33	0.69
phenanthrene	0.34	0.44	7.71	1.43	3.27	4.98	0.68	1.46	0.64	0.27	0.56	3.32
anthracene	0.02	<0.01	0.61	0.12	0.05	1.06	<0.2	0.21	<0.01	<0.01	<0.07	0.31
fluoranthene	0.11	0.51	3.09	0.3	0.7	2.1	0.12	0.33	0.09	<0.12	0.17	0.26
benzo[c]fluorene	<0.01	<0.01	0.21	0.01	0.05	0.18	<0.07	0.02	<0.01	<0.01	<0.01	<0.01
pyrene	0.11i	0.38	1.96i	0.36	0.79i	1.47i	0.16i	0.3	0.09	<0.11	0.16i	0.53
benzo[ghi]fluoranthene	0.01	0.04	0.3	0.02	0.08	0.15	<0.02	0.01	<0.01	<0.01	0.02	<0.01
benz (a) anthracene	0.01	0.03	0.9	0.05	0.1	0.84	0.02	<0.07	<0.02	<0.01	0.02	<0.01
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.03	<0.15	<0.01	0.04	0.09	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	<0.01	<0.01	0.27	0.03	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
chrysene	<0.03	0.2i	1.11i	<0.06	0.18i	0.9i	0.01i	<0.09	<0.03	<0.02	0.04i	<0.03
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.03	0.18	0.84	<0.03	0.1	0.45	<0.02	0.03	<0.03	<0.01	0.03	<0.02
benzo[j]fluoranthene	<0.02	0.1	0.32	<0.02	0.08	0.31	<0.01	<0.02	<0.02	<0.01	0.02	<0.01
benzo[k]fluoranthene	<0.03	0.11	0.31	<0.03	0.04	0.26	<0.01	<0.03	<0.03	<0.01	0.01	<0.01
benzo[e]pyrene	<0.03	0.17	0.67	<0.03	0.09	0.33	<0.01	<0.03	<0.03	<0.01	0.02	<0.01
benzo[a]pyrene	<0.04	0.17	0.49	<0.04	0.07	0.41	<0.04	<0.04	<0.03	<0.03	<0.04	<0.03
indeno[1,2,3-cd]pyrene	<0.02	0.15	0.47	<0.03	0.07	0.26	<0.01	<0.03	<0.02	<0.02	<0.03	<0.01
dibenz[ah]anthracene	<0.02	<0.03	0.11	<0.02	<0.02	0.09	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01
benzo-[g,h,i]perylene	0.02	0.14	0.52	0.03	0.07	0.22	<0.01	0.02	0.02	<0.01	0.02	<0.01
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.17	<0.1	<0.1	<0.13	<0.1	<0.1	<0.1	<0.12	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**101**	**20**	**16**	**27**	**24**	**16**	**47**	**23**	**63**	**157**	**37**	**22**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**187**	**126**	**77**	**151**	**94**	**82**	**179**	**164**	**185**	**199**	**156**	**171**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19219	19220	19221	19222	19245	19246	19247	19248	19249	19250	19251	19252
FERA LIMs No.	S10-017340	S10-017341	S10-017342	S10-017343	S10-017465	S10-017466	S10-017467	S10-017468	S10-017469	S10-017470	S10-017471	S10-017472
FSA/Ventress Reference	234-133	234-134	234-135	234-136	234-137	234-138	234-139	234-140	234-141	234-142	234-143	234-144
Sample Details:	Self raising flour	Cocktail gherkins	Farmhouse soft white bread	Pearl barley	Hot smoked salmon fillet	Smokies	Hot smoked mackerel	Hot smoked salmon fillet	Peppered smoked mackerel fillets	Smokies	Undyed whole kippers	Smokies
ug/kg whole weight												
acenaphthylene	<0.09	<0.09	<0.13	<0.11	70.91i*	152.96i	2.04i	83.11i	2.32	17.88i	6.5i	18.08i
acenaphthene	0.29	<0.14	0.3	<0.18	10.56	9.59	1.71	10.79	3.61	3.18	3.48i	3.16
fluorene	0.25	<0.15	0.36	<0.18	31.94i	52.45i	2.76	36.96	3.54	9.23	8.83i	8.7
phenanthrene	0.47	1.16	0.91	<0.22	132.72i*	119.85i*	4.39	112.67i*	4.96	59.99i*	9.63	32.83i
anthracene	0.44	0.08	0.07	<0.02	46.99i	77.03i*	0.48	63.63i	0.79	12.85	1.97	8.42
fluoranthene	0.15	0.59	0.25	<0.1	66.8i*	65.51i*	0.8	64.09i	1.38	14.16	0.66	5.12
benzo[c]fluorene	<0.01	0.03	<0.01	<0.01	4.34	6.19	0.02	5.72	0.05	0.93	0.05	0.22
pyrene	0.16i	0.6	0.3i	<0.1	61.66i*	70.73i*	0.42i	61.24i*	0.96	10.4i	0.52i	4.44i
benzo[ghi]fluoranthene	0.02	0.07	0.03	<0.01	8.89	8.12	<0.05	7.19	0.12	1.02	0.03	0.3
benz (a) anthracene	0.04	0.04	0.09	<0.01	18.73	12.9	<0.03	13.57	0.22	2.53	0.1	0.86
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.04	<0.02	<0.01	<0.11	<0.1	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	0.02	<0.03	0.03	<0.01	7.6	27.31	0.03	16.58	0.19	1.09	0.03	0.31
chrysene	<0.06	<0.1	0.18i	<0.01	16.24i	11.17i	<0.05	15.54i	0.26i	2.55i	0.13i	0.99i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.1	0.07	<0.01	<0.09	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.05	0.02	0.11	<0.02	8.82	6.54	<0.04	5.51	0.13	1.05	0.05	0.39
benzo[j]fluoranthene	0.03	0.02	0.04	<0.01	6.38	4.99	<0.03	3.63	0.09	0.62	<0.03	0.21
benzo[k]fluoranthene	0.03	<0.01	0.04	<0.01	3.38	3.71	<0.02	2.54	<0.05	0.31	0.08	0.13
benzo[e]pyrene	0.05	0.02	0.17	<0.01	6.57	4.23	0.03	3.91	0.12	0.88	0.04	0.35
benzo[a]pyrene	0.05	<0.03	0.09	<0.03	10.13	9.01	<0.07	6.31	0.15	1.05	<0.07	0.42
indeno[1,2,3-cd]pyrene	<0.05	<0.02	0.07	<0.01	5.44	5.26	<0.06	3.03	0.08	0.5	<0.05	0.22
dibenz[ah]anthracene	<0.01	<0.01	<0.04	<0.01	1.03	0.87	<0.04	0.64	<0.04	0.11	<0.04	<0.06
benzo-[g,h,i]perylene	0.04	0.02	0.12	<0.01	4.45	4.68	0.03	2.74	0.08	0.48	<0.03	0.21
anthanthrene	<0.1	<0.1	<0.1	<0.1	3.21	2.08	<0.1	1	<0.1	0.34	<0.1	0.18
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.1	3.15i	0.8i	<0.25	<0.52	<0.25	<0.4	<0.25	<0.25
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	0.12	0.24	<0.1	0.12i	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	0.45	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	3.63i	1.47i	<0.16	0.55i	<0.16	<0.36	<0.16	<0.16
% Uncert Min	**22**	**33**	**21**	**201**	**16**	**16**	**27**	**16**	**18**	**16**	**21**	**16**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**136**	**147**	**110**	**201**	**58**	**61**	**158**	**77**	**102**	**63**	**134**	**79**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19253	19254	19255	19256	19257	19258	19259	19260	19261	19262	19263	19264
FERA LIMs No.	S10-017473	S10-017474	S10-017475	S10-017476	S10-017477	S10-017478	S10-017479	S10-017480	S10-017481	S10-017482	S10-017483	S10-017484
FSA/Ventress Reference	234-145	234-146	234-147	234-148	234-149	234-150	234-151	234-152	234-153	234-154	234-155	234-156
Sample Details:	Smoked mackerel fillets (plain)	Hot smoked trout	Hot smoked salmon	Flaky smoked salmon	Smoked Beltie beef sausage	Scottish smoked mackerel fillets	Roasted salmon fillets & sweet chilli	Sliced hot smoked duck	Smoked trout fillets	Sliced smoked chicken breast	Smoke roasted salmon tail pieces	Peppered smoked mackerel fillets
ug/kg whole weight												
acenaphthylene	1.27i	27.88i	55.47	3.36	1.48i	<0.18	4.28i	1.89i	1.9i	2.04i	1.09i	10.65i
acenaphthene	2.94	5.18	7.84	1.99	<0.28	<0.29	1.18i	0.51i	1.67i	0.38i	0.43i	1.37i
fluorene	1.99	11.46	27.08	8.31i	15.81i	1.04	4.16	1.8	4.11	1.57	3.02	4.18
phenanthrene	2.32	63.54i*	92.41i*	11.91	8.96	1.06	9.86	4.07	12.95	6.63	9.01	10.57
anthracene	0.47	15.63	43.03	3.61	2.87	<0.05	2.48	0.66	3.47	1.22	2.13	1.99
fluoranthene	0.53	21.94i	49.08i*	2.26	1.48	0.27	2.32	0.65	4.54i	1.43	2.43	1.31
benzo[c]fluorene	<0.02	2.28	4i	0.38	0.15	<0.01	0.16	0.03	0.51	0.06	0.22	0.05
pyrene	0.28	14.8i	47.6i*	1.47i	1.38	<0.25	1.62i	0.47	2.98i	0.97	1.85i	0.91
benzo[ghi]fluoranthene	0.03	2.06	6.9	0.12	0.05	<0.01	0.12	0.03	0.2	0.07	0.09	0.07
benz (a) anthracene	0.05	4.77	14.03	0.47	0.09	<0.01	0.25	0.05	0.39	0.12	0.18	0.09
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.02	<0.03	<0.02	<0.02	<0.01	<0.03	<0.01	<0.02	<0.01	<0.02	<0.01
cyclopenta[c,d]pyrene	0.03	5.14	14.49	0.03	0.04	<0.01	0.12	<0.02	0.12	0.03	0.06	0.06
chrysene	0.08i	6.08i	15.51i	0.63i	0.1i	<0.04	0.35i	0.08i	0.33i	0.13i	0.2i	<0.07
5-methylchrysene	<0.01	<0.04	0.12	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.04	2.45	6.65	0.3	0.03	<0.03	0.06	<0.03	0.05	0.05	<0.03	0.04
benzo[j]fluoranthene	0.01	1.39	4.24	0.13	0.02	<0.01	0.03	0.01	0.03	<0.02	0.01	0.03
benzo[k]fluoranthene	<0.01	0.93	2.94	0.09	<0.06	<0.06	<0.07	<0.06	<0.07	<0.05	<0.07	<0.07
benzo[e]pyrene	<0.03	1.92	5.12	0.31	0.03	<0.02	0.04	<0.02	0.03	0.03	<0.02	0.03
benzo[a]pyrene	<0.07	2.47	7.54	0.22	<0.06	<0.06	<0.07	<0.06	<0.07	<0.05	<0.07	<0.07
indeno[1,2,3-cd]pyrene	<0.04	1.3	3.69	0.16	<0.05	<0.02	<0.03	<0.02	<0.03	<0.03	<0.02	<0.03
dibenz[ah]anthracene	<0.03	0.27	0.8	<0.05	<0.03	<0.03	<0.03	<0.02	<0.03	<0.02	<0.03	<0.03
benzo-[g,h,i]perylene	<0.03	1.21	3.41	0.19	<0.08	<0.09	<0.09	<0.08	<0.09	<0.07	<0.09	<0.09
anthanthrene	<0.1	0.94	1.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.2	<0.83	<0.59	<0.28	<0.2	<0.21	<0.21	<0.18	<0.21	<0.17	<0.21	<0.21
dibenzo[a,i]pyrene	<0.1	<0.1	0.12i	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	0.88i	0.67i	<0.19	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**25**	**16**	**16**	**16**	**21**	**65**	**18**	**23**	**17**	**21**	**19**	**21**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**144**	**59**	**77**	**82**	**137**	**191**	**121**	**151**	**122**	**135**	**137**	**127**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19265	19269	19270	19271	19272	19273	19287	19288	19289	19290	19291	19292
FERA LIMs No.	S10-017485	S10-017527	S10-017528	S10-017529	S10-017530	S10-017531	S10-017658	S10-017659	S10-017660	S10-017661	S10-017662	S10-017663
FSA/Ventress Reference	234-157	234-158	234-159	234-160	234-161	234-162	234-163	234-164	234-165	234-166	234-167	234-168
Sample Details:	Hot smoked side of salmon	Smoked eel	Smoked chicken breast	Roast smoked trout	Smoked mussels	Roast smoked salmon	Sliced smoked duck	Sliced smoked chicken	Hot smoked trout fillet	Hot smoked salmon	Smoked duck breast	Fairlie kippers
ug/kg whole weight												
acenaphthylene	12.07i	1.65	1.28i	16.75i	103.64i	4.85i	1.55i	<0.9	31.59i	15.87i	5.28i	46.96i
acenaphthene	1.81	2.12	<0.37	1.22	11.71i	0.67	2.66i	1.21i	14.7	7.93	1.5	13.86
fluorene	6.77	1.19	1.2	7.06	36.05i	2.99	16.78i	9.29	15.29i	14.34i	5.06	17.95
phenanthrene	14.94	2.74	3.42	28.66i	69.12i*	8.99	27.35i	11.56	50.49i*	47.39i*	17.18	37.8i
anthracene	3.16	0.31	0.6	7.78	17.72	2.35	4.86	2.33	23.16	21.31	3.55	10.68
fluoranthene	1.35	0.9	0.57	9.29	9.41	2.96	6.69	2.57i	18.53	20.43	3.81	2.29
benzo[c]fluorene	0.04	<0.02	<0.04	0.41	0.34	0.18	0.59	0.26	0.53	0.98	0.14	0.06
pyrene	0.8	0.39i	0.47	7.49i	6.22i	2.66i	2.42i	1.27	13.05i	13.22i	3.77	2.05i
benzo[ghi]fluoranthene	0.03	0.03	0.04	0.8	0.67	0.23	0.18	0.06	1.03	1.38	0.31	0.14
benz (a) anthracene	0.04	0.03	0.07	0.94	0.96	0.34	0.46	0.21	2.25	3.3	0.55	0.22
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.01	<0.02	<0.03	<0.01	0.07	<0.03	<0.01	<0.02	<0.01	<0.01
cyclopenta[c,d]pyrene	0.02	0.01	<0.01	0.5	0.9	0.44	<0.01	<0.01	0.29	0.7	0.11	0.06
chrysene	0.06	0.05i	0.1i	0.93i	1.01i	0.26i	0.51i	0.31i	2.61i	4.42i	0.63i	0.3i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	0.02	<0.01	<0.01
benzo[b]fluoranthene	0.06	0.05	<0.04	0.32	0.55	0.14	0.31	0.13	0.74	1.37	0.18	0.14
benzo[j]fluoranthene	0.03	0.02	<0.01	0.27	0.46	0.1	0.12	0.06	0.29	0.5	0.11	0.08
benzo[k]fluoranthene	0.02	0.02	<0.01	0.14	0.24	<0.07	0.05	0.03	0.16	0.3	0.04	0.04
benzo[e]pyrene	<0.06	<0.06	<0.03	0.21	0.44	0.1	0.24	0.11	0.71	1.34	0.19	0.17
benzo[a]pyrene	<0.08	<0.06	<0.07	0.35	0.68	0.19	0.11	0.06	0.56	1.11	0.18	0.15
indeno[1,2,3-cd]pyrene	<0.06	<0.06	<0.03	0.17	0.45	0.1	<0.08	<0.04	0.19	0.34	<0.07	0.09
dibenz[ah]anthracene	<0.03	<0.02	<0.03	<0.04	<0.09	<0.03	<0.04	<0.03	<0.06	<0.11	<0.03	<0.03
benzo-[g,h,i]perylene	0.05	0.05	<0.01	0.18	0.49	<0.09	0.06	0.03	0.25	0.46	0.08	0.13
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.26	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.21	<0.17	<0.21	<0.21	<0.35	<0.21	<0.22	<0.2	<0.24	<0.29	<0.21	<0.21
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.25	0.5	<0.1	<0.1	<0.12	<0.16	0.23i	<0.1	<0.18
% Uncert Min	**21**	**26**	**29**	**16**	**16**	**16**	**16**	**18**	**16**	**16**	**17**	**21**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**124**	**136**	**168**	**82**	**73**	**106**	**105**	**113**	**82**	**73**	**92**	**87**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19323	19324	19350	19334	19335	19336	19337	19338	19339	19351	19352	19353
FERA LIMs No.	S10-017808	S10-017809	S10-030345	S10-017878	S10-017879	S10-017880	S10-017881	S10-017882	S10-017883	S10-030346	S10-030347	S10-030348
FSA/Ventress Reference	234-169	234-170	234-171	234-172	234-173	234-174	234-175	234-176	234-177	234-178	234-179	234-180
Sample Details:	Slow roasted salmon	Smoked salmon	Manuka smoked duck	chicken	Cluny smokies (pair)	Hot smoked mackerel	Roasted smoked salmon	Kippers	Smoked haddock	Smoked pheasant	Smoked duck breast	Smoked chicken breast
ug/kg whole weight												
acenaphthylene	38.36i	23.67i	0.35i	<0.63	3.07	37.8i	6.73i	34.94i	<1.98	4.26	1.75	3.23
acenaphthene	8.64	5.66	0.63	0.89i	1.47	14.18i	0.72	7.52i	1.88	1.8	5.35	8.77
fluorene	27.98i	7.94i	2.53	4.36i	4.34	30.54	3.89	27.16i	5.53i	10.9	9.3	16.21
phenanthrene	129.91i	9.78	1.24	2.62	11.09	98.67i	14.43	49.66i	16.17	41.87i	15.63	25.22i
anthracene	34.53	3.83	0.48	1.05	1.93	19.21	5.04	9.27	2.52	10.7	2.06	3.41
fluoranthene	41.39	0.71	0.34	0.64	0.9	8.18	3.79	2.38	1.48	11.34	2.52	3.01
benzo[c]fluorene	3.22	0.04	0.07	0.12	0.24	2.25	0.31	0.19	0.6	0.9	0.65	0.95
pyrene	29.83i	0.51	0.41i	0.7	0.71	5.44i	2.87i	2.06	1.05i	8.15i	5i	5.25i
benzo[ghi]fluoranthene	4.02	0.04	0.02	0.03	0.07	0.95	0.25	0.13	0.12	0.58	0.19	0.22
benz (a) anthracene	3.42	0.05	0.06	0.12	0.12	2.36	0.24	0.54	0.36	1.09	0.9	1.1
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.2	0.39	<0.02	<0.15	<0.18
cyclopenta[c,d]pyrene	19.75	0.22	<0.01	<0.01	0.14	2.19	0.36	0.03	0.04	0.33	0.16	0.24
chrysene	3.79	0.04i	0.07i	0.12i	0.15	2.96	0.22i	0.69i	0.57	1.1i	0.97i	1.3i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	1.17	0.03	<0.07	0.05	0.05	0.79	0.06	0.18	0.11	0.23	0.31	0.41
benzo[j]fluoranthene	0.91	<0.02	0.03	<0.03	0.03	0.51	0.04	0.07	0.03	0.1	0.12	0.16
benzo[k]fluoranthene	0.76	0.01	<0.02	<0.01	<0.04	0.61i	0.03	<0.05	<0.04	0.07	0.12	0.13
benzo[e]pyrene	0.89	0.03	<0.08	0.07	<0.04	0.67	0.04	0.19	0.11	0.16	0.79	1.12
benzo[a]pyrene	1.46	<0.07	<0.07	0.06	<0.07	1.04	<0.07	0.2	0.1	0.18	0.48	0.64
indeno[1,2,3-cd]pyrene	0.72	<0.03	<0.07	<0.04	<0.04	0.32	<0.04	<0.08	<0.03	<0.08	0.08	0.11
dibenz[ah]anthracene	0.11	<0.02	<0.03	<0.03	<0.02	<0.12	<0.02	<0.05	<0.02	<0.03	<0.07	<0.1
benzo-[g,h,i]perylene	0.84	0.02	0.05	0.03	<0.02	0.32	0.03	0.06	0.03	0.07	0.34	0.53
anthanthrene	0.72	<0.1	<0.1	<0.1	<0.1	0.23	<0.1	<0.1	<0.1	<0.1	<0.1	0.15
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.23	<0.18	<0.22	<0.2	<0.18	<0.18	<0.18	<0.11	<0.14	<0.1	<0.21	<0.26
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	0.29	<0.1	<0.1	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11	0.13i
% Uncert Min	**16**	**18**	**30**	**21**	**21**	**16**	**17**	**19**	**16**	**16**	**16**	**16**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**61**	**120**	**153**	**131**	**118**	**80**	**101**	**106**	**100**	**90**	**82**	**75**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19354	19370	19445	19371	19355	19356	19357	19358	19359	19360	19361	19362
FERA LIMs No.	S10-030349	S10-030410	S10-031627	S10-030411	S10-030350	S10-030351	S10-030352	S10-030353	S10-030354	S10-030355	S10-030356	S10-030357
FSA/Ventress Reference	234-181	234-182	234-183	234-184	234-185	234-186	234-187	234-188	234-189	234-190	234-191	234-192
Sample Details:	Kiln roasted smoked salmon	Kiln roasted smoked salmon	Kiln roasted trout fillets	Smoked haddock	Hot smoked Scottish salmon	Whole smoked Rainbow trout	Smoked duck breast	Oak smoked whole chicken	Smoked whole trout	Smoked mackerel	Smoked Scottish venison	Smoked chicken legs
ug/kg whole weight												
acenaphthylene	2.41	4.11i	3.39i	1.48i	1.64	0.92	3.69	1.48	3.89	1.37	3.2i	4.19i
acenaphthene	1.76	1.35i	1.37	0.33	2.29	1.31	1.8	8.16	1.46	0.4	0.59i	0.44
fluorene	4.28	3.5	2.04	1.17	9.9i	6.81	4.47	12.32i	2.76	1.6	2.41	2.72
phenanthrene	6.46	9.13	3.41	3.24	32.29i	22.74i	10.36	36.74i	5.13	3.04	6.7	7.56
anthracene	1.69	1.77	1.53	0.57	3.77	2.11	3.59	3.14	2.92	0.48	1.38	1.59
fluoranthene	0.57	1.25	<0.38	<0.22	2.89i	2.73i	1.05	5.89i	1.25	0.54	1.67	1.11
benzo[c]fluorene	0.07	0.04	<0.01	<0.01	0.42	0.48	0.06	0.74	0.1	0.01	0.09	0.03
pyrene	0.77	0.75i	0.3i	<0.21	1.74i	1.61i	0.62	2.73i	0.83	0.39i	1.44	0.84
benzo[ghi]fluoranthene	0.03	0.06	<0.03	<0.01	0.06	0.09	0.02	0.16	0.09	0.03	0.18	0.05
benz (a) anthracene	0.09	0.08	<0.02	0.03	0.14	0.18	0.04	0.29	0.13	0.03	0.23	0.04
benzo[b]naphtho[2,1-d]thiophene	<0.03	<0.02	<0.01	<0.01	<0.01	<0.03	<0.01	<0.03	<0.01	<0.01	<0.01	<0.01
cyclopenta[c,d]pyrene	<0.01	<0.03	<0.01	0.02	<0.01	<0.01	<0.01	0.02	0.06	<0.01	0.19	0.08
chrysene	0.11i	<0.07	0.09i	<0.05	0.33i	0.31i	0.06i	0.5i	0.16i	<0.04	0.1i	<0.06
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.05	<0.04	<0.04	<0.04	0.04	0.09	<0.03	0.16	0.05	<0.03	0.09	<0.04
benzo[j]fluoranthene	0.02	<0.01	<0.01	<0.02	0.01	0.03	<0.01	0.04	0.03	<0.01	0.07	0.02
benzo[k]fluoranthene	0.03	<0.02	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.02	<0.01	0.04	<0.01
benzo[e]pyrene	0.08	0.02	<0.02	<0.02	0.04	0.09	<0.02	0.14	0.04	<0.02	0.07	0.02
benzo[a]pyrene	<0.08	<0.09	<0.07	<0.06	<0.08	<0.08	<0.08	<0.06	<0.07	<0.07	0.11	<0.07
indeno[1,2,3-cd]pyrene	<0.03	<0.04	<0.03	<0.04	<0.03	<0.03	<0.03	<0.03	<0.04	<0.03	<0.08	<0.04
dibenz[ah]anthracene	<0.03	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.02	<0.03	<0.03	<0.03	<0.03
benzo-[g,h,i]perylene	0.04	<0.03	<0.01	0.02	<0.01	0.03	<0.01	0.03	0.03	<0.01	0.08	0.03
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.21	<0.1	<0.21	<0.21	<0.21	<0.21	<0.21	<0.17	<0.2	<0.21	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**21**	**23**	**22**	**25**	**20**	**19**	**21**	**16**	**21**	**24**	**18**	**22**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**115**	**148**	**173**	**173**	**125**	**108**	**140**	**101**	**107**	**156**	**107**	**133**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19363	19364	19365	19406	19407	19446	19505	19372	19373	19340	19341	19342
FERA LIMs No.	S10-030358	S10-030359	S10-030360	S10-030968	S10-030969	S10-031628	S10-032238	S10-030412	S10-030413	S10-017884	S10-017885	S10-017886
FSA/Ventress Reference	234-193	234-194	234-195	234-196	234-197	234-198	234-199	234-200	234-201	234-202	234-203	234-204
Sample Details:	Sliced smoked duck breast	Hot roasted smoked Cajun salmon	Smoked whole trout	Smoked trout	Smoked duck breast	Smoked chicken breast	Hot flaky smoked salmon	Oak roasted duck breast	Oak roasted chicken breast	Organic gingerbread biscotti	Org. raspberry & apple oaty bars	Natural wheatgerm
ug/kg whole weight												
acenaphthylene	11.28i	4.82	7.02i	7.76i	1.01i	4.25	9.83	1.84i	0.7i	<0.11	<0.23	<0.22
acenaphthene	1.02	1.32	2.92	2.09	<0.39	0.67	1.96i	<0.46	<0.31	0.21	0.93	1.15
fluorene	5	3.38	4.16	4.09	1.43	1.81	7.05i	1.88	1.47	0.25	0.75	1.02
phenanthrene	14.81	4.45	5.23	9.79	5.89	6.41	24.34	7.03	6.49	0.3	1.64	2.55
anthracene	3.4	0.66	1.05	2.15	0.76	1.21	7.29	1.47	1.33	<0.2	<0.2	0.1
fluoranthene	3.91	0.77	0.94	1.7	1.29	0.9	4.31	2.07	2.13	<0.1	0.21	0.6
benzo[c]fluorene	0.21	0.02	0.02	0.09	0.1	0.05	0.23	0.19	0.2	<0.07	<0.07	<0.02
pyrene	3.07i	0.47i	0.49i	1.11	0.97	0.69	2.83i	1.64	1.56i	<0.11	0.19i	0.52
benzo[ghi]fluoranthene	0.31	0.05	0.04	0.07	0.06	0.06	0.21	0.16	0.16	0.01	0.01	0.02
benz (a) anthracene	0.48	0.04	0.06	0.13	0.1	0.08	0.42	0.32	0.33	0.01	0.01	0.03
benzo[b]naphtho[2,1-d]thiophene	<0.02	<0.03	<0.02	<0.01	<0.03	<0.01	<0.03	<0.02	<0.01	<0.01	<0.02	<0.02
cyclopenta[c,d]pyrene	0.43	<0.04	0.06	0.06	0.02	0.05	0.09	0.04	0.03	<0.01	<0.01	<0.01
chrysene	0.43i	<0.04	<0.06	0.1i	0.09i	0.12i	0.32i	0.35i	0.15i	0.03i	0.06i	0.06i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	0.14	0.07	<0.04	0.05	0.04	0.03	0.1	0.06	0.06	0.03	<0.02	0.03
benzo[j]fluoranthene	0.11	0.03	<0.02	0.02	0.02	<0.02	0.06	0.03	0.03	0.01	<0.01	0.01
benzo[k]fluoranthene	0.07	<0.04	<0.03	<0.02	<0.03	<0.01	0.04	<0.03	0.02	0.01	<0.01	0.02
benzo[e]pyrene	0.11	0.07	0.03	0.04	0.05	0.02	0.07	0.04	0.04	0.03	0.01	0.03
benzo[a]pyrene	0.16	<0.09	<0.09	<0.09	<0.09	<0.06	0.09	<0.09	<0.06	<0.04	<0.04	<0.03
indeno[1,2,3-cd]pyrene	<0.09	<0.08	<0.04	<0.05	<0.04	<0.03	<0.05	<0.04	<0.03	<0.04	<0.01	<0.03
dibenz[ah]anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.02	<0.03	<0.04	<0.03	<0.01	<0.01	<0.01
benzo-[g,h,i]perylene	0.07	0.06	<0.03	0.06	0.18	0.02	0.03	<0.03	<0.02	0.05	0.02	0.02
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.29	<0.29	<0.1	<0.21	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.16	<0.16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**16**	**26**	**26**	**22**	**25**	**23**	**16**	**17**	**17**	**43**	**30**	**27**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**97**	**134**	**142**	**124**	**134**	**124**	**102**	**128**	**123**	**175**	**167**	**138**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19343	19344	19345	19346	19347	19366	19367	19368	19369	19374	19375	19376
FERA LIMs No.	S10-017887	S10-017888	S10-017889	S10-017890	S10-017891	S10-030361	S10-030362	S10-030363	S10-030364	S10-030414	S10-030415	S10-030416
FSA/Ventress Reference	234-205	234-206	234-207	234-208	234-209	234-210	234-211	234-212	234-213	234-214	234-215	234-216
Sample Details:	Millet grain	Organic Fairtrade quinoa	Rye flakes	Organic self raising flour	Quality plain flour	Okra	Organic chickpeas	Coarse boulgur wheat	Chip shop batter mix	Courgettes	Crispy salad	Peat smoked sea trout, horseradish & dill
ug/kg whole weight												
acenaphthylene	<0.14	<0.27	<0.17	<0.06	<0.06	<0.08	<0.06	<0.09	<0.11	<0.05	<0.08	33.31i
acenaphthene	0.23	0.27	<0.18	<0.11	0.92	<0.14	<0.11	<0.18	<0.18	<0.14	<0.14	6.12i
fluorene	0.3	0.79	0.34	0.4	0.32	<0.17	<0.14	<0.17	<0.18	<0.15	<0.17	52.5i
phenanthrene	0.63	2.26	0.9	1.4	0.5	0.52	<0.19	0.27	0.45	<0.2	0.37	35.71i
anthracene	0.07	0.11	0.05	0.12	0.02	<0.03	<0.02	0.02	0.02	<0.01	<0.01	18.86
fluoranthene	<0.1	0.29	0.28	0.3	0.07	0.31	<0.11	0.11	0.17	<0.09	0.49	11.08
benzo[c]fluorene	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.85
pyrene	<0.1	0.26i	0.21i	0.23i	<0.11	0.37	<0.11	0.26i	0.17i	<0.09	0.43	8.94i
benzo[ghi]fluoranthene	<0.01	0.02	0.02	0.01	<0.01	0.06	<0.01	0.03	0.02	<0.01	0.03	0.71
benz (a) anthracene	<0.01	0.01	0.03	0.06	<0.01	0.01	<0.01	0.02	0.03	<0.01	0.24	1.51
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.04	<0.01	<0.01	<0.02	<0.18
cyclopenta[c,d]pyrene	<0.01	<0.01	0.04	<0.01	<0.01	0.01	<0.01	0.02	0.02	<0.01	<0.01	1.9
chrysene	<0.01	0.03i	0.05i	0.07i	<0.02	<0.03	<0.01	<0.04	0.04i	<0.02	0.1i	1.63i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.02	<0.02	0.04	0.06	<0.02	<0.02	<0.02	0.03	0.03	<0.01	0.1	0.2
benzo[j]fluoranthene	<0.01	<0.01	0.02	0.03	<0.01	<0.01	<0.01	0.01	0.02	<0.01	0.03	0.15
benzo[k]fluoranthene	<0.01	<0.01	0.01	0.03	<0.01	<0.01	<0.01	0.02	0.01	<0.01	0.03	0.09
benzo[e]pyrene	<0.01	0.01	0.03	0.05	<0.01	0.02	<0.01	0.04	0.03	<0.01	<0.04	0.17
benzo[a]pyrene	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.04	<0.03	<0.03	<0.03	<0.04	0.2
indeno[1,2,3-cd]pyrene	<0.01	<0.01	<0.04	0.04	<0.02	<0.02	<0.02	<0.02	<0.03	<0.01	0.05	<0.09
dibenz[ah]anthracene	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.04
benzo-[g,h,i]perylene	<0.01	0.01	0.03	0.04	<0.01	<0.01	<0.01	0.04	0.03	<0.01	0.04	0.07
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.12	<0.1	<0.1	<0.1	<0.1	<0.12	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Uncert Min	**61**	**29**	**43**	**32**	**32**	**37**	**201**	**52**	**52**	**201**	**18**	**16**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**187**	**164**	**144**	**132**	**185**	**178**	**201**	**156**	**159**	**201**	**145**	**98**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19377	19408	19409	19410	19411	19412	19413	19447	19448	19449	19450
FERA LIMs No.	S10-030417	S10-030970	S10-030971	S10-030972	S10-030973	S10-030974	S10-030975	S10-031629	S10-031630	S10-031631	S10-031632
FSA/Ventress Reference	234-217	234-218	234-219	234-220	234-221	234-222	234-223	234-224	234-225	234-226	234-227
Sample Details:	Peat smoked roasted salmon	Smoked back bacon	Hot smoked trout	Smoked ham shank	Smoked guinea fowl (oven ready)	Smoked pheasant (oven ready)	Carpaccio - smoked Aberdeen Angus beef	Roast smoked Isle of Bute lamb	Roast smoked merguez sausage	Roast smoked Loch Fad trout	Roast smoked Scotch beef
ug/kg whole weight											
acenaphthylene	10.55i	2.22i	4.31	9.04i	5.2i	2.24i	1.79i	14.47i	40.68i	59.15i	3.87i
acenaphthene	3.02	<0.26	1.09	2.35i	6.13i	2.72	2.36	2.53	7.45	4.18	0.95
fluorene	22.05i	0.85	3.11	5.68	13.48	5.68i	6.06	9.14	17.39	18.2	3.9
phenanthrene	19.11i	1.03	4.78	6.18	15.45	8.64	9.11	25.74i	62.4i*	66.78i*	4.44
anthracene	9.75	0.17	1.2	1.34	3.05	1.79	2.05	6.06	15.36	22.76	0.93
fluoranthene	8.78	<0.19	1.08	1.49	3.32	1.58	2.42	5.62	18.95	30.04	0.49
benzo[c]fluorene	1.82	<0.01	0.08	0.11	0.11	0.05	0.09	0.23	0.73	1.58	<0.05
pyrene	7.67i	0.2i	1.04	1.38i	2.18i	1.06	1.57i	4.59i	13.55i	21.85i	0.52i
benzo[ghi]fluoranthene	0.74	0.01	0.1	0.16	0.08	0.04	0.04	0.44	1.56	2.31	0.04
benz (a) anthracene	1.92	0.01	0.16	0.21	0.28	0.13	0.21	0.64	2.14	3.1	0.07
benzo[b]naphtho[2,1-d]thiophene	<0.19	<0.01	<0.06	<0.01	<0.06	<0.03	<0.04	<0.01	<0.06	<0.01	<0.01
cyclopenta[c,d]pyrene	0.45	0.02	0.07	0.23	0.02	0.03	0.02	0.32	1.75	3.31	0.03
chrysene	2.34i	<0.03	0.21i	0.37i	0.49	0.15i	0.24	0.8i	2.53i	3.31i	0.12i
5-methylchrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
benzo[b]fluoranthene	0.34	<0.02	0.06	0.13	0.1	0.06	0.08	0.26	0.83	0.82	<0.04
benzo[j]fluoranthene	0.23	<0.01	0.04	0.08	0.04	0.03	0.04	0.21	0.68	0.75	0.02
benzo[k]fluoranthene	0.16	<0.01	0.04	0.08	0.05	<0.03	0.04	0.09	0.4	0.41	<0.01
benzo[e]pyrene	0.26	<0.01	0.05	0.1	0.09	0.05	0.07	0.23	0.65	0.52	<0.02
benzo[a]pyrene	0.3	<0.06	<0.07	0.13	<0.07	<0.07	<0.07	0.3	0.9	1.08	<0.07
indeno[1,2,3-cd]pyrene	<0.1	<0.03	<0.04	0.07	<0.03	<0.03	<0.04	0.15	0.41	0.44	<0.03
dibenz[ah]anthracene	<0.04	<0.03	<0.04	<0.03	<0.04	<0.04	<0.04	<0.04	<0.08	<0.09	<0.03
benzo-[g,h,i]perylene	0.09	0.01	0.03	0.07	0.05	0.03	0.03	0.16	0.44	0.43	0.02
anthanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.29	<0.19	<0.23	<0.2	<0.24	<0.23	<0.24	<0.21	<0.31	<0.31	<0.2
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
coronene	<0.16	<0.11	<0.13	<0.11	<0.13	<0.13	<0.13	<0.14	<0.39	<0.45	<0.1
% Uncert Min	**16**	**41**	**20**	**18**	**17**	**21**	**18**	**17**	**16**	**16**	**25**
% Uncert Max	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**	**201**
Average Uncert	**100**	**181**	**107**	**87**	**108**	**121**	**113**	**80**	**72**	**74**	**149**

i - indicative value

Table 2 (cont'd): Concentrations of PAHs in food

OPHA Sample No.	19506	19507	19508
FERA LIMs No.	S10-032239	S10-032240	S10-032241
FSA/Ventress Reference	234-228	234-229	234-230
Sample Details:	Roast smoked Rainbow trout	Roast smoked salmon	Smoked duck breast
ug/kg whole weight			
acenaphthylene	4.36	17.02	17.9
acenaphthene	1.11	3.24	2.6
fluorene	2.54	8.78i	10.74i
phenanthrene	3.95	12.85	31.71i
anthracene	1.14	5.87	7.13
fluoranthene	0.92	1.97	8.91i
benzo[c]fluorene	<0.07	0.09	0.68
pyrene	0.66i	1.34	6.47i
benzo[ghi]fluoranthene	0.06	0.12	0.62
benz (a) anthracene	0.08	0.17	0.83
benzo[b]naphtho[2,1-d]thiophene	<0.01	<0.01	<0.02
cyclopenta[c,d]pyrene	0.06	0.09	0.74
chrysene	0.04i	0.07i	0.9i
5-methylchrysene	<0.01	<0.01	<0.01
benzo[b]fluoranthene	<0.04	0.07	0.21
benzo[j]fluoranthene	0.02	0.04	0.14
benzo[k]fluoranthene	0.01	0.02	0.1
benzo[e]pyrene	0.03	0.05	0.14
benzo[a]pyrene	<0.09	<0.07	0.2
indeno[1,2,3-cd]pyrene	<0.04	<0.06	<0.12
dibenz[ah]anthracene	<0.03	<0.03	<0.03
benzo-[g,h,i]perylene	0.02	0.04	0.1
anthanthrene	<0.1	<0.1	<0.1
dibenzo[a,l]pyrene	<0.1	<0.1	<0.1
dibenzo[a,e]pyrene	<0.1	<0.21	<0.1
dibenzo[a,i]pyrene	<0.1	<0.1	<0.1
dibenzo[a,h]pyrene	<0.1	<0.1	<0.1
coronene	<0.1	<0.1	<0.1
% Uncert Min	**25**	**21**	**16**
% Uncert Max	**201**	**201**	**201**
Average Uncert	**132**	**108**	**89**

i - indicative value

Table 3: Summary of PAH concentrations in foods

Food Type		Benzo[a]pyrene	Sum, EU-proposed 4 compounds	Sum, EFSA-15 compounds	Sum, 28 PAH compounds
		Upper-bound concentration in µg/kg			
Smoked fish and shellfish	Median	0.07	0.41	1.37	33
	Mean	0.68	4.02	8.15	90
	Range	0.03 - 10.1	0.11 - 54	0.6 - 94	3.3 - 658
Smoked meat/products	Median	0.07	0.28	1.0	19.4
	Mean	0.12	0.69	1.73	31
	Range	0.03 - 0.9	0.12 - 6.4	0.66 - 11.5	2.9 - 190
Smoked poultry and game	Median	0.07	0.61	1.42	24
	Mean	0.12	0.92	2.0	35
	Range	0.05 - 0.64	0.21 - 3.5	0.85 - 6.2	5.6 - 95
Vegetables and vegetable products	Median	0.03	0.08	0.58	1.79
	Mean	0.04	0.14	0.67	2.39
	Range	0.03 - 0.17	0.07 - 0.6	0.54 - 1.5	1.5 - 7.1
Cereal products, bread and flour	Median	0.04	0.18	0.75	3.69
	Mean	0.06	0.32	1.0	5.01
	Range	0.03 - 0.49	0.07 - 3.3	0.54 - 7.7	1.35 - 50

Table 4: Results of reference material analysis – PAHs in coconut oil

Certified Reference Material CRM458 PAHs in Coconut Oil				Batch Reference			
Compound	**Certified Value(ug/kg)**	**Uncertainty (ug/kg)**	**Range (ug/kg)**	**px8148**	**px8150**	**px8167**	**px8182**
Pyrene	9.40	1.5	7.9 - 10.9	9.52	8.9	9.0	9.53
Chrysene	4.90	0.4	4.5 - 5.3	4.56	4.6	4.7	4.49
Benzo[k]fluoranthene	1.87	0.18	1.69 - 2.05	1.75	1.72	1.70	1.84
Benzo[a]pyrene	0.93	0.09	0.84 - 1.02	0.95	0.88	0.90	0.96
Indeno[1,2,3-cd]pyrene	1.00	0.07	0.93 - 1.07	0.96	0.94	0.95	0.95
Benzo[ghi]perylene	0.97	0.07	0.90 - 1.04	0.97	0.94	0.95	0.97

Table 4 (cont'd): Results of reference material analysis – Cocoa butter

T0638 Cocoa Butter Reference Material				Batch RM									
Compound	Assigned Value (ug/kg) From Consensus Data	Target Standard deviation σp ug/kg	Acceptable Range ug/kg	**px8210**	**px8215**	**px8237**	**px8241**	**px8317**	**px8319**	**px8376**	**px8379**	**px8400**	**px8422**
benz (a) anthracene	3.32	0.73	2.59-4.05	3.46	3.02	3.45	3.21	3.32	3.3	3.27	3.29	3.26	3.22
benzo[b]fluoranthene	2.36	0.518	1.84-2.88	2.1	2.11	2.13	2.25	2.23	2.25	2.27	2.25	2.21	2.23
benzo[a]pyrene	1.97	0.432	1.54-2.40	1.88	1.89	1.9	1.92	1.93	1.89	1.9	1.93	1.89	1.98
indeno[1,2,3-cd]pyrene	1.19	0.261	0.93-1.45	1.15	1.09	1.15	1.13	1.17	1.14	1.14	1.14	1.14	1.14
benzo-[g,h,i]perylene	1.48	0.325	1.16-1.81	1.45	1.37	1.45	1.43	1.48	1.45	1.44	1.43	1.44	1.49

Table 4 (cont'd): Results of reference material analysis – Smoked fish paste

T0642 Smoked Fish Pate Reference Material				Batch RM						
Compound	Assigned Value (ug/kg) From Consensus Data	Target Standard deviation σp ug/kg	Acceptable Range ug/kg	**px8510**	**px8525**	**px8558**	**px8570**	**px8578**	**px8602**	**px8618**
benz (a) anthracene	6.35	1.4	4.95-7.75	6.74	6.47	6.8	6.95	5.94	6.56	7.13
benzo[b]fluoranthene	1.31	0.75	0.56-2.06	1.23	1.22	1.29	1.39	1.26	1.28	1.38
benzo[a]pyrene	3.41	0.56	2.85-3.97	3.16	3.16	3.34	3.59	3.1	3.23	3.64
indeno[1,2,3-cd]pyrene	2.53	0.96	1.57-3.49	2.49	2.48	2.63	2.76	2.45	2.56	2.81
benzo-[g,h,i]perylene	4.37	0.29	4.08-4.66	4.33	4.31	4.48	4.61	4.4	4.52	4.44